**Attachment A:**

# Enrollment Plan

| Grade Level | Number of Students | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year 1 2017 | | Year 2 2018 | | Year 3 2019 | | Year 4 2020 | | Year 5 2021 | | Capacity 20__ | |
| Brick & Mortar/ Blended vs. Virtual | B&M/ Blended | Virtual | B&M/ Blended | Virtual | B&M/ Blended | Virtual | B&M/ Blended | Virtual | B&M/ Blended | Virtual | B&M/ Blended | Virtual |
| K | 25 | | 25 | | 25 | | 25 | | 25 | | 25 | |
| 1 | 25 | | 25 | | 25 | | 25 | | 25 | | 25 | |
| 2 | 25 | | 25 | | 25 | | 25 | | 25 | | 25 | |
| 3 | 25 | | 25 | | 25 | | 25 | | 25 | | 25 | |
| 4 | 25 | | 25 | | 25 | | 25 | | 25 | | 25 | |
| 5 | 25 | | 25 | | 25 | | 25 | | 25 | | 25 | |
| 6 | 52 | | 52 | | 52 | | 52 | | 52 | | 52 | |
| 7 | | | 52 | | 52 | | 52 | | 52 | | 52 | |
| 8 | | | | | | | 52 | | 52 | | 52 | |
| 9 | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | |
| **Subtotals** | | | | | | | | | | | | |
| **Totals** | 202 | | 254 | | 306 | | 306 | | 306 | | 306 | |

**Attachment B**

| Site | Proximity | Level | Enrollment |
|---|---|---|---|
| | | | |
| Hale Kula Elementary | 2.75 mi. | K-5 | 722 |
| Helemano Elementary | 0.9 mi. | K-5 | 601 |
| Iliahi Elementary | 1.15 mi. | K-5 | 428 |
| Ka`ala Elementary | 1.45 mi. | K-5 | 429 |
| Solomon Elementary | 2.2 mi. | K-5 | 948 |
| Wahiawa Elementary | 0.2 mi. | K-5 | 490 |
| Wheeler Elementary | 1.85 mi. | K-5 | 770 |
| Total | | | 4388 |
| **Site** | **Proximity** | **Level** | **Enrollment** |
| | | | |
| Wahiawa Middle | 0.6 mi. | 6-8 | 838 |
| Wheeler Middle | 1.8 mi. | 6-8 | 842 |
| Total | | | 1680 |

Source: Trend Report: Educational and Fiscal Accountability-School Report for School Year 2014-2015 (updated 12/07/2015) and the School Status and Improvement Report published on 11/24/2015

| Site | Level | Enrollment |
|---|---|---|
| Abundant Life | Pre K – 6 | 68 |
| Ho`ala School | K-12 | 95 |
| Leeward Adventist | K-8 | 32 |
| Marantha | Pre K -12 | 14 |
| Trinity Lutheran | Pre K – 8 | 213 |
| Total | | 422 |

Source: privateschoolreview.com

**Attachment C**

Kamalani Academy expects to draw its student population primarily from the Central Complex Area in the Honolulu District. The public schools from which Kamalani may draw its population include:

**Public Schools, Grades K-5**

Kaala Elementary

Kipapa Elementary

Hale Kula Elementary

Haleiwa Elementary

Helemano Elementary

Iliahi Elementary

Mililani Ike Elementary

Mililani Mauka Elementary

Mililani Uka Elementary

Mililani Waena Elementary

Solomon Elementary

Waialua Elementary

Wahiawa Elementary

Wheeler Elementary

**Public Schools, Grades 6-8**

Mililani Middle

Wahiawa Middle

Waialua Intermediate

Wheeler Middle

**Private School, Grades K-12**

Hoʻala

Island Pacific Academy

**NATIONAL CORE ARTS STANDARDS**

# Dance

The National Core Arts Standards in Dance are designed to enable students to achieve dance literacy. To be literate in the arts, students need specific knowledge and skills in a particular arts discipline to a degree that allows for fluency and deep understanding. In dance, this means discovering the expressive elements of dance; knowing the terminology that is used to comprehend dance; having a clear sense of embodying dance; and being able to reflect, critique, and connect personal experience to dance.

Four artistic processes organize the standards across the arts disciplines: Creating, Performing, Responding, and Connecting. Each artistic process includes a set of overarching anchor standards. The anchor standards are consistent among the arts disciplines represented in the National Core Arts Standards and demonstrate the breadth of the work. They are held constant for student learning over time.

Each anchor standard in dance is supported by a process component, an enduring understanding, and an essential question. These additional features will benefit educational leaders and teachers as they consider curricular models and structure lessons aligned to the dance standards. Performance standards describe more specifically what students should know and be able to do in dance and are expressed as measurable outcomes across the grades pre-kindergarten to eighth grade and into high school at three levels of proficiency. The performance standards are the substantive portion of the work and represent the depth of study in dance.

Of significance is that the four artistic processes are addressed linearly in written standards, but are envisioned to occur simultaneously in the actual practice of dance. The dancer imagines, envisions, or improvises movements (creating), executes the movements (performing), reflects on them (responding), and connects the experience to all other contexts of meaning or knowledge (connecting). As a result, one lesson can address many standards at the same time. In a single class, students can learn by solving movement problems, showing their ideas through movement, thinking critically about them, and relating them to other ideas, experiences, contexts, and meanings.

The National Core Arts Standards in Dance are rooted in a creative approach to teaching and learning. They describe expectations for learning in dance regardless of culture, style or genre and impart the breadth and depth of the dance experience through the art-making processes. The goal of the standards is to inspire dance educators and their students to explore dance and prepare them for a lifetime of engagement with the art form.

# Dance/Connecting

**#DA:Cn10.1**

**Process Component:** Synthesize

**Anchor Standard:** Synthesize and relate knowledge and personal experiences to make art.

**Grade K**
**DA:Cn10.1.K**

a. Recognize and name an emotion that is experienced when watching, improvising, or performing dance and relate it to a personal experience.

b. Observe a work of visual art. Describe and then express through movement something of interest about the artwork, and ask questions for discussion concerning the artwork.

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**Grade 1**
**DA:Cn10.1.1**

a. Find an experience expressed or portrayed in a dance that relates to a familiar experience. Identify the movements that communicate this experience.

b. Observe illustrations from a story. Discuss observations and identify ideas for dance movement and demonstrate the big ideas of the story.

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**Grade 2**
**DA:Cn10.1.2**

a. Describe, create, and/or perform a dance that expresses personal meaning and explain how certain movements express this personal meaning.

b. Respond to a dance work using an inquiry-based set of questions (for example, See, Think, Wonder). Create movement using ideas from responses and explain how certain movements express a specific idea.

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**Grade 3**
**DA:Cn10.1.3**

a. Compare the relationships expressed in a dance to relationships with others. Explain how they are the same or different.

b. Ask and research a question about a key aspect of a dance that communicates a perspective about an issue or event. Explore the key aspect through movement. Share movements and describe how the movements help to remember or discover new qualities in these key aspects. Communicate the new learning in oral, written, or movement form.

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**Grade 4**
**DA:Cn10.1.4**

a. Relate the main idea or content in a dance to other experiences. Explain how the main idea of a dance is similar to or different from one's own experiences, relationships, ideas or perspectives.

b. Develop and research a question relating to a topic of study in school using multiple sources of references. Select key aspects about the topic and choreograph movements that

communicate the information. Discuss what was learned from creating the dance and describe how the topic might be communicated using another form of expression.

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**Grade 5**
**DA:Cn10.1.5**

a. Compare two dances with contrasting themes. Discuss feelings and ideas evoked by each. Describe how the themes and movements relate to points of view and experiences.

b. Choose a topic, concept, or content from another discipline of study and research how other art forms have expressed the topic. Create a dance study that expresses the idea. Explain how the dance study expressed the idea and discuss how this learning process is similar to, or different from, other learning situations.

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**Grade 6**
**DA:Cn10.1.6**

a. Observe the movement characteristics or qualities observed in a specific dance genre. Describe differences and similarities about what was observed to one's attitudes and movement preferences.

b. Conduct research using a variety of resources to find information about a social issue of great interest. Use the information to create a dance study that expresses a specific point of view on the topic. Discuss whether the experience of creating and sharing the dance reinforces personal views or offers new knowledge and perspectives.

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**Grade 7**
**DA:Cn10.1.7**

a. Compare and contrast the movement characteristics or qualities found in a variety of dance genres. Discuss how the movement characteristics or qualities differ from one's own movement characteristics or qualities and how different perspectives are communicated.

b. Research the historical development of a dance genre or style. Use knowledge gained from the research to create a dance study that evokes the essence of the style or genre. Share the study with peers as part of a lecture demonstration that tells the story of the historical journey of the chosen genre or style. Document the process of research and application.

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**Grade 8**
**DA:Cn10.1.8**

a. Relate connections found between different dances and discuss the relevance of the connections to the development of one's personal perspectives.

b. Investigate two contrasting topics using a variety of research methods. Identify and organize ideas to create representative movement phrases. Create a dance study exploring the contrasting ideas.

# Dance/Connecting

**#DA:Cn11.1**
**Process Component:** Relate

**Anchor Standard:** Relate artistic ideas and works with societal, cultural and historical context to deepen understanding.

**Grade K**
**DA:Cn11.1.K**

a. Describe or demonstrate the movements in a dance that was watched or performed.

**Grade 1**
**DA:Cn11.1.1**

a. Watch and/or perform a dance from a different culture and discuss or demonstrate the types of movement danced.

**Grade 2**
**DA:Cn11.1.2**

a. Observe a dance and relate the movement to the people or environment in which the dance was created and performed.

**Grade 3**
**DA:Cn11.1.3**

a. Find a relationship between movement in a dance from a culture, society, or community and the culture from which the dance is derived. Explain what the movements communicate about key aspects of the culture, society, or community.

**Grade 4**
**DA:Cn11.1.4**

a. Select and describe movements in a specific genre or style and explain how the movements relate to the culture, society, historical period, or community from which the dance originated.

**Grade 5**
**DA:Cn11.1.5**

a. Describe how the movement characteristics and qualities of a dance in a specific genre or style communicate the ideas and perspectives of the culture, historical period, or community from which the genre or style originated.

**Grade 6**
**DA:Cn11.1.6**

a. Interpret and show how the movement and qualities of a dance communicate its cultural, historical, and/or community purpose or meaning.

**Grade 7**
**DA:Cn11.1.7**

a. Compare, contrast, and discuss dances performed by people in various localities or communities. Formulate possible reasons why similarities and differences developed in relation to the ideas and perspectives important to each social group.

**Grade 8**
**DA:Cn11.1.8**

a. Analyze and discuss, how dances from a variety of cultures, societies, historical periods, or communities reveal the ideas and perspectives of the people.

# Dance/Creating

**#DA:Cr1.1**
**Process Component:** Explore
**Anchor Standard:** Generate and conceptualize artistic ideas and work.

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**Grade K**
**DA:Cr1.1.K**

a. Respond in movement to a variety of stimuli (for example, music/sound, text, objects, images, symbols, observed dance).

b. Explore different ways to do basic locomotor and non-locomotor movements by changing at least one of the elements of dance.

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**Grade 1**
**DA:Cr1.1.1**

a. Explore movement inspired by a variety of stimuli (for example, music/sound, text, objects, images, symbols, observed dance, experiences) and identify the source

b. Explore a variety of locomotor and non-locomotor movements by experimenting with and changing the elements of dance.

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**Grade 2**
**DA:Cr1.1.2**

a. Explore movement inspired by a variety of stimuli (for example, music/sound, text, objects, images, symbols, observed dance, experiences) and suggest additional sources for movement ideas.

b.Combine a variety of movements while manipulating the elements of dance

**Grade 3**
**DA:Cr1.1.3**

a. Experiment with a variety of self-identified stimuli (for example, music/sound, text, objects, images, notation, observed dance, experiences) for movement.

b.Explore a given movement problem. Select and demonstrate a solution.

**Grade 4**
**DA:Cr1.1.4**

a. Identify ideas for choreography generated from a variety of stimuli (for example, music/sound, text, objects, images, notation, observed dance, experiences).

b. Develop a movement problem and manipulate the elements of dance as tools to find a solution.

**Grade 5**
**DA:Cr1.1.5**

a. Build content for choreography using several stimuli (for example, music/sound, text, objects, images, notation, observed dance, experiences, literary forms, natural phenomena, current news, social events).

b. Construct and solve multiple movement problems to develop choreographic content.

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**Grade 6**
**DA:Cr1.1.6**

a. Relate similar or contrasting ideas to develop choreography using a variety of stimuli (for example, music, observed dance, literary forms, notation, natural phenomena, personal experience/recall, current news or social events).

b. Explore various movement vocabularies to transfer ideas into choreography

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**Grade 7**
**DA:Cr1.1.7**

a. Compare a variety of stimuli (for example, music, observed dance, literary forms, notation, natural phenomena, personal experience/recall, current news or social events) and make selections to expand movement vocabulary and artistic expression.

b. Explore various movement vocabularies to express an artistic intent in choreography. Explain and discuss the choices made using genre-specific dance terminology.

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**Grade 8**
**DA:Cr1.1.8**

a. Implement movement from a variety of stimuli (for example, music, observed dance, literary forms, notation, natural phenomena, personal experience/recall, current news or social events) to develop dance content for an original dance study or dance.

b. Identify and select personal preferences to create an original dance study or dance. Use genre-specific dance terminology to articulate and justify choices made in movement development to communicate intent.

# Dance/Creating

**#DA:Cr2.1**
**Process Component:** Plan
**Anchor Standard:** Organize and develop artistic ideas and work.

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**Grade K**
**DA:Cr2.1.K**

a. Improvise dance that has a beginning, middle, and end.

b. Express an idea, feeling, or image, through improvised movement moving alone or with a partner

**Grade 1**
**DA:Cr2.1.1**

a. Improvise a series of movements that have a beginning, middle, and end, and describe movement choices.

b. Choose movements that express an idea or emotion, or follow a musical phrase.

**Grade 2**
**DA:Cr2.1.2**

a. Improvise a dance phrase with a beginning, a middle that has a main idea, and a clear end.

b. Choose movements that express a main idea or emotion, or follow a musical phrase. Explain reasons for movement choices.

**Grade 3**
**DA:Cr2.1.3**

a. Identify and experiment with choreographic devices to create simple movement patterns and dance structures (for example, AB, ABA, theme and development).

b. Develop a dance phrase that expresses and communicates an idea or feeling. Discuss the effect of the movement choices.

**Grade 4**
**DA:Cr2.1.4**

a. Manipulate or modify choreographic devices to expand movement possibilities and create a variety of movement patterns and structures. Discuss movement choices.

b. Develop a dance study that expresses and communicates a main idea. Discuss the reasons and effectiveness of the movement choices.

**Grade 5**
**DA:Cr2.1.5**

a. Manipulate or modify a variety of choreographic devices to expand choreographic possibilities and develop a main idea. Explain reasons for movement choices.

b. Develop a dance study by selecting a specific movement vocabulary to communicate a main idea. Discuss how the dance communicates non-verbally.

**Grade 6**
**DA:Cr2.1.6**

a. Explore choreographic devices and dance structures to develop a dance study that supports an artistic intent. Explain the goal or purpose of the dance.

b. Determine artistic criteria to choreograph a dance study that communicates personal or cultural meaning. Based on the criteria, evaluate why some movements are more or less effective than others.

**Grade 7**
**DA:Cr2.1.7**

a. Use a variety of choreographic devices and dance structures to develop a dance study with a clear artistic intent. Articulate reasons for movement and structural choices.

b. Determine artistic criteria to choreograph a dance study that communicates personal or cultural meaning. Articulate how the artistic criteria serve to communicate the meaning of the dance.

**Grade 8**
**DA:Cr2.1.8**

a. Collaborate to select and apply a variety of choreographic devices and dance structures to choreograph an original dance study or dance with a clear artistic intent. Articulate the group process for making movement and structural choices.

b. Define and apply artistic criteria to choreograph a dance that communicates personal or cultural meaning. Discuss how the criteria clarify or intensify the meaning of the dance.

# Dance/Creating

**#DA:Cr3.1**
**Process Component:** Revise
**Anchor Standard:** Refine and complete artistic work.

**Grade K**
**DA:Cr3.1.K**

a. Apply suggestions for changing movement through guided improvisational experiences. b. Depict a dance movement by drawing a picture or using a symbol.

**Grade 1**
**DA:Cr3.1.1**

a. Explore suggestions to change movement from guided improvisation and/or short remembered sequences

b. Depict several different types of movements of a dance by drawing a picture or using a symbol (for example, jump, turn, slide, bend, reach).

**Grade 2**
**DA:Cr3.1.2**

a. Explore suggestions and make choices to change movement from guided improvisation and/or short remembered sequences.

b. Depict the levels of movements in a variety of dance movements by drawing a picture or using symbols (for example, high, middle, low).

**Grade 3**
**DA:Cr3.1.3**

a. Revise movement choices in response to feedback to improve a short dance study. Describe the differences the changes made in the movements.

**b.** Depict directions or spatial pathways in a dance phrase by drawing a picture map or using a symbol

**Grade 4**

**DA:Cr3.1.4**

a. Revise movement based on peer feedback and self-reflection to improve communication of artistic intent in a short dance study. Explain choices made in the process.

b. Depict the relationships between two or more dancers in a dance phrase by drawing a picture or using symbols (for example, next to, above, below, behind, in front .)

**Grade 5**
**DA:Cr3.1.5**

a. Explore through movement the feedback from others to expand choreographic possibilities for a short dance study that communicates artistic intent. Explain the movement choices and refinements.

b. Record changes in a dance sequence through writing, symbols, or a form of media technology.

**Grade 6**
**DA:Cr3.1.6**

a. Revise dance compositions using collaboratively developed artistic criteria. Explain reasons for revisions and how choices made relate to artistic intent.

b. Explore or invent a system to record a dance sequence through writing, symbols, or a form of media technology.

**Grade 7**
**DA:Cr3.1.7**

a. Evaluate possible revisions of dance compositions and, if necessary, consider revisions of artistic criteria based on self-reflection and feedback of others. Explain reasons for choices and how they clarify artistic intent.

b. Investigate a recognized system to document a dance sequence by using words, symbols, or media technologies.

**Grade 8**
**DA:Cr3.1.8**

a. Revise choreography collaboratively or independently based on artistic criteria, self-reflection, and the feedback of others. Articulate the reasons for choices and revisions and explain how they clarify and enhance the artistic intent.

b. Experiment with aspects of a recognized system to document a section of a dance by using words, symbols, or media technologies.

# Dance/Performing

**#DA:Pr4.1**

**Process Component:** Express

**Anchor Standard:** Select, analyze, and interpret artistic work for presentation.

**Grade K**

**DA:Pr4.1.K**

a. Make still and moving body shapes that show lines (for example, straight, bent, and curved), changes levels, and vary in size (large/small). Join with others to make a circle formation and work with others to change its dimensions.

b. Demonstrate tempo contrasts with movements that match to tempo of sound stimuli.

c. Identify and apply different characteristics to movements (for example, slow, smooth, or wavy).

**Grade 1**

**DA:Pr4.1.1**

a. Demonstrate locomotor and non-locomotor movements that change body shapes, levels, and facings. Move in straight, curved, and zig-zagged pathways. Find and return to place in space. Move with others to form straight lines and circles.

b. Relate quick, moderate and slow movements to duration in time. Recognize steady beat and move to varying tempi of steady beat.

c. Demonstrate movement characteristics along with movement vocabulary (for example, use adverbs and adjectives that apply to movement such as a bouncy leap, a floppy fall, a jolly jump, and joyful spin).

**Grade 2**

**DA:Pr4.1.2**

a. Demonstrate clear directionality and intent when performing locomotor and non-locomotor movements that change body shapes, facings, and pathways in space. Identify symmetrical and asymmetrical body shapes and examine relationships between body parts. Differentiate between circling and turning as two separate ways of continuous directional change.

b. Identify the length of time a move or phrase takes (for example, whether it is long or short). Identify and move on the downbeat in duple and triple meter. Correlate metric phrasing with movement phrasing.

c. Select and apply appropriate characteristics to movements (for example, selecting specific adverbs and adjectives and apply them to movements). Demonstrate kinesthetic awareness while dancing the movement characteristics.

**Grade 3**

**DA:Pr4.1.3**

a. Judge spaces as distance traveled and use space three-dimensionally. Demonstrate shapes with positive and negative space. Perform movement sequences in and through space with intentionality and focus.

Fulfill specified duration of time with improvised locomotor and non-locomotor movements. Differentiate between "in time" and "out of time" to music. Perform movements that are the

same or of a different time orientation to accompaniment.

b. Use metric and kinesthetic phrasing

c. Fulfill specified duration of time with improvised locomotor and non-locomotor movements. Differentiate between "in time" and "out of time" to music. Perform movements that are the same or of a different time orientation to accompaniment. Use metric and kinesthetic phrasing.

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**Grade 4**
**DA:Pr4.1.4**

a. Make static and dynamic shapes with positive and negative space. Perform elevated shapes ( jump shapes) with soft landings and movement sequences alone and with others, establishing relationships with other dancers through focus of eyes.

b. Accompany other dancers using a variety of percussive instruments and sounds. Respond in movement to even and uneven rhythms. Recognize and respond to tempo changes as they occur in dance and music.

c. Analyze movements and phrases for use of energy and dynamic changes and use adverbs and adjectives to describe them. Based on the analysis, refine the phrases by incorporating a range of movement characteristics.

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**Grade 5**
**DA:Pr4.1.5**

a. Integrate static and dynamic shapes and floor and air pathways into dance sequences. Establish relationships with other dancers through focus of eyes and other body parts. Convert inward focus to outward focus for projecting out to far space.

b. Dance to a variety of rhythms generated from internal and external sources. Perform movement phrases that show the ability to respond to changes in time.

c. Contrast bound and free-flowing movements. Motivate movement from both central initiation (torso) and peripheral initiation (distal) and analyze the relationship between initiation and energy.

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**Grade 6**
**DA:Pr4.1.6**

a. Refine partner and ensemble skills in the ability to judge distance and spatial design. Establish diverse pathways, levels, and patterns in space. Maintain focus with partner or group in near and far space.

b. Use combinations of sudden and sustained timing as it relates to both the time and the dynamics of a phrase or dance work. Accurately use accented and unaccented beats in 3/4 and 4/4 meter.

c. Use the internal body force created by varying tensions within one's musculature for movement initiation and dynamic expression. Distinguish between bound and free-flowing movements and appropriately apply them to technique exercises and dance phrases.

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**Grade 7**
**DA:Pr4.1.7**

a. Expand movement vocabulary of floor and air pattern designs. Incorporate and modify

body designs from different dance genres and styles for the purpose of expanding movement vocabulary to include differently designed shapes and movements for interest and contrast.

b. Vary durational approach in dance phrasing by using timing accents and variations within a phrase to add interest kinesthetically, rhythmically, and visually.

c. Compare and contrast movement characteristics from a variety of dance genres or styles. Discuss specific characteristics and use adverbs and adjectives to describe them. Determine what dancers must do to perform them clearly.

**Grade 8**
**DA:Pr4.1.8**

a. Sculpt the body in space and design body shapes in relation to other dancers, objects, and environment. Use focus of eyes during complex floor and air patterns or direct and indirect pathways.

b. Analyze and select metric, kinetic, and breath phrasing and apply appropriately to dance phrases. Perform dance phrases of different lengths that use various timings within the same section. Use different tempi in different body parts at the same time.

c. Direct energy and dynamics in such a way that movement is textured. Incorporate energy and dynamics to technique exercises and dance performance. Use energy and dynamics to enhance and project movements.

# Dance/Performing

**#DA:Pr5.1**
**Process Component:** Embody
**Anchor Standard:** Develop and refine artistic technique and work for presentation.

**Grade K**
**DA:Pr5.1.K**

a. Demonstrate same-side and cross-body locomotor and non-locomotor movements, body patterning movements, and body shapes.

b. Move safely in general space and start and stop on cue during activities, group formations, and creative explorations while maintaining personal space.

c. Move body parts in relation to other body parts and repeat and recall movements upon request.

**Grade 1**
**DA:Pr5.1.1**

a. Demonstrate a range of locomotor and non-locomotor movements, body patterning, body shapes, and directionality.

b. Move safely in general space through a range of activities and group formations while maintaining personal space.

c. Modify movements and spatial arrangements upon request

**Grade 2**
**DA:Pr5.1.2**

a. Demonstrate a range of locomotor and non-locomotor movements, body patterning,

and dance sequences that require moving through space using a variety of pathways.

b. Move safely in a variety of spatial relationships and formations with other dancers, sharing and maintaining personal space.

c. Repeat movements, with an awareness of self and others in space. Self-adjust and modify movements or placement upon request.

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**Grade 3**
**DA:Pr5.1.3**

a. Replicate body shapes, movement characteristics, and movement patterns in a dance sequence with awareness of body alignment and core support.

b. Adjust body-use to coordinate with a partner or other dancers to safely change levels, directions, and pathway designs.

c. Recall movement sequences with a partner or in group dance activities. Apply constructive feedback from teacher and self-check to improve dance skills.

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**Grade 4**
**DA:Pr5.1.4**

a. Demonstrate fundamental dance skills (for example, alignment, coordination, balance, core support, kinesthetic awareness) and movement qualities when replicating and recalling patterns and sequences of locomotor and non-locomotor movements.

b. Execute techniques that extend movement range, build strength, and develop endurance. Explain the relationship between execution of technique, safe body-use, and healthful nutrition.

c. Coordinate phrases and timing with other dancers by cueing off each other and responding to stimuli cues (for example, music, text, or lighting). Reflect on feedback from others to inform personal dance performance goals

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**Grade 5**
**DA:Pr5.1.5**

a. Recall and execute a series of dance phrases using fundamental dance skills (for example, alignment, coordination, balance, core support, kinesthetic awareness, clarity of movement).

b. Demonstrate safe body-use practices during technical exercises and movement combinations. Discuss how these practices, along with healthful eating habits, promote strength, flexibility, endurance and injury prevention.

c. Collaborate with peer ensemble members to repeat sequences, synchronize actions, and refine spatial relationships to improve performance quality. Apply feedback from others to establish personal performance goals.

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**Grade 6**
**DA:Pr5.1.6**

a. Embody technical dance skills (for example, alignment, coordination, balance, core support, kinesthetic awareness, clarity of movement) to accurately execute changes of direction, levels, facings, pathways, elevations and landings, extensions of limbs, and movement transitions.

b. Apply basic anatomical knowledge, proprioceptive feedback, spatial awareness, and nutrition to promote safe and healthful strategies when warming up and dancing.

c. Collaborate as an ensemble to refine dances by identifying what works and does not work in executing complex patterns, sequences, and formations. Solve movement problems to dances by testing options and finding good results. Document self- improvements over time

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**Grade 7**

**DA:Pr5.1.7**

a. Apply body-use strategies to accommodate physical maturational development to technical dance skills (for example, functional alignment, coordination, balance, core support, kinesthetic awareness, clarity of movement, weight shifts, flexibility/range of motion).

b. Utilize healthful practices and sound nutrition in dance activities and everyday life. Discuss benefits of practices and how choices enhance performance.

c. Collaborate with peers to practice and refine dances. Develop group performance expectations through observation and analyses (for example, view live or recorded professional dancers and collaboratively develop group performance expectations based on information gained from observations)

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**Grade 8**

**DA:Pr5.1.8**

a. Embody technical dance skills (for example, functional alignment, coordination, balance, core support, clarity of movement, weight shifts, flexibility/range of motion) to replicate, recall, and execute spatial designs and musical or rhythmical dance phrases.

b. Evaluate personal healthful practices in dance activities and everyday life including nutrition and injury prevention. Discuss choices made, the effects experienced, and methods for improvement.

c. Collaborate with peers to discover strategies for achieving performance accuracy, clarity, and expressiveness. Articulate personal performance goals and practice to reach goals. Document personal improvement over time (for example, journaling, portfolio, or timeline).

# Dance/Performing

**#DA:Pr6.1**

**Process Component:** Present

**Anchor Standard:** Convey meaning through the presentation of artistic work.

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**Grade K**

**DA:Pr6.1.K**

a. Dance for and with others in a designated space.

b. Select a prop to use as part of a dance.

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**Grade 1**
**DA:Pr6.1.1**

a. Dance for others in a space where audience and performers occupy different areas.

b. Explore the use of simple props to enhance performance.

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**Grade 2**
**DA:Pr6.1.2**

a. Dance for and with others in a space where audience and performers occupy different areas.

b. Use limited production elements (for example, hand props, simple scenery, or media projections).

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**Grade 3**
**DA:Pr6.1.3**

a. Identify the main areas of a performance space using production terminology (for example, stage right, stage left, center stage, upstage, and downstage).

b. Explore simple production elements (costumes, props, music, scenery, lighting, or media) for a dance performed for an audience in a designated specific performance space.

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**Grade 4**
**DA:Pr6.1.4**

a. Consider how to establish a formal performance space from an informal setting (for example, gymnasium or grassy area).

b. Identify, explore, and experiment with a variety of production elements to heighten the artistic intent and audience experience.

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**Grade 5**
**DA:Pr6.1.5**

a. Demonstrate the ability to adapt dance to alternative performance venues by modifying spacing and movements to the performance space.

b. Identify, explore, and select production elements that heighten and intensify the artistic intent of a dance and are adaptable for various performance spaces.

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**Grade 6**
**DA:Pr6.1.6**

a. Recognize needs and adapt movements to performance area. Use performance etiquette and performance practices during class, rehearsal and performance. Post-performance, accept notes from choreographer and make corrections as needed and apply to future performances.

b. Compare and contrast a variety of possible production elements that would intensify and heighten the artistic intent of the work. Select choices and explain reasons for the decisions made using production terminology.

**Grade 7**
**DA:Pr6.1.7**

a. Recommend changes to and adapt movements to performance area. Use performance etiquette and performance practices during class, rehearsal and performance. Maintain journal documenting these efforts. Post-performance, accept notes from choreographer and apply corrections to future performances.

b. Explore possibilities of producing dance in a variety of venues or for different audiences and, using production terminology, explain how the production elements would be handled in different situations.

**Grade 8**
**DA:Pr6.1.8**

a. Demonstrate leadership qualities (for example commitment, dependability, responsibility, and cooperation) when preparing for performances. Use performance etiquette and performance practices during class, rehearsal and performance. Document efforts and create a plan for ongoing improvements. Post-performance, accept notes from choreographer and apply corrections to future performances.

b. Collaborate to design and execute production elements that would intensify and heighten the artistic intent of a dance performed on a stage, in a different venue, or for different audiences. Explain reasons for choices using production terminology.

# Dance/Responding

**#DA:Re7.1**
**Process Component:** Analyze
**Anchor Standard:** Perceive and analyze artistic work.

**Grade K**
**DA:Re7.1.K**

a. Find a movement that repeats in a dance.

b. Demonstrate or describe observed or performed dance movement

**Grade 1**
**DA:Re7.1.1**

a. Find a movement that repeats in a dance to make a pattern.

b. Demonstrate and describe observed or performed dance movements from a specific genre

**Grade 2**
**DA:Re7.1.2**

a. Find movements in a dance that develop a pattern.

b. Demonstrate and describe movements in dances from different genres or cultures.

**Grade 3**
**DA:Re7.1.3**

a. Find a movement pattern that creates a movement phrase in a dance work

b. Demonstrate and explain how one dance genre is different from another, or how one cultural movement practice is different from another.

**Grade 4**
**DA:Re7.1.4**

a. Find patterns of movement in dance works that create a style or theme.

b. Demonstrate and explain how dance styles differ within a genre or within a cultural movement practice.

**Grade 5**
**DA:Re7.1.5**

a. Find meaning or artistic intent from the patterns of movement in a dance work.

b. Describe, using basic dance terminology, the qualities and characteristics of style used in a dance from one's own cultural movement practice. Compare them to the qualities and characteristics of style found in a different dance genre, style, or cultural movement practice, also using basic dance terminology.

**Grade 6**
**DA:Re7.1.6**

a. Describe or demonstrate recurring patterns of movement and their relationships in dance.

b. Explain how the elements of dance are used in a variety of dance genres, styles, or cultural movement practices. Use genre-specific dance terminology.

**Grade 7**
**DA:Re7.1.7**

a. Compare, contrast, and discuss patterns of movement and their relationships in dance.

b. Compare and contrast how the elements of dance are used in a variety of genres, styles, or cultural movement practices. Use genre-specific dance terminology.

**Grade 8**
**DA:Re7.1.8**

a. Describe, demonstrate and discuss patterns of movement and their relationships in dance in context of artistic intent.

b. Explain how the elements of dance are used in a variety of genres, styles, or cultural movement practices to communicate intent. Use genre-specific dance terminology.

# Dance/Responding

**#DA:Re8.1**
**Process Component:** Interpret
**Anchor Standard:** Interpret intent and meaning in artistic work.

**Grade K**
**DA:Re8.1.K**

a. Observe movement and describe it using simple dance terminology.

**Grade 1**
**DA:Re8.1.1**

a. Select movements from a dance that suggest ideas and explain how the movement captures the idea using simple dance terminology.

**Grade 2**
**DA:Re8.1.2**

a. Use context cues from movement to identify meaning and intent in a dance using simple dance terminology.

**Grade 3**
**DA:Re8.1.3**

a. Select specific context cues from movement. Explain how they relate to the main idea of the dance using basic dance terminology.

**Grade 4**
**DA:Re8.1.4**

a. Relate movements, ideas, and context to decipher meaning in a dance using basic dance terminology.

**Grade 5**
**DA:Re8.1.5**

a. Interpret meaning in a dance based on its movements. Explain how the movements communicate the main idea of the dance using basic dance terminology.

**Grade 6**
**DA:Re8.1.6**

a. Explain how the artistic expression of a dance is achieved through the elements of dance, use of body, dance technique, dance structure, and context. Explain how these communicate the intent of the dance using genre specific dance terminology.

**Grade 7**
**DA:Re8.1.7**

a. Compare the meaning of different dances. Explain how the artistic expression of each dance is achieved through the elements of dance, use of body, dance technique, and context. Use genre specific dance terminology.

**Grade 8**
**DA:Re8.1.8**

a. Select a dance and explain how artistic expression is achieved through relationships among

the elements of dance, use of body, dance technique and context. Cite evidence in the dance to support your interpretation using genre specific dance terminology.

# Dance/Responding

**#DA:Re9.1**
**Process Component:** Critique
**Anchor Standard:** Apply criteria to evaluate artistic work.

**Grade K**
**DA:Re9.1.K**

a. Find a movement that was noticed in a dance. Demonstrate the movement that was noticed and explain why it attracted attention.

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**Grade 1**
**DA:Re9.1.1**

a. Identify and demonstrate several movements in a dance that attracted attention. Describe the characteristics that make the movements interesting and talk about why they were chosen.

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**Grade 2**
**DA:Re9.1.2**

a. Observe or demonstrate dances from a genre or culture. Discuss movements and other aspects of the dances that make the dances work well, and explain why they work. Use simple dance terminology.

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**Grade 3**
**DA:Re9.1.3**

a. Select dance movements from specific genres, styles, or cultures. Identify characteristic movements from these dances and describe in basic dance terminology ways in which they are alike and different.

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**Grade 4**
**DA:Re9.1.4**

a. Discuss and demonstrate the characteristics that make a dance artistic and apply those characteristics to dances observed or performed in a specific genre, style, or cultural movement practice. Use basic dance terminology.

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**Grade 5**
**DA:Re9.1.5**

a. Define the characteristics of dance that make a dance artistic and meaningful. Relate them to the elements of dance in genres, styles, or cultural movement practices. Use basic dance terminology to describe characteristics that make a dance artistic and meaningful.

**Grade 6**
**DA:Re9.1.6**

a. Discuss the characteristics and artistic intent of a dance from a genre, style, or cultural movement practice and develop artistic criteria to critique the dance using genre-specific dance terminology.

**Grade 7**
**DA:Re9.1.7**

a. Compare artistic intent, content and context from dances to examine the characteristics of genre, style, or cultural movement practice. Based on the comparison, refine artistic criteria using genre-specific dance terminology.

**Grade 8**
**DA:Re9.1.8**

a. Use artistic criteria to determine what makes an effective performance. Consider content, context, genre, style, or cultural movement practice to comprehend artistic expression. Use genre-specific dance terminology.

# Media Arts

Media arts standards are intended to address the diverse forms and categories of media arts, including: imaging, sound, moving image, virtual and interactive. Media arts standards do not dictate what or how to teach, but define age-appropriate outcomes for students, towards the achievement of Enduring Understandings and Artistic Literacy. They are therefore quite generalized, not specifying particular technologies or techniques, and containing very few examples of terminology and activities. The standards allow for a great diversity of instruction, methodology and circumstance. They are adaptive to the wide range of conditions that exist currently for the form across the country. State and district standards may offer greater specificity as they are developed, and Model Cornerstone Assessments will provide more specific examples of projects, lessons and activities.

The standards are normally presented in a linear, sequential format, which does provide a representation of the creative production process. But the standards are designed for access in a non-linear manner as well, whereby one can address any particular process, process component, or standard on an as needed basis. For example, lessons and units can easily begin within Connecting by considering a given context, move next into Responding to analyze particular examples of media arts, and then into Creating to begin production. Also, the standards represent portions of holistic creative process, and may be addressed in rapid-fire succession, as one is creating work. Therefore, a brainstorming session that is contained within Creating is also constantly accessing Responding and even Connecting. One well-structured class, lesson or unit can address many, if not all standards. This interactive web site offers versatility in accessing the standards for flexibility in lesson planning, instruction, and assessment. For example, process components may be selected as a primary organizational tool for some teachers.

Enduring Understandings and Essential Questions are written at one grade-level, and are to be adapted by the instructor to their specific grade-level. It is advisable to view standards at lower and higher grade levels in order to view a progression of proficiency. Nevertheless, it is assumed that students may have little or no formal media arts instruction at a particular grade level. Based on best practice, collaboration is assumed throughout the media arts standards.

# Media Arts/Connecting

**#MA:Cn10.1**
**Process Component:** Synthesize

**Anchor Standard:** Synthesize and relate knowledge and personal experiences to make art.

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**Grade K**
**MA:Cn10.1.K**

a. Use personal experiences and choices in making media artworks.
b. Share memorable experiences of media artworks.

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**Grade 1**
**MA:Cn10.1.1**

a. Use personal experiences, interests, and models in creating media artworks. b.
b. Share meaningful experiences of media artworks.

**Grade 2**
**MA:Cn10.1.2**

a. Use personal experiences, interests, information, and models in creating media artworks.
b. Discuss experiences of media artworks, describing their meaning and purpose.

**Grade 3**
**MA:Cn10.1.3**

a. Use personal and external resources, such as interests, information, and models, to create media artworks.

b. Identify and show how media artworks form meanings, situations, and/or culture, such as popular media.

**Grade 4**
**MA:Cn10.1.4**

a. Examine and use personal and external resources, such as interests, research, and cultural understanding, to create media artworks.

b. Examine and show how media artworks form meanings, situations, and/or cultural experiences, such as online spaces.

**Grade 5**
**MA:Cn10.1.5**

a. Access and use internal and external resources to create media artworks, such as interests, knowledge, and experiences.

b. Examine and show how media artworks form meanings, situations, and cultural experiences, such as news and cultural events.

**Grade 6**
**MA:Cn10.1.6**

a. Access, evaluate, and use internal and external resources to create media artworks, such as knowledge, experiences, interests, and research.

b. Explain and show how media artworks form new meanings, situations, and cultural experiences, such as historical events.

**Grade 7**
**MA:Cn10.1.7**

a. Access, evaluate and use internal and external resources to inform the creation of media artworks, such as experiences, interests, research, and exemplary works.

b. Explain and show how media artworks form new meanings and knowledge, situations, and cultural experiences, such as learning, and new information

**Grade 8**
**MA:Cn10.1.8**

a. Access, evaluate, and use internal and external resources to inform the creation of media artworks, such as cultural and societal knowledge, research, and exemplary works.

b. Explain and demonstrate how media artworks expand meaning and knowledge, and create cultural experiences, such as local and global events.

## Media Arts/Connecting

**#MA:Cn11.1**
**Process Component:** Relate

**Anchor Standard:** Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.

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**Grade K**
**MA:Cn11.1.K**

a. With guidance, share ideas in relating media artworks and everyday life, such as daily activities.

b. With guidance, interact safely and appropriately with media arts tools and environments.

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**Grade 1**
**MA:Cn11.1.1**

a. Discuss and describe media artworks in everyday life, such as popular media, and connections with family and friends.

b. Interact appropriately with media arts tools and environments, considering safety, rules, and fairness.

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**Grade 2**
**MA:Cn11.1.2**

a. Discuss how media artworks and ideas relate to everyday and cultural life, such as media messages and media environments.

b. Interact appropriately with media arts tools and environments, considering safety, rules, and fairness.

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**Grade 3**
**MA:Cn11.1.3**

a. Identify how media artworks and ideas relate to everyday and cultural life and can influence values and online behavior.

b. Examine and interact appropriately with media arts tools and environments, considering safety, rules, and fairness.

**Grade 4**
**MA:Cn11.1.4**

a. Explain verbally and/or in media artworks, how media artworks and ideas relate to everyday and cultural life, such as fantasy and reality, and technology use.

b. Examine and interact appropriately with media arts tools and environments, considering ethics, rules, and fairness.

**Grade 5**
**MA:Cn11.1.5**

a. Research and show how media artworks and ideas relate to personal, social and community life, such as exploring commercial and information purposes, history, and ethics.

b. Examine, discuss and interact appropriately with media arts tools and environments,

**Grade 6**
**MA:Cn11.1.6**

a. Research and show how media artworks and ideas relate to personal life, and social, community, and cultural situations, such as personal identity, history, and entertainment.

b. Analyze and interact appropriately with media arts tools and environments, considering fair use and copyright, ethics, and media literacy.

**Grade 7**
**MA:Cn11.1.7**

a. Research and demonstrate how media artworks and ideas relate to various situations, purposes and values, such as community, vocations, and social media.

b. Analyze and responsibly interact with media arts tools and environments, considering copyright, ethics, media literacy, and social media.

**Grade 8**
**MA:Cn11.1.8**

a. Demonstrate and explain how media artworks and ideas relate to various contexts, purposes, and values, such as democracy, environment, and connecting people and places

b. Analyze and responsibly interact with media arts tools, environments, legal, and technological contexts, considering ethics, media literacy, social media, and virtual worlds

# Media Arts/Creating

**#MA:Cr1.1.1**
**Process Component:** Conceive
**Anchor Standard:** Generate and conceptualize artistic ideas and work.

**Grade K**
**MA:Cr1.1.1.K**

a. Discover and share ideas for media artworks using play and experimentation.

**Grade 1**
**MA:Cr1.1.1.1**

a. Express and share ideas for media artworks through sketching and modeling.

**Grade 2**
**MA:Cr1.1.1.2**

a. Discover multiple ideas for media artworks through brainstorming and improvising.

**Grade 3**
**MA:Cr1.1.1.3**

a. Develop multiple ideas for media artworks using a variety of tools, methods and/or materials.

**Grade 4**
**MA:Cr1.1.1.4**

a. Conceive of original artistic goals for media artworks using a variety of creative methods, such as brainstorming and modeling.

**Grade 5**
**MA:Cr1.1.1.5**

a. Envision original ideas and innovations for media artworks using personal experiences and/or the work of others.

**Grade 6**
**MA:Cr1.1.1.6**

a. Formulate variations of goals and solutions for media artworks by practicing chosen creative processes, such as sketching, improvising and brainstorming.

**Grade 7**
**MA:Cr1.1.1.7**

a. Produce a variety of ideas and solutions for media artworks
b. Produce a variety of ideas and solutions for media artworks through application of chosen inventive processes, such as concept modeling and prototyping.

**Grade 8**
**MA:Cr1.1.1.8**

a. Generate ideas, goals, and solutions for original media artworks through application of focused creative processes, such as divergent thinking and experimenting.

# Media Arts/Creating

**#MA:Cr2.1.1**
**Process Component:** Develop
**Anchor Standard:** Organize and develop artistic ideas and work.

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**Grade K**
**MA:Cr2.1.1.K**

a. With guidance, use ideas to form plans or models for media arts productions.

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**Grade 1**
**MA:Cr2.1.1.1**

a. With guidance, use identified ideas to form plans and models for media arts productions.

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**Grade 2**
**MA:Cr2.1.1.2**

a. Choose ideas to create plans and models for media arts productions.

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**Grade 3**
**MA:Cr2.1.1.3**

a. Form, share, and test ideas, plans, and models to prepare for media arts productions.

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**Grade 4**
**MA:Cr2.1.1.4**

a. Discuss, test, and assemble ideas, plans, and models for media arts productions, considering the artistic goals and the presentation.

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**Grade 5**
**MA:Cr2.1.1.5**

a. Develop, present, and test ideas, plans, models, and proposals for media arts productions, considering the artistic goals and audience

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**Grade 6**
**MA:Cr2.1.1.6**

a. Organize, propose, and evaluate artistic ideas, plans, prototypes, and production processes for media arts productions, considering purposeful intent.

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**Grade 7**
**MA:Cr2.1.1.7**

a. Design, propose, and evaluate artistic ideas, plans, prototypes, and production processes for media arts productions, considering expressive intent and resources.

**Grade 8**
**MA:Cr2.1.1.8**

a. Structure and critique ideas, plans, prototypes, and production processes for media arts productions, considering intent, resources, and the presentation context.

# Media Arts/Creating

**#MA:Cr3.1**
**Process Component:** Construct
**Anchor Standard:** Refine and complete artistic work.

**Grade K**
**MA:Cr3.1.K**

a. Form and capture media arts content for expression and meaning in media arts productions.
b. Make changes to the content, form, or presentation of media artworks and share results.

**Grade 1**
**MA:Cr3.1.1**

a. Create, capture, and assemble media arts content for media arts productions, identifying basic principles, such as pattern and repetition.

b. Practice and identify the effects of making changes to the content, form, or presentation, in order to refine and finish media artworks.

**Grade 2**
**MA:Cr3.1.2**

a. Construct and assemble content for unified media arts productions, identifying and applying basic principles, such as positioning and attention.

b. Test and describe expressive effects in altering, refining, and completing media artworks.

**Grade 3**
**MA:Cr3.1.3**

a. Construct and order various content into unified, purposeful media arts productions, describing and applying a defined set of principles, such as movement and force.

b. Practice and analyze how the emphasis of elements alters effect and purpose in refining and completing media artworks.

**Grade 4**
**MA:Cr3.1.4**

a. Structure and arrange various content and components to convey purpose and meaning in different media arts productions, applying sets of associated principles, such as balance and contrast.

**b.** Demonstrate intentional effect in refining media artworks, emphasizing elements for a purpose.

**Grade 5**

**MA:Cr3.1.5**

a. Create content and combine components to convey expression, purpose, and meaning in a variety of media arts productions, utilizing sets of associated principles, such as emphasis and exaggeration.

b. Determine how elements and components can be altered for clear communication and intentional effects, and refine media artworks to improve clarity and purpose.

**Grade 6**
**MA:Cr3.1.6**

a. Experiment with multiple approaches to produce content and components for determined purpose and meaning in media arts productions, utilizing a range of associated principles, such as point of view and perspective.

b. Appraise how elements and components can be altered for intentional effects and audience, and refine media artworks to reflect purpose and audience.

**Grade 7**
**MA:Cr3.1.7**

a. Coordinate production processes to integrate content and components for determined purpose and meaning in media arts productions, demonstrating understanding of associated principles, such as narrative structures and composition.

b. Improve and refine media artworks by intentionally emphasizing particular expressive elements to reflect an understanding of purpose, audience, or place.

**Grade 8**
**MA:Cr3.1.8**

a. Implement production processes to integrate content and stylistic conventions for determined meaning in media arts productions, demonstrating understanding of associated principles, such as theme and unity.

b. Refine and modify media artworks, improving technical quality and intentionally accentuating selected expressive and stylistic elements, to reflect an understanding of purpose, audience, and place.

# Media Arts/Producing

**#MA:Pr4.1**
**Process Component:** Integrate
**Anchor Standard:** Select, analyze, and interpret artistic work for presentation.

**Grade K**
**MA:Pr4.1.K**

a. With guidance, combine arts forms and media content, such as dance and video, to form media artworks.

**Grade 1**
**MA:Pr4.1.1**

a. Combine varied academic, arts, and media content in media artworks, such as an illustrated story,

**Grade 2**
**MA:Pr4.1.2**

a. Practice combining varied academic, arts, and media content into unified media artworks, such as a narrated science animation.

**Grade 3**
**MA:Pr4.1.3**

a. Practice combining varied academic, arts, and media forms and content into unified media artworks, such as animation, music, and dance.

**Grade 4**
**MA:Pr4.1.4**

a. Demonstrate how a variety of academic, arts, and media forms and content may be mixed and coordinated into media artworks, such as narrative, dance, and media.

**Grade 5**
**MA:Pr4.1.5**

a. Create media artworks through the integration of multiple contents and forms, such as a media broadcast.

**Grade 6**
**MA:Pr4.1.6**

a.Validate how integrating multiple contents and forms can support a central idea in a media artwork, such as media, narratives, and performance.

**Grade 7**
**MA:Pr4.1.7**

a. Integrate multiple contents and forms into unified media arts productions that convey consistent perspectives and narratives, such as an interactive video game.

**Grade 8**
**MA:Pr4.1.8**

a.Integrate multiple contents and forms into unified media arts productions that convey specific themes or ideas, such as interdisciplinary projects, or multimedia theatre.

# Media Arts/Producing

**#MA:Pr5.1**
**Process Component:** Practice
**Anchor Standard:** Develop and refine artistic techniques and work for presentation.

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**Grade K**
**MA:Pr5.1.K**

a. Identify and demonstrate basic skills, such as handling tools, making choices, and cooperating in creating media artworks.

b. Identify and demonstrate creative skills, such as performing, within media arts productions.

c. Practice, discover, and share how media arts creation tools work.

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**Grade 1**
**MA:Pr5.1.1**

a. Describe and demonstrate various artistic skills and roles, such as technical steps, planning, and collaborating in media arts productions.

b. Describe and demonstrate basic creative skills within media arts productions, such as varying techniques.

c. Experiment with and share different ways to use tools and techniques to construct media artworks.

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**Grade 2**
**MA:Pr5.1.2**

a. Enact roles to demonstrate basic ability in various identified artistic, design, technical, and soft skills, such as tool use and collaboration in media arts productions.

b. Demonstrate use of experimentation skills, such as playful practice, and trial and error, within and through media arts productions.

c. Demonstrate and explore identified methods to use tools to capture and form media artworks.

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**Grade 3**
**MA:Pr5.1.3**

a. Exhibit developing ability in a variety of artistic, design, technical, and organizational roles, such as making compositional decisions, manipulating tools, and group planning in media arts productions.

b. Exhibit basic creative skills to invent new content and solutions within and through media arts productions.

c. Exhibit standard use of tools and techniques while constructing media artworks.

**Grade 4**
**MA:Pr5.1.4**

a. Enact identified roles to practice foundational artistic, design, technical, and soft skills, such as formal technique, equipment usage, production, and collaboration in media arts productions.

b. Practice foundational innovative abilities, such as design thinking, in addressing problems within and through media arts productions.

c. Demonstrate use of tools and techniques in standard and novel ways while constructing media artworks.

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**Grade 5**
**MA:Pr5.1.5**

a. Enact various roles to practice fundamental ability in artistic, design, technical, and soft

b. Practice fundamental creative and innovative abilities, such as expanding conventions, in addressing problems within and through media arts productions.

c. Examine how tools and techniques could be used in standard and experimental ways in constructing media artworks.

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**Grade 6**
**MA:Pr5.1.6**

a. Develop a variety of artistic, design, technical, and soft skills through performing various assigned roles in producing media artworks, such as invention, formal technique, production, self-initiative, and problem-solving.

b. Develop a variety of creative and adaptive innovation abilities, such as testing constraints, in developing solutions within and through media arts productions.

c. Demonstrate adaptability using tools and techniques in standard and experimental ways in constructing media artworks.

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**Grade 7**
**MA:Pr5.1.7**

a. Exhibit an increasing set of artistic, design, technical, and soft skills through performing various roles in producing media artworks, such as creative problem-solving and organizing.

b. Exhibit an increasing set of creative and adaptive innovation abilities, such as exploratory processes, in developing solutions within and through media arts productions.

c. Demonstrate adaptability using tools and techniques in standard and experimental ways to achieve an assigned purpose in constructing media artworks.

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**Grade 8**
**MA:Pr5.1.8**

a. Demonstrate a defined range of artistic, design, technical, and soft skills, through performing specified roles in producing media artworks, such as strategizing and collaborative communication.

b. Demonstrate a defined range of creative and adaptive innovation abilities, such as divergent solutions and bending conventions, in developing new solutions for identified problems within and through media arts productions.

c. Demonstrate adaptability using tools, techniques and content in standard and experimental ways to communicate intent in the production of media artworks.

# Media Arts/Producing

**#MA:Pr6.1**
**Process Component:** Present
**Anchor Standard:** Convey meaning through the presentation of artistic work.

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**Grade K**
**MA:Pr6.1.K**

a. With guidance, identify and share roles and the situation in presenting media artworks.

b. With guidance, identify and share reactions to the presentation of media artworks.

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**Grade 1**
**MA:Pr6.1.1**

a. With guidance, discuss presentation conditions and perform a task in presenting media artworks.

b. With guidance, discuss the experience of the presentation of media artworks.

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**Grade 2**
**MA:Pr6.1.2**

a. Identify and describe presentation conditions and perform task(s) in presenting media artworks.

b. Identify and describe the experience and share results of presenting media artworks.

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**Grade 3**
**MA:Pr6.1.3**

a. Identify and describe the presentation conditions, and take on roles and processes in presenting or distributing media artworks.

b. Identify and describe the experience, and share results of and improvements for presenting media artworks.

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**Grade 4**
**MA:Pr6.1.4**

a. Explain the presentation conditions, and fulfill a role and processes in presenting or distributing media artworks.

b. Explain results of and improvements for presenting media artworks.

**Grade 5**
**MA:Pr6.1.5**

a. Compare qualities and purposes of presentation formats, and fulfill a role and associated processes in presentation and/or distribution of media artworks.

b. Compare results of and improvements for presenting media artworks.

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**Grade 6**
**MA:Pr6.1.6**

a. Analyze various presentation formats and fulfill various tasks and defined processes in the presentation and/or distribution of media artworks.

b. Analyze results of and improvements for presenting media artworks.

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**Grade 7**
**MA:Pr6.1.7**

a. Evaluate various presentation formats in order to fulfill various tasks and defined processes in the presentation and/or distribution of media artworks.

b. Evaluate the results of and improvements for presenting media artworks, considering impacts on personal growth.

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**Grade 8**
**MA:Pr6.1.8**

a. Design the presentation and distribution of media artworks through multiple formats and/or contexts.

b. Evaluate the results of and implement improvements for presenting media artworks, considering impacts on personal growth and external effects.

# Media Arts/Responding

**#MA:Re7.1**
**Process Component:** Perceive
**Anchor Standard:** Perceive and analyze artistic work.

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**Grade K**
**MA:Re7.1.K**

a. Recognize and share components and messages in media artworks.

b. Recognize and share how a variety of media artworks create different experiences.

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**Grade 1**
**MA:Re7.1.1**

a. Identify components and messages in media artworks.

b. With guidance, identify how a variety of media artworks create different experiences.

**Grade 2**
**MA:Re7.1.2**

a. Identify and describe the components and messages in media artworks.

b. Identify and describe how a variety of media artworks create different experiences.

**Grade 3**
**MA:Re7.1.3**

a. Identify and describe how messages are created by components in media artworks.

b. Identify and describe how various forms, methods, and styles in media artworks manage audience experience.

**Grade 4**
**MA:Re7.1.4**

a. Identify, describe, and explain how messages are created by components in media artworks.

b. Identify, describe, and explain how various forms, methods, and styles in media artworks manage audience experience.

**Grade 5**
**MA:Re7.1.5**

a. Identify, describe, and differentiate how message and meaning are created by components in media artworks.

b. Identify, describe, and differentiate how various forms, methods, and styles in media artworks manage audience experience.

**Grade 6**
**MA:Re7.1.6**

a. Identify, describe, and analyze how message and meaning are created by components in media artworks.

b. Identify, describe, and analyze how various forms, methods, and styles in media artworks manage audience experience.

**Grade 7**
**MA:Re7.1.7**

a. Describe, compare, and analyze the qualities of and relationships between the components in media artworks.

b. Describe, compare, and analyze how various forms, methods, and styles in media artworks interact with personal preferences in influencing audience experience.

**Grade 8**
**MA:Re7.1.8**

a. Compare, contrast, and analyze the qualities of and relationships between the components and style in media artworks.

b. Compare, contrast, and analyze how various forms, methods, and styles in media artworks
c. Manage audience experience and create intention.

# Media Arts/Responding

**#MA:Re8.1**
**Process Component:** Interpret
**Anchor Standard:** Interpret intent and meaning in artistic work.

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**Grade K**
**MA:Re8.1.K**

a. With guidance, share observations regarding a variety of media artworks.

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**Grade 1**
**MA:Re8.1.1**

a. With guidance, identify the meanings of a variety of media artworks.

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**Grade 2**
**MA:Re8.1.2**

a. Determine the purposes and meanings of media artworks, considering their context.

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**Grade 3**
**MA:Re8.1.3**

a. Determine the purposes and meanings of media artworks while describing their context.

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**Grade 4**
**MA:Re8.1.4**

a. Determine and explain reactions and interpretations to a variety of media artworks, considering their purpose and context

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**Grade 5**
**MA:Re8.1.5**

a. Determine and compare personal and group interpretations of a variety of media artworks, considering their intention and context.

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**Grade 6**
**MA:Re8.1.6**

a. Analyze the intent of a variety of media artworks, using given criteria.

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**Grade 7**
**MA:Re8.1.7**

a. Analyze the intent and meaning of a variety of media artworks, using self-developed criteria.

**Grade 8**
**MA:Re8.1.8**

a. Analyze the intent and meanings of a variety of media artworks, focusing on intentions, forms, and various contexts.

# Media Arts/Responding

**#MA:Re9.1**
**Process Component:** Evaluate
**Anchor Standard:** Apply criteria to evaluate artistic work.

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**Grade K**
**MA:Re9.1.K**

a. Share appealing qualities and possible changes in media artworks.

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**Grade 1**
**MA:Re9.1.1**

a. Identify the effective parts of and possible changes to media artworks considering viewers.

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**Grade 2**
**MA:Re9.1.2**

a. Discuss the effectiveness of and improvements for media artworks, considering their context.

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**Grade 3**
**MA:Re9.1.3**

a. Identify basic criteria for and evaluate media artworks, considering possible improvements and context.

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**Grade 4**
**MA:Re9.1.4**

a. Identify and apply basic criteria for evaluating and improving media artworks and production processes, considering context

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**Grade 5**

**MA:Re9.1.5**

a. Determine and apply criteria for evaluating media artworks and production processes, considering context, and practicing constructive feedback.

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**Grade 6**
**MA:Re9.1.6**

a. Determine and apply specific criteria to evaluate various media artworks and production processes, considering context and practicing constructive feedback.

**Grade 7**
**MA:Re9.1.7**

a. Develop and apply criteria to evaluate various media artworks and production processes, considering context, and practicing constructive feedback.

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**Grade 8**
**MA:Re9.1.8**

a. Evaluate media art works and production processes with developed criteria, considering context and artistic goals.

# Music

The National Core Music Standards are designed to guide music educators as they help their students achieve the goal of independent music literacy. The structure of the standards organizes outcomes by Artistic Process, thereby facilitating sequential instruction while also authentically reflecting the way musicians think and work.

**The music standards are organized and presented as follows:**

- All music performance standards are grouped under the Artistic Processes of Creating, Performing, or Responding.
- Because music connections are an essential part of each Artistic Process, open-ended Connecting outcomes cross-reference users to Creating, Performing, and Responding performance standards.
- Music performance standards are organized and coded according to the process components or "steps" of the Artistic Processes. The process components for each Process are as follows:
  - Creating: Imagine; Plan and Make; Evaluate and Refine, and Present
  - Performing: Select; Analyze; Interpret; Rehearse, Evaluate, and Refine; and Present
  - Responding: Select; Analyze; Interpret; and Evaluate
- Performance standards are provided for each grade level from Prekindergarten through grade eight.
- Four distinct "strands" of high school performance standards are provided, reflecting the increasing variety of music courses offered in American secondary schools.
  - Ensemble, Harmonizing Instrument (guitar, keyboard, etc.), Composition/Theory, and Music Technology performance standards are provided for three levels: Proficient, Accomplished, and Advanced.
  - Because many students become involved in Ensemble and Harmonizing Instrument classes before they enter high school, performance standards for these strands also include two preparatory levels: Novice (nominally assigned to the fifth grade level) and Intermediate (nominally the eighth grade level).
- To clarify the progression of performance standards across grade and high school levels, italic type is used to indicate changes from one grade level to the next.
- Similarities across the arts disciplines are highlighted in the eleven Common Anchors, which are shared by all five sets of discipline-specific standards. Each Anchor includes one or more process components.
- The standards are based on the assumption of quality resources, including instructional time, spanning PreK-8 and continuing at the high school level.

## General Music/Connecting

**#MU:Cn10.0**

**Process Component:** GMS-Connect #10- Synthesize and relate knowledge and personal experiences to make music.

**Anchor Standard:** Synthesize and relate knowledge and personal experiences to make art.

**Grade K**
**MU:Cn10.0.K**

Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music

**Grade 1**
**MU:Cn10.0.1**

Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music

**Grade 2**
**MU:Cn10.0.2**

Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.

**Grade 3**
**MU:Cn10.0.3**

Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.

**Grade 4**
**MU:Cn10.0.4**

Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.

**Grade 5**
**MU:Cn10.0.5**

Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.

**Grade**
**MU:Cn10.0.6**

Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.

**Grade 7**
**MU:Cn10.0.7**

Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music

**Grade 8**
**MU:Cn10.0.8**

Demonstrate how interests, knowledge, and skills relate to personal choices and intent when creating, performing, and responding to music.

# General Music/Connecting

**#MU:Cn11.0**

**Process Component:** GMS-Connect #11 - Relate musical ideas and works with varied context to deepen understanding.

**Anchor Standard:** Relate artistic ideas and works with societal, cultural and historical context to deepen understanding.

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**Grade K**

**MU:Cn11.0.K**

Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.

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**Grade 1**

**MU:Cn11.0.1**

Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.

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**Grade 2**

**MU:Cn11.0.2**

Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.

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**Grade 3**

**MU:Cn11.0.3**

Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.

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**Grade 4**

**MU:Cn11.0.4**

Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.

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**Grade 5**

**MU:Cn11.0.5**

Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.

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**Grade 6**

**MU:Cn11.0.6**

Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.

**Grade 7**
**MU:Cn11.0.7**

Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life.

**Grade 8**
**MU:Cn11.0.8**

Demonstrate understanding of relationships between music and the other arts, other disciplines, varied contexts, and daily life

# General Music/Creating

**#MU:Cr1.1**
**Process Component:** GMS-Imagine - Generate musical ideas for various purposes and contexts.
**Anchor Standard:** Generate and conceptualize artistic ideas and work.

**Grade K**
**MU:Cr1.1.K**

a. With guidance, explore and experience music concepts (such as beat and melodic contour).
b. With guidance, generate musical ideas (such as movements or motives).

**Grade 1**
**MU:Cr1.1.1**

a. With limited guidance, create musical ideas (such as answering a musical question) for a specific purpose.

b. With limited guidance, generate musical ideas in multiple tonalities (such as major and minor) and meters (such as duple and triple).

**Grade 2**
**MU:Cr1.1.2**

a. Improvise rhythmic and melodic patterns and musical ideas for a specific purpose.

b. Generate musical patterns and ideas within the context of a given tonality (such as major and minor) and meter (such as duple and triple).

**Grade 3**
**MU:Cr1.1.3**

a. Improvise rhythmic and melodic ideas, and describe connection to specific purpose and context (such as personal and social).

b. Generate musical ideas (such as rhythms and melodies) within a given tonality and/or meter.

**Grade 4**
**MU:Cr1.1.4**

a. Improvise rhythmic, melodic, and harmonic ideas, and explain connection to specific purpose and context (such as social and cultural).

b. Generate musical ideas (such as rhythms, melodies, and simple accompaniment patterns) within related tonalities (such as major and minor) and meters.

**Grade 5**

**MU:Cr1.1.5**

a. Improvise rhythmic, melodic, and harmonic ideas, and explain connection to specific purpose and context (such as social, cultural, and historical).

b. Generate musical ideas (such as rhythms, melodies, and accompaniment patterns) within specific related tonalities, meters, and simple chord changes.

**Grade 6**
**MU:Cr1.1.6**

Generate simple rhythmic, melodic, and harmonic phrases within AB and ABA forms that convey expressive intent.

**Grade 7**
**MU:Cr1.1.7**

Generate rhythmic, melodic, and harmonic phrases and variations over harmonic accompaniments within AB, ABA, or theme and variation forms that convey expressive intent.

**Grade 8**
**MU:Cr1.1.8**

Generate rhythmic, melodic and harmonic phrases and harmonic accompaniments within expanded forms (including introductions, transitions, and codas) that convey expressive intent

# General Music/Creating

**#MU:Cr2.1**

**Process Component:** GMS-Plan and Make - Select and develop musical ideas for defined purposes and contexts.

**Anchor Standard:** Organize and develop artistic ideas and work.

**Grade K**
**MU:Cr2.1.K**

a. With guidance, demonstrate and choose favorite musical ideas.

b. With guidance, organize personal musical ideas using iconic notation and/or recording technology.

**Grade 1**
**MU:Cr2.1.1**

a. With limited guidance, demonstrate and discuss personal reasons for selecting musical ideas that represent expressive intent.

b. With limited guidance, use iconic or standard notation and/or recording technology to document and organize personal musical ideas.

**Grade 2**
**MU:Cr2.1.2**

a. Demonstrate and explain personal reasons for selecting patterns and ideas for music that represent expressive intent.

b. Use iconic or standard notation and/or recording technology to combine, sequence, and document personal musical ideas.

**Grade 3**
**MU:Cr2.1.3**

a. Demonstrate selected musical ideas for a simple improvisation or composition to express intent, and describe connection to a specific purpose and context.

b. Use standard and/or iconic notation and/or recording technology to document personal rhythmic and melodic musical ideas.

**Grade 4**
**MU:Cr2.1.4**

a. Demonstrate selected and organized musical ideas for an improvisation, arrangement, or composition to express intent, and explain connection to purpose and context.

b. Use standard and/or iconic notation and/or recording technology to document personal rhythmic, melodic, and simple harmonic musical ideas.

**Grade 5**
**MU:Cr2.1.5**

a. Demonstrate selected and developed musical ideas for improvisations, arrangements, or compositions to express intent, and explain connection to purpose and context.

b. Use standard and/or iconic notation and/or recording technology to document personal rhythmic, melodic, and two-chord harmonic musical ideas.

**Grade 6**
**MU:Cr2.1.6**

a. Select, organize, construct, and document personal musical ideas for arrangements and compositions within AB or ABA form that demonstrate an effective beginning, middle, and ending, and convey expressive intent.

b. Use standard and/or iconic notation and/or audio/ video recording to document personal simple rhythmic phrases, melodic phrases, and two-chord harmonic musical ideas.

**Grade 7**
**MU:Cr2.1.7**

a. Select, organize, develop and document personal musical ideas for arrangements, songs, and compositions within AB, ABA, or theme and variation forms that demonstrate unity and variety and convey expressive intent.

b. Use standard and/or iconic notation and/or audio/ video recording to document personal simple rhythmic phrases, melodic phrases, and harmonic sequences.

**Grade 8**
**MU:Cr2.1.8**

a. Select, organize, and document musical ideas for arrangements, songs, and compositions within expanded forms that demonstrate tension and release, unity and variety, balance, and convey expressive intent.

b. Use standard and/or iconic notation and/or audio/ video recording to document personal rhythmic phrases, melodic phrases, and harmonic sequences.

## General Music/Creating

**#MU:Cr3.1**

**Process Component:** GMS-Evaluate and Refine -Evaluate and refine selected musical ideas to create musical work that meets appropriate criteria.
**Anchor Standard:** Refine and complete artistic work.

**Grade K**
**MU:Cr3.1.K**

a. With guidance, apply personal, peer, and teacher feedback in refining personal musical ideas.

**Grade 1**
**MU:Cr3.1.1**

a. With limited guidance, discuss and apply personal, peer, and teacher feedback to refine personal musical ideas.

**Grade 2**
**MU:Cr3.1.2**

a. Interpret and apply personal, peer, and teacher feedback to revise personal music.

**Grade 3**
**MU:Cr3.1.3**

a. Evaluate, refine, and document revisions to personal musical ideas, applying teacher-provided and collaboratively-developed criteria and feedback.

**Grade 4**
**MU:Cr3.1.4**

a. Evaluate, refine, and document revisions to personal music, applying teacher-provided and collaboratively-developed criteria and feedback to show improvement over time.

**Grade 5**
**MU:Cr3.1.5**

a. Evaluate, refine, and document revisions to personal music, applying teacher-provided and collaboratively-developed criteria and feedback, and explain rationale for changes

**Grade 6**
**MU:Cr3.1.6**

a. Evaluate their own work, applying teacher-provided criteria such as application of selected elements of music, and use of sound sources.

b. Describe the rationale for making revisions to the music based on evaluation criteria and feedback from their teacher.

**Grade 7**

**MU:Cr3.1.7**

a. Evaluate their own work, applying selected criteria such as appropriate application of elements of music including style, form, and use of sound sources.

b. Describe the rationale for making revisions to the music based on evaluation criteria and feedback from others (teacher and peers).

**Grade 8**
**MU:Cr3.1.8**

a. Evaluate their own work by selecting and applying criteria including appropriate application of compositional techniques, style, form, and use of sound sources.

b. Describe the rationale for refining works by explaining the choices, based on evaluation criteria.

## General Music/Creating

**#MU:Cr3.2**

**Process Component:** GMS-Present - Share creative musical work that conveys intent, demonstrates craftsmanship, and exhibits originality.
**Anchor Standard:** Refine and complete artistic work.

**Grade K**
**MU:Cr3.2.K**

With guidance, demonstrate a final version of personal musical ideas to peers.

**Grade 1**
**MU:Cr3.2.1**

With limited guidance, convey expressive intent for a specific purpose by presenting a final version of personal musical ideas to peers or informal audience.

**Grade 2**
**MU:Cr3.2.2**

Convey expressive intent for a specific purpose by presenting a final version of personal musical ideas to peers or informal audience.

**Grade 3**
**MU:Cr3.2.3**

Present the final version of personal created music to others, and describe connection to expressive intent.

**Grade 4**
**MU:Cr3.2.4**

Present the final version of personal created music to others, and explain connection to expressive intent.

**Grade 5**
**MU:Cr3.2.5**

Present the final version of personal created music to others that demonstrates craftsmanship, and explain connection to expressive intent.

**Grade 6**
**MU:Cr3.2.6**

Present the final version of their documented personal composition or arrangement, using craftsmanship and originality to demonstrate an effective beginning, middle, and ending, and convey expressive intent.

**Grade 7**
**MU:Cr3.2.7**

Present the final version of their personal documented personal composition, song, or arrangement, using craftsmanship and originality to demonstrate unity and variety, and convey expressive intent.

**Grade 8**
**MU:Cr3.2.8**

Present the final version of their documented composition, song, or arrangement, using craftsmanship and originality to demonstrate the application of compositional techniques for creating unity and variety, tension and release, and balance to convey expressive intent.

## General Music/Performing

**#MU:Pr4.1**

**Process Component:** GMS-Select - Select varied musical works to present based on interest, knowledge, technical skill, and context.
**Anchor Standard:** Select, analyze and interpret artistic work for presentation.

**Grade K**
**MU:Pr4.1.K**

With guidance, demonstrate and state personal interest in varied musical selections.

**Grade 1**
**MU:Pr4.1.1**

With limited guidance, demonstrate and discuss personal interest in, knowledge about, and purpose of varied musical selections.

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**Grade 2**
**MU:Pr4.1.2**

Demonstrate and explain personal interest in, knowledge about, and purpose of varied musical selections.

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**Grade 3**
**MU:Pr4.1.3**

Demonstrate and explain how the selection of music to perform is influenced by personal interest, knowledge, purpose, and context.

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**Grade 4**
**MU:Pr4.1.4**

Demonstrate and explain how the selection of music to perform is influenced by personal interest, knowledge, context, and technical skill.

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**Grade 5**
**MU:Pr4.1.5**

Demonstrate and explain how the selection of music to perform is influenced by personal interest, knowledge, and context, as well as their personal and others' technical skill.

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**Grade 6**
**MU:Pr4.1.6**

Apply teacher-provided criteria for selecting music to perform for a specific purpose and/or context, and explain why each was chose

**Grade 7**
**MU:Pr4.1.7**

Apply collaboratively-developed criteria for selecting music of contrasting styles for a program with a specific purpose and/or context and, after discussion, identify expressive qualities, technical challenges, and reasons for choices.

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**Grade 8**
**MU:Pr4.1.8**

Apply personally-developed criteria for selecting music of contrasting styles for a program with a specific purpose and/or context, and explain expressive qualities, technical challenges, and reasons for choices.

## General Music/Performing

**#MU:Pr4.2**

**Process Component:** GMS-Analyze - Analyze the structure and context of varied musical works and their implications for performance
**Anchor Standard:** Select, analyze and interpret artistic work for presentation.

**Grade K**
**MU:Pr4.2.K**

a. With guidance, explore and demonstrate awareness of music contrasts (such as high/low, loud/soft, same/different) in a variety of music selected for performance.

**Grade 1**
**MU:Pr4.2.1**

a. With limited guidance, demonstrate knowledge of music concepts (such as beat and melodic contour) in music from a variety of cultures selected for performance.

**b.** When analyzing selected music, read and perform rhythmic patterns using iconic or standard notation. Grade2 MU:Pr4.2.2

a. Demonstrate knowledge of music concepts (such as tonality and meter) in music from a variety of cultures selected for performance.

b. When analyzing selected music, read and perform rhythmic and melodic patterns using iconic or standard notation.

**Grade 3**
**MU:Pr4.2.3**

a. Demonstrate understanding of the structure in music selected for performance.

b. When analyzing selected music, read and perform rhythmic patterns and melodic phrases using iconic and standard notation.

c. Describe how context (such as personal and social) can inform a performance.

**Grade 4**
**MU:Pr4.2.4**

a. Demonstrate understanding of the structure and the elements of music (such as rhythm, pitch, and form) in music selected for performance.

b. When analyzing selected music, read and perform using iconic and/or standard notation.
c. Explain how context (such as social and cultural) informs a performance.

**Grade 5**
**MU:Pr4.2.5**

a. Demonstrate understanding of the structure and the elements of music (such as rhythm, pitch, form, and harmony) in music selected for performance.

b. When analyzing selected music, read and perform using standard notation.

c. Explain how context (such as social, cultural, and historical) informs performances

**Grade 6**
**MU:Pr4.2.6**

a. Explain how understanding the structure and the elements of music are used in

music selected for performance.

b. When analyzing selected music, read and identify by name or function standard symbols for rhythm, pitch, articulation, and dynamics.

c. Identify how cultural and historical context inform performances.

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**Grade 7**
**MU:Pr4.2.7**

a. Explain and demonstrate the structure of contrasting pieces of music selected for performance and how elements of music are used.

b. When analyzing selected music, read and identify by name or function standard symbols for rhythm, pitch articulation, dynamics, tempo, and form.

c. Identify how cultural and historical context inform performances and result in different music interpretations.

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**Grade 8**
**MU:Pr4.2.8**

a. Compare the structure of contrasting pieces of music selected for performance, explaining how the elements of music are used in each.

b. When analyzing selected music, sight-read in treble or bass clef simple rhythmic, melodic, and/or harmonic notation.

c. Identity how cultural and historical context inform performances and result in different musical effects.

# General Music/Performing

**#MU:Pr4.3**

**Process Component:** GMS-Interpret - Develop personal interpretations that consider creators' intent.
**Anchor Standard:** Select, analyze and interpret artistic work for presentation.

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**Grade K**
**MU:Pr4.3.K**

With guidance, demonstrate awareness of expressive qualities (such as voice quality, dynamics, and tempo) that support the creators' expressive intent.

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**Grade 1**
**MU:Pr4.3.1**

Demonstrate and describe music's expressive qualities (such as dynamics and tempo).

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**Grade 2**
**MU:Pr4.3.2**

Demonstrate understanding of expressive qualities (such as dynamics and tempo) and how

creators use them to convey expressive intent.

**Grade 3**
**MU:Pr4.3.3**

Demonstrate and describe how intent is conveyed through expressive qualities (such as dynamics and tempo).

**Grade 4**
**MU:Pr4.3.4**

Demonstrate and explain how intent is conveyed through interpretive decisions and expressive qualities (such as dynamics, tempo, and timbre).

**Grade 5**
**MU:Pr4.3.5**

Demonstrate and explain how intent is conveyed through interpretive decisions and expressive qualities (such as dynamics, tempo, timbre, and articulation/style).

**Grade 6**
**MU:Pr4.3.6**

Perform a selected piece of music demonstrating how their interpretations of the elements of music and the expressive qualities (such as dynamics, tempo, timbre, articulation/style, and phrasing) convey intent.

**Grade 7**
**MU:Pr4.3.7**

Perform contrasting pieces of music demonstrating their interpretations of the elements of music and expressive qualities (such as dynamics, tempo, timbre, articulation/style, and phrasing) convey intent.

**Grade 8**
**MU:Pr4.3.8**

Perform contrasting pieces of music, demonstrating as well as explaining how the music's intent is conveyed by their interpretations of the elements of music and expressive qualities (such as dynamics, tempo, timbre, articulation/style, and phrasing).

# General Music/Performing

**#MU:Pr5.1**

**Process Component:** GMS-Rehearse, Evaluate and Refine - Evaluate and refine personal and ensemble performances, individually or in collaboration with others.
**Anchor Standard:** Develop and refine artistic techniques and work for presentation.

**Grade K**
**MU:Pr5.1.K**

a. With guidance, apply personal, teacher, and peer feedback to refine performances.

b. With guidance, use suggested strategies in rehearsal to improve the expressive qualities of music.

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**Grade 1**
**MU:Pr5.1.**

a. With limited guidance, apply personal, teacher, and peer feedback to refine performances.

b. With limited guidance, use suggested strategies in rehearsal to address interpretive challenges of music.

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**Grade 2**
**MU:Pr5.1.2**

a. Apply established criteria to judge the accuracy, expressiveness, and effectiveness of performances.

b. Rehearse, identify and apply strategies to address interpretive, performance, and technical challenges of music.

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**Grade 3**
**MU:Pr5.1.3**

a. Apply teacher-provided and collaboratively-developed criteria and feedback to evaluate accuracy of ensemble performances.

b. Rehearse to refine technical accuracy, expressive qualities, and identified performance challenges.

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**Grade 4**
**MU:Pr5.1.4**

a. Apply teacher-provided and collaboratively-developed criteria and feedback to evaluate accuracy and expressiveness of ensemble and personal performances.

**b.** Rehearse to refine technical accuracy and expressive qualities, and address performance challenges.

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**Grade 5**

**MU:Pr5.1.5**

a. Apply teacher-provided and established criteria and feedback to evaluate the accuracy and expressiveness of ensemble and personal performances.

b. Rehearse to refine technical accuracy and expressive qualities to address challenges, and show improvement over time.

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**Grade 6**
**MU:Pr5.1.6**

a. Identify and apply teacher-provided criteria (such as correct interpretation of notation, technical accuracy, originality, and interest) to rehearse, refine, and determine when a piece is ready to perform.

**Grade 7**
**MU:Pr5.1.7**

a. Identify and apply collaboratively-developed criteria (such as demonstrating correct interpretation of notation, technical skill of performer, originality, emotional impact, and interest) to rehearse, refine, and determine when the music is ready to perform.

**Grade 8**
**MU:Pr5.1.8**

a. Identify and apply personally-developed criteria (such as demonstrating correct interpretation of notation, technical skill of performer, originality, emotional impact.

# General Music/Performing

**#MU:Pr6.1**

**Process Component:** GMS-Present - Perform expressively, with appropriate interpretation and technical accuracy, and in a manner appropriate to the audience and context.
**Anchor Standard:** Convey meaning through the presentation of artistic work.

**Grade K**
**MU:Pr6.1.K**

a. With guidance, perform music with expression. b.
Perform appropriately for the audience.

**Grade 1**
**MU:Pr6.1.1**

a. With limited guidance, perform music for a specific purpose with expression.

b. Perform appropriately for the audience and purpose.

**Grade 2**
**MU:Pr6.1.2**

a. Perform music for a specific purpose with expression and technical accuracy. b.
Perform appropriately for the audience and purpose.

**Grade 3**
**MU:Pr6.1.3**

a. Perform music with expression and technical accuracy.

b. Demonstrate performance decorum and audience etiquette appropriate for the context and venue.

**Grade 4**
**MU:Pr6.1.4**

a. Perform music, alone or with others, with expression and technical accuracy, and appropriate interpretation.

b. Demonstrate performance decorum and audience etiquette appropriate for the context, venue, and genre.

**Grade 5**
**MU:Pr6.1.5**

a. Perform music, alone or with others, with expression, technical accuracy, and appropriate interpretation.

b. Demonstrate performance decorum and audience etiquette appropriate for the context, venue, genre, and style.

**Grade 6**
**MU:Pr6.1.6**

a. Perform the music with technical accuracy to convey the creator's intent.

b. Demonstrate performance decorum (such as stage presence, attire, and behavior) and audience etiquette appropriate for venue and purpose.

**Grade 7**
**MU:Pr6.1.7**

a. Perform the music with technical accuracy and stylistic expression to convey the creator's intent.
b. Demonstrate performance decorum (such as stage presence, attire, and behavior) and audience etiquette appropriate for venue, purpose, and context. Grade 8 MU:Pr6.1.8
c. Perform the music with technical accuracy, stylistic expression, and culturally authentic practices in music to convey the creator's intent.
d. Demonstrate performance decorum (such as stage presence, attire, and behavior) and audience etiquette appropriate for venue, purpose, context, and style.

# General Music/Responding

**#MU:Re7.1**
**Process Component:** GMS-Select - Choose music appropriate for a specific purpose or context.
**Anchor Standard:** Perceive and analyze artistic work.

**Grade K**
**MU:Re7.1.K**

With guidance, list personal interests and experiences and demonstrate why they prefer some music selections over others.

**Grade 1**
**MU:Re7.1.1**

With limited guidance, identify and demonstrate how personal interests and experiences influence musical selection for specific purposes.

**Grade 2**
**MU:Re7.1.2**

Explain and demonstrate how personal interests and experiences influence musical selection for specific purposes.

**Grade 3**
**MU:Re7.1.3**

Demonstrate and describe how selected music connects to and is influenced by specific interests, experiences, or purposes.

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**Grade 4**
**MU:Re7.1.4**

Demonstrate and explain how selected music connects to and is influenced by specific interests, experiences, purposes, or contexts.

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**Grade 5**
**MU:Re7.1.5**

Demonstrate and explain, citing evidence, how selected music connects to and is influenced by specific interests, experiences, purposes, or contexts.

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**Grade 6**
**MU:Re7.1.6**

Select or choose music to listen to and explain the connections to specific interests or experiences for a specific purpose.

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**Grade 7**
**MU:Re7.1.7**

Select or choose contrasting music to listen to and compare the connections to specific interests or experiences for a specific purpose.

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**Grade 8**
**MU:Re7.1.8**

Select programs of music (such as a CD mix or live performances) and demonstrate the connections to an interest or experience for a specific purpose.

# General Music/Responding

**#MU:Re7.2**

**Process Component:** GMS-Analyze - Analyze how the structure and context of varied musical works inform the response.
**Anchor Standard:** Perceive and analyze artistic work.

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**Grade K**
**MU:Re7.2.K**

With guidance, demonstrate how a specific music concept (such as beat or melodic direction) is used in music.

**Grade 1**
**MU:Re7.2.1**

With limited guidance, demonstrate and identify how specific music concepts (such as beat or pitch) are used in various styles of music for a purpose.

**Grade 2**
**MU:Re7.2.2**

Describe how specific music concepts are used to support a specific purpose in music.

**Grade 3**
**MU:Re7.2.3**

Demonstrate and describe how a response to music can be informed by the structure, the use of the elements of music, and context (such as personal and social).

**Grade 4**
**MU:Re7.2.4**

Demonstrate and explain how responses to music are informed by the structure, the use of the elements of music, and context (such as social and cultural).

**Grade 5**
**MU:Re7.2.5**

Demonstrate and explain, citing evidence, how responses to music are informed by the structure, the use of the elements of music, and context (such as social, cultural, and historical).

**Grade 6**
**MU:Re7.2.6**

a. Describe how the elements of music and expressive qualities relate to the structure of the pieces

b. Identify the context of music from a variety of genres, cultures, and historical periods.

**Grade 7**

**MU:Re7.2.7**

a. Classify and explain how the elements of music and expressive qualities relate to the structure of contrasting pieces.

b. Identify and compare the context of music from a variety of genres, cultures, and historical periods.

**Grade 8**
**MU:Re7.2.8**

a. Compare how the elements of music and expressive qualities relate to the structure within programs of music.

b. Identify and compare the context of programs of music from a variety of genres, cultures, and historical periods.

# General Music/Responding

**#MU:Re8.1**

**Process Component:** GMS-Interpret - Support interpretations of musical works that reflect creators'/performers' expressive intent.
**Anchor Standard:** Interpret intent and meaning in artistic work.

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**Grade K**
**MU:Re8.1.K**

With guidance, demonstrate awareness of expressive qualities (such as dynamics and tempo) that reflect creators'/performers' expressive intent.

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**Grade 1**
**MU:Re8.1.1**

With limited guidance, demonstrate and identify expressive qualities (such as dynamics and tempo) that reflect creators'/performers' expressive intent.

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**Grade 2**
**MU:Re8.1.2**

Demonstrate knowledge of music concepts and how they support creators'/performers' expressive intent.

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**Grade 3**
**MU:Re8.1.3**

Demonstrate and describe how the expressive qualities (such as dynamics and tempo) are used in performers' interpretations to reflect expressive intent.

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**Grade 4**
**MU:Re8.1.4**

Demonstrate and explain how the expressive qualities (such as dynamics, tempo, and timbre) are used in performers' and personal interpretations to reflect expressive intent

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**Grade 5**
**MU:Re8.1.5**

Demonstrate and explain how the expressive qualities (such as dynamics, tempo, timbre, and articulation) are used in performers' and personal interpretations to reflect expressive intent

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**Grade 6**
**MU:Re8.1.6**

Describe a personal interpretation of how creators' and performers' application of the elements of music and expressive qualities, within genres and cultural and historical context, convey expressive intent.

**Grade 7**
**MU:Re8.1.7**

Describe a personal interpretation of contrasting works and explain how creators' and performers' application of the elements of music and expressive qualities, within genres, cultures, and historical periods, convey expressive intent

**Grade 8**
**MU:Re8.1.8**

Support personal interpretation of contrasting programs of music and explain how creators' or performers' apply the elements of music and expressive qualities, within genres, cultures, and historical periods to convey expressive intent

## General Music/Responding

**#MU:Re9.1**

**Process Component:** GMS-Evaluate - Support evaluations of musical works and performances based on analysis, interpretation, and established criteria.
**Anchor Standard:** Apply criteria to evaluate artistic work.

**Grade K**
**MU:Re9.1.K**

With guidance, apply personal and expressive preferences in the evaluation of music.

**Grade 1**
**MU:Re9.1.1**

With limited guidance, apply personal and expressive preferences in the evaluation of music for specific purposes.

**Grade 2**
**MU:Re9.1.2**

Apply personal and expressive preferences in the evaluation of music for specific purposes.

**Grade 3**
**MU:Re9.1.3**

Evaluate musical works and performances, applying established criteria, and describe appropriateness to the context.

**Grade 4**
**MU:Re9.1.4**

Evaluate musical works and performances, applying established criteria, and explain appropriateness to the context.

**Grade 5**
**MU:Re9.1.5**

Evaluate musical works and performances, applying established criteria, and explain appropriateness to the context, citing evidence from the elements of music.

**Grade 6**
**MU:Re9.1.6**

Apply teacher-provided criteria to evaluate musical works or performances.

**Grade 7**
**MU:Re9.1.7**

Select from teacher-provided criteria to evaluate musical works or performances.

**Grade 8**
**MU:Re9.1.8**

Apply appropriate personally-developed criteria to evaluate musical works or performances.

# Theatre

Welcome to the 2014 Theatre Standards. These grade-by-grade standards are an effort to articulate the most fundamental elements of theatre, in the hope that by doing so there will be recognition that every student can and should achieve a level of proficiency or beyond in this ancient and honorable craft. The most widespread theatre education opportunities in the United States have traditionally been in high schools, and the standards included here can readily be employed as a springboard for curriculum design and assessment at that level. The standards in the earlier grades suggest the same rigor and understanding but it's understood that at each successively earlier grade, there are fewer and fewer theatre programs and trained educators to teach in them. Thus, the PreK through middle grade standards are largely aspirational—what should be in our schools and arts programs.

The 2014 Theatre Standards are written with both drama processes and theatre products in mind. While many secondary theatre programs focus on performance and design in staged productions as evidence of a student's understanding and achievement in the art, ongoing student engagement in theatre without an end product in mind has not always been defined and valued. These standards address those drama processes as well as traditional theatre. Drama processes encompass envisioned worlds and unscripted activities designed to engage students in a wide range of real and imagined issues; theatre includes the broader and more traditional conventions of the craft that have been developed over the centuries —scripted plays, acting, public performance, and stagecraft.

To address both process and product in theatre, the grade 3 through high school standards of Proficient, Advanced, and Accomplished often include the term "drama/theatre" to clarify the distinct but companion parts of theatre education. The PreK through grade 2 standards, acknowledging the early childhood need for supervision and unfettered play, employ the phraseology "dramatic play" and/or "guided drama experience."

You will also find Model Cornerstone Assessments (MCAs) intended to show the ways in which standards serve as a foundation for the creation of reliable and authentic measurements of student learning in theatre. These MCAs are not put forth as a definitive assessment of a particular set of skills; rather they presented to inspire teachers to create their own assessments that serve both their pedagogy and the learning needs of their students.

# Theatre/Connecting

**#TH:Cn10.1**

**Process Component:** Empathize

**Anchor Standard:** Synthesize and relate knowledge and personal experiences to make art.

**Grade K**
**TH:Cn10.1.K**

a. With prompting and support, identify similarities between characters and oneself in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 1**
**TH:Cn10.1.1**

a. Identify character emotions in a guided drama experience (e.g., process drama, story drama, creative drama) and relate it to personal experience.

**Grade 2**
**TH:Cn10.1.2**

a. Relate character experiences to personal experiences in a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 3**
**TH:Cn10.1.3**

a. Use personal experiences and knowledge to make connections to community and culture in a drama/theatre work.

**Grade 4**
**TH:Cn10.1.4**

a. Identify the ways drama/theatre work reflects the perspectives of a community or culture.

**Grade 5**
**TH:Cn10.1.5**

a. Explain how drama/theatre connects oneself to a community or culture.

**Grade 6**
**TH:Cn10.1.6**

a. Explain how the actions and motivations of characters in a drama/theatre work impact perspectives of a community or culture.

**Grade 7**
**TH:Cn10.1.7**

a. Incorporate multiple perspectives and diverse community ideas in a drama/theatre work.

**Grade 8**
**TH:Cn10.1.8**

a. Examine a community issue through multiple perspectives in a drama/theatre work

# Theatre/Connecting

**#TH:Cn11.1**
**Process Component:** Interrelate

**Anchor Standard:** Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.

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**Grade K**
**TH:Cn11.1.K**

a. With prompting and support, identify skills and knowledge from other areas in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).

a. Apply skills and knowledge from different art forms and content areas in a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 2**
**TH:Cn11.1.2**

a. Determine appropriate skills and knowledge from different art forms and content areas to apply in a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 3**
**TH:Cn11.1.3**

a. Identify connections to community, social issues and other content areas in drama/theatre work.

**Grade 4**
**TH:Cn11.1.4**

a. Respond to community and social issues and incorporate other content areas in drama/theatre work.

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**Grade 5**
**TH:Cn11.1.5**

a. Investigate historical, global and social issues expressed in drama/theatre work.

a. Identify universal themes or common social issues and express them through a drama/theatre work.

**Grade 7**
**TH:Cn11.1.7**

a. Incorporate music, dance, art, and/or media to strengthen the meaning and conflict in a drama/theatre work with a particular cultural, global, or historic context.

**Grade 8**
**TH:Cn11.1.8**

a. Use different forms of drama/theatre work to examine contemporary social, cultural, or global issues.

## Theatre/Connecting

**#TH:Cn11.2**
**Process Component:** Research

**Anchor Standard:** Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.

**Grade K**
**TH:Cn11.2.K**

a. With prompting and support, identify stories that are different from one another in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).

b. With prompting and support, tell a short story in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 1**
**TH:Cn11.2.1**

a. Identify similarities and differences in stories from one's own community in a guided drama experience (e.g., process drama, story drama, creative drama).

b. Collaborate on the creation of a short scene based on a fictional literary source in a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 2**
**TH:Cn11.2.2**

a. Identify similarities and differences in stories from multiple cultures in a guided drama experience (e.g., process drama, story drama, creative drama).

b. Collaborate on the creation of a short scene based on a non-fiction literary source in a guided drama experience (e.g., process drama, story drama, creative drama)

**Grade 3**
**TH:Cn11.2.3**

a. Explore how stories are adapted from literature to drama/theatre work.

b. Examine how artists have historically presented the same stories using different art forms genres, or drama/theatre conventions.

**Grade 4**
**TH:Cn11.2.4**

a. Investigate cross-cultural approaches to storytelling in drama/theatre work.

b. Compare the drama/theatre conventions of a given time period with those of the present.

**Grade 5**
**TH:Cn11.2.5**

a. Analyze commonalities and differences between stories set in different cultures in preparation for a drama/theatre work.

b. Identify historical sources that explain drama/theatre terminology and conventions.

**Grade 6**
**TH:Cn11.2.6**

a. Research and analyze two different versions of the same drama/theatre story to determine differences and similarities in the visual and aural world of each story.

b. Investigate the time period and place of a drama/theatre work to better understand performance and design choices.

**Grade 7**
**TH:Cn11.2.7**

a. Research and discuss how a playwright might have intended a drama/theatre work to be produced.

b. Examine artifacts from a time period and geographic location to better understand performance and design choices in a drama/theatre work.

**Grade 8**
**TH:Cn11.2.8**

a. Research the story elements of a staged drama/theatre work and compare them to another production of the same work.

b. Identify and use artifacts from a time period and place to develop performance and design choices in a drama/theatre work.

# Theatre/Creating

**#TH:Cr1.1**
**Process Component:** Envision, Conceptualize
**Anchor Standard:** Generate and conceptualize artistic ideas and work.

**Grade K**
**TH:Cr1.1.K**

a. With prompting and support, invent and inhabit an imaginary elsewhere in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).

b. With prompting and support, use non-representational materials to create props, puppets, and costume pieces for dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 1**
**TH:Cr1.1.1**

a. Propose potential choices characters could make in a guided drama experience (e.g., process drama, story drama, creative drama).

b. Collaborate with peers to conceptualize costumes and props in a guided drama experience (e.g., process drama, story drama, creative drama).

c. Identify ways in which gestures and movement may be used to create or retell a story in guided drama experiences (e.g., process drama, story drama, creative drama).

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**Grade 2**
**TH:Cr1.1.2**

a. Propose potential new details to plot and story in a guided drama experience (e.g., process drama, story drama, creative drama).

b. Collaborate with peers to conceptualize scenery in a guided drama experience (e.g., process drama, story drama, creative drama).

c. Identify ways in which voice and sounds may be used to create or retell a story in guided drama experiences (e.g., process drama, story drama, creative drama).

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**Grade 3**
**TH:Cr1.1.3**

a. Create roles, imagined worlds, and improvised stories in a drama/theatre work.

b. Imagine and articulate ideas for costumes, props and sets for the environment and characters in a drama/theatre work.

c. Collaborate to determine how characters might move and speak to support the story and given circumstances in drama/theatre work.

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**Grade 4**
**TH:Cr1.1.4**

a. Articulate the visual details of imagined worlds, and improvised stories that support the given circumstances in a drama/theatre work.

b. Visualize and design technical elements that support the story and given circumstances in a drama/theatre work.

c. Imagine how a character might move to support the story and given circumstances in a drama/theatre work.

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**Grade 5**
**TH:Cr1.1.5**

a. Identify physical qualities that might reveal a character's inner traits in the imagined world of a drama/theatre work.

b. Propose design ideas that support the story and given circumstances in a drama/theatre work.

c. Imagine how a character's inner thoughts impact the story and given circumstances in a drama/ theatre work

**Grade 6**
**TH:Cr1.1.6**

a. Identify possible solutions to staging challenges in a drama/theatre work.

b. Identify solutions to design challenges in a drama/theatre work.

c. Explore a scripted or improvised character by imagining the given circumstances in a drama/theatre work.

**Grade 7**
**TH:Cr1.1.7**

a. Investigate multiple perspectives and solutions to staging challenges in a drama/theatre work.

b. Explain and present solutions to design challenges in a drama/ theatre work.

c. Envision and describe a scripted or improvised character's inner thoughts and objectives in a drama/theatre work.

**Grade 8**
**TH:Cr1.1.8**

a. Imagine and explore multiple perspectives and solutions to staging problems in a drama/ theatre work.

b. Imagine and explore solutions to design challenges of a performance space in a drama/theatre work.

c. Develop a scripted or improvised character by articulating the character's inner thoughts, objectives, and motivations in a drama/theatre work

## Theatre/Creating

**#TH:Cr2.1**
**Process Component:** Develop
**Anchor Standard:** Organize and develop artistic ideas and work.

**Grade K**
**TH:Cr2.1.K**

a. With prompting and support, interact with peers and contribute to dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).

b. With prompting and support, express original ideas in dramatic play or a guided drama experience (e.g., creative drama, process drama, story drama).

**Grade 1**
**TH:Cr2.1.1**

a. Contribute to the development of a sequential plot in a guided drama experience (e.g., process drama, story drama, creative drama).

b. With prompting and support, participate in group decision making in a guided drama experience (e.g., process drama, story drama, creative drama).

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**Grade 2**
**TH:Cr2.1.2**

a. Collaborate with peers to devise meaningful dialogue in a guided drama experience (e.g., process drama, story drama, creative drama).

b. Contribute ideas and make decisions as a group to advance a story in a guided drama experience (e.g., process drama, story drama, creative drama).

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**Grade 3**
**TH:Cr2.1.3**

a. Participate in methods of investigation to devise original ideas for a drama/theatre work.

b. Compare ideas with peers and make selections that will enhance and deepen group drama/theatre work.

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**Grade 4**
**TH:Cr2.1.4**

a. Collaborate to devise original ideas for a drama/theatre work by asking questions about characters and plots.

b. Make and discuss group decisions and identify responsibilities required to present a drama/theatre work to peers.

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**Grade 5**
**TH:Cr2.1.5**

a. Devise original ideas for a drama/theatre work that reflect collective inquiry about characters and their given circumstances.

b. Participate in defined responsibilities required to present a drama/theatre work informally to an audience.

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**Grade 6**
**TH:Cr2.1.6**

a. Use critical analysis to improve, refine, and evolve original ideas and artistic choices in a devised or scripted drama/theatre work.

b. Contribute ideas and accept and incorporate the ideas of others in preparing or devising drama/theatre work.

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**Grade 7**
**TH:Cr2.1.7**

a. Examine and justify original ideas and artistic choices in a drama/theatre work based on critical analysis, background knowledge, and historical and cultural context.

b. Demonstrate mutual respect for self and others and their roles in preparing or devising drama/theatre work.

**Grade 8**
**TH:Cr2.1.8**

a. Articulate and apply critical analysis, background knowledge, research, and historical and cultural context to the development of original ideas for a drama/theatre work.

b. Share leadership and responsibilities to develop collaborative goals when preparing or devising drama/theatre work.

# Theatre/Creating

**#TH:Cr3.**
Process Component: **Rehearse**

**Anchor Standard:** Refine new work through play, drama processes and theatre experiences using critical analysis and experimentation.

**Grade K**
**TH:Cr3.1.K**

a. With prompting and support, ask and answer questions in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 1**
**TH:Cr3.1.1**

a. Contribute to the adaptation of the plot in a guided drama experience (e.g., process drama, story drama, creative drama).

b. Identify similarities and differences in sounds and movements in a guided drama experience (e.g., process drama, story drama, creative drama)

c. Collaborate to imagine multiple representations of a single object in a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 2**
**TH:Cr3.1.2**

a. Contribute to the adaptation of dialogue in a guided drama experience (e.g., process drama, story drama, creative drama).

b. Use and adapt sounds and movements in a guided drama experience (e.g., process drama, story drama, creative drama).

c. Generate independently multiple representations of a single object in a guided drama experience (e.g., process drama, story drama, creative drama.

**Grade 3**
**TH:Cr3.1.3**

a. Collaborate with peers to revise, refine, and adapt ideas to fit the given parameters of a drama theatre work.

b. Participate and contribute to physical and vocal exploration in an improvised or scripted drama/theatre work.

c. Practice and refine design and technical choices to support a devised or scripted drama/theatre work.

**Grade 4**
**TH:Cr3.1.4**

a. Revise and improve an improvised or scripted drama/theatre work through repetition and collaborative review.

b. Develop physical and vocal exercise techniques for an improvised or scripted drama/theatre work.

c. Collaborate on solutions to design and technical problems that arise in rehearsal for a drama/theatre work.

**Grade 5**
**TH:Cr3.1.5**

a. Revise and improve an improvised or scripted drama/theatre work through repetition and self-review.

b. Use physical and vocal exploration for character development in an improvised or scripted drama/theatre work.

c. Create innovative solutions to design and technical problems that arise in rehearsal for a drama/theatre work.

**Grade 6**
**TH:Cr3.1.6**

a. Articulate and examine choices to refine a devised or scripted drama/theatre work.

b. Identify effective physical and vocal traits of characters in an improvised or scripted drama/theatre work.

c. Explore a planned technical design during the rehearsal process for a devised or scripted drama/theatre work.

**Grade 7**
**TH:Cr3.1.7**

a. Demonstrate focus and concentration in the rehearsal process to analyze and refine choices in a devised or scripted drama/theatre work.

b. Develop effective physical and vocal traits of characters in an improvised or scripted drama/theatre work

c. Consider multiple planned technical design elements during the rehearsal process for a devised or scripted drama/theatre work.

**Grade 8**
**TH:Cr3.1.8**

a. Use repetition and analysis in order to revise devised or scripted drama/theatre work.

b. Refine effective physical, vocal, and physiological traits of characters in an improvised or scripted drama/ theatre work.

c. Implement and refine a planned technical design using simple technology during the rehearsal process for devised or scripted drama/ theatre work.

# Theatre/Performing

**#TH:Pr4.1**
**Process Component:** Select
**Anchor Standard:** Select, analyze, and interpret artistic work for presentation.

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**Grade K**
**TH:Pr4.1.K**

a. With prompting and support, identify characters and setting in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).

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**Grade 1**
**TH:Pr4.1.1**

a. Describe a story's character actions and dialogue in a guided drama experience (e.g., process drama, story drama, creative drama).

b. Use body, face, gestures, and voice to communicate character traits and emotions in a guided drama experience (e.g., process drama, story drama, creative drama).

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**Grade 2**
**TH:Pr4.1.2**

a Interpret story elements in a guided drama experience (e.g., process drama, story drama, creativedrama).

b. Alter voice and body to expand and articulate nuances of a character in a guided drama experience (e.g., (e.g., process drama, story drama, creative drama).

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**Grade 3**
**TH:Pr4.1.3**

a. Apply the elements of dramatic structure to a story and create a drama/theatre work.

b. Investigate how movement and voice are incorporated into drama/theatre work.

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**Grade 4**
**TH:Pr4.1.4**

a. Modify the dialogue and action to change the story in a drama/theatre work.

b. Make physical choices to develop a character in a drama/theatre work.

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**Grade 5**
**TH:Pr4.1.5**

a. Describe the underlying thoughts and emotions that create dialogue and action in a drama/theatre work.

b. Use physical choices to create meaning in a drama/theatre work.

**Grade 6**
**TH:Pr4.1.6**

a. Identify the essential events in a story or script that make up the dramatic structure in a drama/theatre work.

b. Experiment with various physical choices to communicate character in a drama/theatre work.

**Grade 7**
**TH:Pr4.1.7**

a. Consider various staging choices to enhance the story in a drama/theatre work.

b. Use various character objectives in a drama/theatre work.

**Grade 8**
**TH:Pr4.1.8**

a. Explore different pacing to better communicate the story in a drama/theatre work.

b. Use various character objectives and tactics in a drama/theatre work to overcome an obstacle.

# Theatre/Performing

**#TH:Pr5.1**
**Process Component:** Prepare
**Anchor Standard:** Develop and refine artistic techniques and work for presentation.

**Grade K**
**TH:Pr5.1.K**

a. With prompting and support, understand that voice and sound are fundamental to dramatic play and guided drama experiences (e.g., process drama, story drama, creative drama).

b. With prompting and support, explore and experiment with various technical elements in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 1**
**TH:Pr5.1.1**

a. With prompting and support, identify and understand that physical movement is fundamental to guided drama experiences (e.g., process drama, story drama, creative drama).

b. With prompting and support, identify technical elements that can be used in a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 2**
**TH:Pr5.1.2**

a. Demonstrate the relationship between and among body, voice, and mind in a guided drama experience (e.g., process drama, story drama, creative drama)

b. Explore technical elements in a guided drama experience (e.g., process drama)

**Grade 3**
**TH:Pr5.1.3**

a. Participate in a variety of physical, vocal, and cognitive exercises that can be used in a group setting for drama/theatre work.

b. Identify the basic technical elements that can be used in drama/theatre work.

**Grade 4**
**TH:Pr5.1.4**

a. Practice selected exercises that can be used in a group setting for drama/theatre work.

b. Propose the use of technical elements in a drama/theatre work.

**Grade 5**
**TH:Pr5.1.5**

a. Choose acting exercises that can be applied to a drama/theatre work.

b. Demonstrate the use of technical elements in a drama/theatre wor

**Grade 6**
**TH:Pr5.1.6**

a. Recognize how acting exercises and techniques can be applied to a drama/theatre work.

b. Articulate how technical elements are integrated into a drama/ theatre work.

**Grade 7**
**TH:Pr5.1.7**

a. Participate in a variety of acting exercises and techniques that can be applied in a rehearsal or drama/theatre performance

b. Choose a variety of technical elements that can be applied to a design in a drama/theatre work.

**Grade 8**
**TH:Pr5.1.8**

a. Use a variety of acting techniques to increase skills in a rehearsal or drama/theatre performance.

b. Use a variety of technical elements to create a design for a rehearsal or drama/theatre production.

# Theatre/Performing

**#TH:Pr6.1**
**Process Component:** Share, Present
**Anchor Standard:** Convey meaning through the presentation of artistic work.

**Grade K**
**TH:Pr6.1.K**

a. With prompting and support, use voice and sound in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 1**
**TH:Pr6.1.1**

a. With prompting and support, use movement and gestures to communicate emotions in a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 2**

**TH:Pr6.1.2**

a. Contribute to group guided drama experiences (e.g., process drama, story drama, creative drama) and informally share with peers.

**Grade 3**
**TH:Pr6.1.3**

a. Practice drama/theatre work and share reflections individually and in small groups.

**Grade 4**
**TH:Pr6.1.4**

a. Share small-group drama/theatre work, with peers as audience.

**Grade 5**
**TH:Pr6.1.5**

a. Present drama/theatre work informally to an audience.

**Grade 6**
**TH:Pr6.1.6**

a. Adapt a drama/theatre work and present it informally for an audience.

**Grade 7**
**TH:Pr6.1.7**

a. Participate in rehearsals for a drama/theatre work that will be shared with an audience.

**Grade 8**
**TH:Pr6.1.8**

a. Perform a rehearsed drama/theatre work for an audience.

# Theatre/Responding

**#TH:Re7.1**
**Process Component:** Reflect
**Anchor Standard:** Perceive and analyze artistic work.

**Grade K**
**TH:Re7.1.K**

a. With prompting and support, express an emotional response to characters in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 1**
**TH:Re7.1.1**

a. Recall choices made in a guided drama experience (e.g., process drama, story drama, creativedrama).

**Grade 2**

**TH:Re7.1.2**

a. Recognize when artistic choices are made in a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 3**
**TH:Re7.1.3**

a. Understand why artistic choices are made in a drama/theatre work.

**Grade 4**
**TH:Re7.1.4**

a. Identify artistic choices made in a drama/theatre work through participation and observation.

**Grade 5**
**TH:Re7.1.5**

a. Explain personal reactions to artistic choices made in a drama/theatre work through participation and observation.

**Grade 6**
**TH:Re7.1.6**

a. Describe and record personal reactions to artistic choices in a drama/theatre work.

**Grade 7**
**TH:Re7.1.7**

a. Compare recorded personal and peer reactions to artistic choices in a drama/ theatre work.

**Grade 8**
**TH:Re7.1.8**

a. Apply criteria to the evaluation of artistic choices in a drama/theatre work.

# Theatre/Responding

**#TH:Re8.1**
**Process Component:** Interpret
**Anchor Standard:** Interpret intent and meaning in artistic work.

**Grade K**
**TH:Re8.1.K**

a. With prompting and support, identify preferences in dramatic play, a guided drama experience (e.g., process drama, story drama, creative drama), or age-appropriate theatre performance.

b. With prompting and support, name and describe settings in dramatic play or a guided drama experience (e.g., process drama, story drama, creative drama)

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**Grade 1**
**TH:Re8.1.1**

a. Explain preferences and emotions in a guided drama experience (e.g., process drama, story drama, creative drama), or age-appropriate theatre performance.

b. Identify causes of character actions in a guided drama experience (e.g., process drama, story drama, or creative drama).

c. Explain or use text and pictures to describe how personal emotions and choices compare to the emotions and choices of characters in a guided drama experience (e.g., process drama, story drama, creative drama).

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**Grade 2**
**TH:Re8.1.2**

a. Explain how personal preferences and emotions affect an observer's response in a guided drama experience (e.g., process drama, story drama, creative drama), or age-appropriate theatre performance.

b. Identify causes and consequences of character actions in a guided drama experience (e.g., process drama, story drama, or creative drama).

c. Explain or use text and pictures to describe how others' emotions and choices may compare to the emotions and choices of characters in a guided drama experience (e.g., process drama, story drama, creative drama).

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**Grade 3**
**TH:Re8.1.3**

a. Consider multiple personal experiences when participating in or observing a drama/theatre work.

b. Consider multiple ways to develop a character using physical characteristics and prop or costume design choices that reflect cultural perspectives in drama/theatre work.

c. Examine how connections are made between oneself and a character's emotions in drama/theatre work.

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**Grade 4**
**TH:Re8.1.4**

a. Compare and contrast multiple personal experiences when participating in or observing a drama/theatre work.

b. Compare and contrast the qualities of characters in a drama/theatre work through physical

characteristics and prop or costume design choices that reflect cultural perspectives.

c. Identify and discuss physiological changes connected to emotions in drama/ theatre work.

**Grade 5**
**TH:Re8.1.5**

a. Justify responses based on personal experiences when participating in or observing a drama/theatre work.

b. Explain responses to characters based on cultural perspectives when participating in or observing drama/theatre work.

c. Investigate the effects of emotions on posture, gesture, breathing, and vocal intonation in a drama/theatre work.

**Grade 6**
**TH:Re8.1.6**

a. Explain how artists make choices based on personal experience in a drama/theatre work.

b. Identify cultural perspectives that may influence the evaluation of a drama/theatre work.

c. Identify personal aesthetics, preferences, and beliefs through participation in or observation of drama/ theatre work.

**Grade 7**
**TH:Re8.1.7**

a. Identify the artistic choices made based on personal experience in a drama/theatre work.

b. Describe how cultural perspectives can influence the evaluation of drama/theatre work.

c. Interpret how the use of personal aesthetics, preferences, and beliefs can be used to discuss drama/theatre work.

**Grade 8**
**TH:Re8.1.8**

a. Recognize and share artistic choices when participating in or observing a drama/theatre work.

b. Analyze how cultural perspectives influence the evaluation of a drama/theatre work.

c. Apply personal aesthetics, preferences, and beliefs to evaluate a drama/theatre work.

# Theatre/Responding

**#TH:Re9.1**
**Process Component:** Evaluate
**Anchor Standard:** Apply criteria to evaluate artistic work.

**Grade K**
**TH:Re9.1.K**

a. With prompting and support, actively engage with others in dramatic play or a guided drama experience ((e.g., process drama, story drama, creative drama)

**Grade 1**

**TH:Re9.1.1**

a. Build on others' ideas in a guided drama experience (e.g., process drama, story drama, creativedrama).

b. Identify props and costumes that might be used in a guided drama experience (e.g., process drama, story drama, creative drama).

c. Compare and contrast the experiences of characters in a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 2**

**TH:Re9.1.2**

a. Collaborate on a scene in a guided drama experience (e.g., process drama, story drama, creativedrama).

b. Use a prop or costume in a guided drama experience (e.g., process drama, story drama, creative drama) to describe characters, settings, or events.

c. Describe how characters respond to challenges in a guided drama experience (e.g., process drama, story drama, creative drama).

**Grade 3**

**TH:Re9.1.3**

a. Understand how and why groups evaluate drama/theatre work.

b. Consider and analyze technical elements from multiple drama/theatre works.

c. Evaluate and analyze problems and situations in a drama/theatre work from an audience perspective

**Grade 4**

**TH:Re9.1.4**

a. Propose a plan to evaluate drama/theatre work.

b. Investigate how technical elements may support a theme or idea in a drama/theatre work.

c. Observe how a character's choices impact an audience's perspective in a drama/theatre work.

**Grade 5**

**TH:Re9.1.5**

a. Develop and implement a plan to evaluate drama/theatre work.

b. Assess how technical elements represent the theme of a drama/theatre work.

c. Recognize how a character's circumstances impact an audience's perspective in a drama/theatre work.

**Grade 6**

**TH:Re9.1.6**

a. Use supporting evidence and criteria to evaluate

b. Apply the production elements used in a drama/theatre work to assess aesthetic choices.

c. Identify a specific audience or purpose for a drama/theatre work.

**Grade 7**
**TH:Re9.1.7**

a. Explain preferences, using supporting evidence and criteria to evaluate drama/theatre work.

b. Consider the aesthetics of the production elements in a drama/theatre work.

c. Identify how the intended purpose of a drama/theatre work appeals to a specific audience.

**Grade 8**
**TH:Re9.1.8**

a. Respond to a drama/ theatre work using supporting evidence, personal aesthetics, and artistic criteria.

b. Apply the production elements used in a drama/theatre work to assess aesthetic choices.

c. Assess the impact of a drama/theatre work on a specific audience.

# Visual Arts

Visual Arts include the traditional fine arts such as drawing, painting, printmaking, photography, and sculpture; media arts including film, graphic communications, animation, and emerging technologies; architectural, environmental, and industrial arts such as urban, interior, product, and landscape design; folk arts; and works of art such as ceramics, fibers, jewelry, works in wood, paper, and other materials. (National Art Education Association)

The Visual Arts Standards provide learning progressions from Pre k-12. Please read the conceptual framework narrative to learn more about the additional materials which provide a context for the grade level visual arts Performance Standards. These include:

- Philosophical Foundations and Lifelong Goals for Artistic Literacy;
- Definitions of the artistic processes of Creating, Presenting, Responding, and Connecting;
- Anchor Standards which are common across all five of the arts disciplines.

1. The standards provide the foundation for visual art education for all students. The standards support student-learning outcomes through big ideas – enduring understandings and essential questions. The concepts embedded in the standards reflect the scope of learning – the knowledge, skills, and understandings - taught through study of the visual arts. By including all aspects of creating, presenting, responding, and connecting in study of the visual arts, student learning through these standards explores the full scope of what it means to be an artistically literate citizen. While presented chronologically the processes are best designed and taught in a blended fashion to support rich artistic skills and behaviors.

2. The standards provide ways to address the content of visual art education within the school year. There are 15 Enduring Understandings with 15 correlated grade-by-grade (preK-8 and three levels for high school) Performance Standards. Art educators will be able to cluster group standards using more than one within a given instructional unit. The Performance Standards offer a practical system for teachers to use to inform their instruction.

3. The standards emphasize deep learning in the visual arts creating higher expectations and support college, career and citizenship readiness for all students. The performance standards offer learning progressions for students. Embedded in the standards are ideas about how arts learning can be broadened and deepened to support students in making meaning of their lives and their world. Essential questions are provided for teachers as thought starters promoting inquiry based teaching and learning. They support communicating and learning in art by providing language needed for students and stakeholders alike.

4. The standards provide opportunities for educators to reflect on their practice. The visual arts performance standards are fundamentally grounded in collective beliefs about what constitutes effective teaching and learning. Individual educators are encouraged to review and use the standards in achieving the goal of continuous improvement.

Whether it means updating curriculum or adapting an individual art lesson or curriculum unit, the new visual arts standards inspire and support the ways in which art educators keep their teaching fresh and dynamic.

# Visual Arts/Connecting

**#VA:Cn10.1**

**Process Component:** Interpret

**Anchor Standard:** Synthesize and relate knowledge and personal experiences to make art.

**Grade K**
**VA:Cn10.1.K**

Create art that tells a story about a life experience.

**Grade 1**
**VA:Cn10.1.1**

Identify times, places, and reasons by which students make art outside of school.

**Grade 2**
**VA:Cn10.1.2**

Create works of art about events in home, school, or community life.

**Grade 3**
**VA:Cn10.1.3**

Develop a work of art based on observations of surroundings.

**Grade 4**
**VA:Cn10.1.4**

Create works of art that reflect community cultural traditions.

**Grade 5**
**VA:Cn10.1.5**

Apply formal and conceptual vocabularies of art and design to view surroundings in new ways through art-making.

**Grade 6**
**VA:Cn10.1.6**

Generate a collection of ideas reflecting current interests and concerns that could be investigated in art-making.

**Grade 7**
**VA:Cn10.1.7**

Individually or collaboratively create visual documentation of places and times in which people gather to make and experience art or design in the community.

**Grade 8**
**VA:Cn10.1.8**

Make art collaboratively to reflect on and reinforce positive aspects of group identity.

# Visual Arts/Connecting

**#VA:Cn11.1**

**Process Component:** Synthesize

**Anchor Standard:** Relate artistic ideas and works with societal, cultural, and historical context to deepen understanding.

**Grade K**
**VA:Cn11.1.K**

Identify a purpose of an artwork.

**Grade 1**
**VA:Cn11.1.1**

Understand that people from different places and times have made art for a variety of reasons.

**Grade 2**
**VA:Cn11.1.2**

Compare and contrast cultural uses of artwork from different times and places.

**Grade 3**
**VA:Cn11.1.3**

Recognize that responses to art change depending on knowledge of the time and place in which it was made.

**Grade 4**
**VA:Cn11.1.4**

Through observation, infer information about time, place, and culture in which a work of art was created.

**Grade 5**
**VA:Cn11.1.5**

Identify how art is used to inform or change beliefs, values, or behaviors of an individual or society.

**Grade 6**
**VA:Cn11.1.6**

Analyze how art reflects changing times, traditions, resources, and cultural uses.

**Grade 7**
**VA:Cn11.1.7**

Analyze how response to art is influenced by understanding the time and place in which it was created, the available resources, and cultural uses.

**Grade 8**
**VA:Cn11.1.8**

Distinguish different ways art is used to represent, establish, reinforce, and reflect group identity.

# Visual Arts/Creating

**#VA:Cr1.1**
**Process Component:** Investigate, Plan, Make
**Anchor Standard:** Generate and conceptualize artistic ideas and work.

**Grade K**
**VA:Cr1.1.K**

Engage in exploration and imaginative play with materials.

**Grade 1**
**VA:Cr1.1.1**

Engage collaboratively in exploration and imaginative play with materials.

**Grade 2**
**VA:Cr1.1.2**

Brainstorm collaboratively multiple approaches to an art or design problem.

**Grade 3**
**VA:Cr1.1.3**

Elaborate on an imaginative idea.

**Grade 4**
**VA:Cr1.1.4**

Brainstorm multiple approaches to a creative art or design problem.

**Grade 5**
**VA:Cr1.1.5**

Combine ideas to generate an innovative idea for art-making.

**Grade 6**
**VA:Cr1.1.6**

Combine concepts collaboratively to generate innovative ideas for creating art.

**Grade 7**
**VA:Cr1.1.7**

Apply methods to overcome creative blocks.

**Grade 8**
**VA:Cr1.1.8**

Document early stages of the creative process visually and/or verbally in traditional or new media.

# VisualArts/Creating

**#VA:Cr1.2**
**Process Component:** Investigate, Plan, Make
**Anchor Standard:** Generate and conceptualize artistic ideas and work.

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**Grade K**
**VA:Cr1.2.K**

Engage collaboratively in creative art-making in response to an artistic problem.

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**Grade 1**
**VA:Cr1.2.1**

Use observation and investigation in preparation for making a work of art.

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**Grade 2**
**VA:Cr1.2.2**

Make art or design with various materials and tools to explore personal interests, questions, and curiosity.

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**Grade 3**
**VA:Cr1.2.3**

Apply knowledge of available resources, tools, and technologies to investigate personal ideas through the art-making process.

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**Grade 4**
**VA:Cr1.2.4**

Collaboratively set goals and create artwork that is meaningful and has purpose to the makers.

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**Grade 5**
**VA:Cr1.2.5**

Identify and demonstrate diverse methods of artistic investigation to choose an approach for beginning a work of art.

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**Grade 6**
**VA:Cr1.2.6**

Formulate an artistic investigation of personally relevant content for creating art.

**Grade 7**
**VA:Cr1.2.7**

Develop criteria to guide making a work of art or design to meet an identified goal.

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**Grade 8**
**VA:Cr1.2.8**

Collaboratively shape an artistic investigation of an aspect of present-day life using a contemporary practice of art and design.

# Visual Arts/Creating

**#VA:Cr2.1**
**Process Component:** Investigate
**Anchor Standard:** Organize and develop artistic ideas and work.

**Grade K**
**VA:Cr2.1.K**

Through experimentation, build skills in various media and approaches to art-making.

**Grade 1**
**VA:Cr2.1.1**

Explore uses of materials and tools to create works of art or design

**Grade 2**
**VA:Cr2.1.2**

Experiment with various materials and tools to explore personal interests in a work of art or design.

**Grade 3**
**VA:Cr2.1.3**

Create personally satisfying artwork using a variety of artistic processes and materials.

**Grade 4**
**VA:Cr2.1.4**

Explore and invent art-making techniques and approaches.

**Grade 5**
**VA:Cr2.1.5**

Experiment and develop skills in multiple art-making techniques and approaches through practice.

**Grade 6**
**VA:Cr2.1.6**

Demonstrate openness in trying new ideas, materials, methods, and approaches in making works of art and design.

**Grade 7**
**VA:Cr2.1.7**

Demonstrate persistence in developing skills with various materials, methods, and approaches in creating works of art or design.

**Grade 8**
**VA:Cr2.1.8**

Demonstrate willingness to experiment, innovate, and take risks to pursue ideas, forms, and meanings that emerge in the process of art-making or designing.

# VisualArts/Creating

**#VA:Cr2.2**
**Process Component:** Investigate
**Anchor Standard:** Organize and develop artistic ideas and work.

**Grade K**
**VA:Cr2.2.K**

Identify safe and non-toxic art materials, tools, and equipment.

**Grade 1**
**VA:Cr2.2.1**

Demonstrate safe and proper procedures for using materials, tools, and equipment while making art.

**Grade 2**
**VA:Cr2.2.2**

Demonstrate safe procedures for using and cleaning art tools, equipment, and studio spaces.

**Grade 3**
**VA:Cr2.2.3**

Demonstrate an understanding of the safe and proficient use of materials, tools, and equipment for a variety of artistic processes.

**Grade 4**
**VA:Cr2.2.4**

When making works of art, utilize and care for materials, tools, and equipment in a manner that prevents danger to oneself and others.

**Grade 5**
**VA:Cr2.2.5**

Demonstrate quality craftsmanship through care for and use of materials, tools, and equipment.

**Grade 6**
**VA:Cr2.2.6**

Explain environmental implications of conservation, care, and clean-up of art materials, tools, and equipment.

**Grade 7**
**VA:Cr2.2.7**

Demonstrate awareness of ethical responsibility to oneself and others when posting and sharing images and other materials through the Internet, social media, and other communication formats.

**Grade 8**
**VA:Cr2.2.8**

Demonstrate awareness of practices, issues, and ethics of appropriation, fair use, copyright, open source, and creative commons as they apply to creating works of art and design.

## Visual Arts/Creating

**#VA:Cr2.3**
**Process Component:** Investigate
**Anchor Standard:** Organize and develop artistic ideas and work.

**Grade K**
**VA:Cr2.3.K**

Create art that represents natural and constructed environments.

**Grade 1**
**VA:Cr2.3.1**

Identify and classify uses of everyday objects through drawings, diagrams, sculptures, or other visual means.

**Grade 2**
**VA:Cr2.3.2**

Repurpose objects to make something new.

**Grade 3**
**VA:Cr2.3.3**

Individually or collaboratively construct representations, diagrams, or maps of places that are part of everyday life.

**Grade 4**
**VA:Cr2.3.4**

Document, describe, and represent regional constructed environments.

**Grade 5**
**VA:Cr2.3.5**

Identify, describe, and visually document places and/or objects of personal significance.

**Grade 6**
**VA:Cr2.3.6**

Design or redesign objects, places, or systems that meet the identified needs of diverse users.

**Grade 7**
**VA:Cr2.3.7**

Apply visual organizational strategies to design and produce a work of art, design, or media that clearly communicates information or ideas.

**Grade 8**

**VA:Cr2.3.8**

Select, organize, and design images and words to make visually clear and compelling presentations.

# VisualArts/Creating

**#VA:Cr3.1**
**Process Component:** Reflect, Refine, Continue
**Anchor Standard:** Refine and complete artistic work.

**Grade K**
**VA:Cr3.1.K**

Explain the process of making art while creating.

**Grade 1**
**VA:Cr3.1.1**

Use art vocabulary to describe choices while creating art.

**Grade 2**
**VA:Cr3.1.2**

Discuss and reflect with peers about choices made in creating artwork.

**Grade 3**
**VA:Cr3.1.3**

Elaborate visual information by adding details in an artwork to enhance emerging meaning.

**Grade 4**
**VA:Cr3.1.4**

Revise artwork in progress on the basis of insights gained through peer discussion.

**Grade 5**
**VA:Cr3.1.5**

Create artist statements using art vocabulary to describe personal choices in art-making

**Grade 6**
**VA:Cr3.1.6**

Reflect on whether personal artwork conveys the intended meaning and revise accordingly.

**Grade 7**
**VA:Cr3.1.7**

Reflect on and explain important information about personal artwork in an artist statement or another format.

**Grade 8**
**VA:Cr3.1.8**

Apply relevant criteria to examine, reflect on, and plan revisions for a work of art or design in progress.

# Visual Arts/Presenting

**#VA:Pr.4.1**
**Process Component:** Relate
**Anchor Standard:** Select, analyze and interpret artistic work for presentation.

**Grade K**
**VA:Pr.4.1.K**

Select art objects for personal portfolio and display, explaining why they were chosen.

**Grade 1**
**VA:Pr.4.1.1**

Explain why some objects, artifacts, and artwork are valued over others

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**Grade 2**
**VA:Pr.4.1.2**

Categorize artwork based on a theme or concept for an exhibit.

**Grade 3**
**VA:Pr.4.1.3**

Investigate and discuss possibilities and limitations of spaces, including electronic, for exhibiting artwork.

**Grade 4**
**VA:Pr.4.1.4**

Analyze how past, present, and emerging technologies have impacted the preservation and presentation of artwork.

**Grade 5**
**VA:Pr.4.1.5**

Define the roles and responsibilities of a curator, explaining the skills and knowledge needed

in preserving, maintaining, and presenting objects, artifacts, and artwork.

**Grade 6**
**VA:Pr.4.1.6**

Analyze similarities and differences associated with preserving and presenting two-dimensional, three- dimensional, and digital artwork.

**Grade 7**
**VA:Pr.4.1.7**

Compare and contrast how technologies have changed the way artwork is preserved, presented, and experienced.

**Grade 8**
**VA:Pr.4.1.8**

Develop and apply criteria for evaluating a collection of artwork for presentation.

## Visual Arts/Presenting

**#VA:Pr5.1**
**Process Component:** Select
**Anchor Standard:** Develop and refine artistic techniques and work for presentation.

**Grade K**
**VA:Pr5.1.K**

Explain the purpose of a portfolio or collection.

**Grade 1**
**VA:Pr5.1.1**

Ask and answer questions such as where, when, why, and how artwork should be prepared for presentation or preservation.

**Grade 2**
**VA:Pr5.1.2**

Distinguish between different materials or artistic techniques for preparing artwork for presentation.

**Grade 3**
**VA:Pr5.1.3**

Identify exhibit space and prepare works of art including artists' statements, for presentation.

**Grade 4**
**VA:Pr5.1.4**

Analyze the various considerations for presenting and protecting art in various locations, indoor or outdoor settings, in temporary or permanent forms, and in physical or digital.

**Grade 5**
**VA:Pr5.1.5**

Develop a logical argument for safe and effective use of materials and techniques for preparing and presenting artwork.

**Grade 6**
**VA:Pr5.1.6**

Individually or collaboratively, develop a visual plan for displaying works of art, analyzing exhibit space, the needs of the viewer, and the layout of the exhibit.

**Grade 7**
**VA:Pr5.1.7**

Based on criteria, analyze and evaluate methods for preparing and presenting art.

**Grade 8**
**VA:Pr5.1.8**

Collaboratively prepare and present selected theme-based artwork for display, and formulate exhibition narratives for the viewer.

# Visual Arts/Presenting

**#VA:Pr6.1**
**Process Component:** Analyze
**Anchor Standard:** Convey meaning through the presentation of artistic work.

**Grade K**
**VA:Pr6.1.K**

Explain what an art museum is and distinguish how an art museum is different from other buildings.

**Grade 1**
**VA:Pr6.1.1**

Identify the roles and responsibilities of people who work in and visit museums and other art venues.

**Grade 2**
**VA:Pr6.1.2**

Analyze how art exhibited inside and outside of schools (such as in museums, galleries, virtual spaces, and other venues) contributes to communities.

**Grade 3**
**VA:Pr6.1.3**

Identify and explain how and where different cultures record and illustrate stories and history of life through art.

**Grade 4**
**VA:Pr6.1.4**

Compare and contrast purposes of art museums, art galleries, and other venues, as well as the types of personal experiences they provide.

**Grade 5**
**VA:Pr6.1.5**

Cite evidence about how an exhibition in a museum or other venue presents ideas and provides information about a specific concept or topic.

**Grade 6**
**VA:Pr6.1.6**

Assess, explain, and provide evidence of how museums or other venues reflect history and values of a community.

**Grade 7**
**VA:Pr6.1.7**

Compare and contrast viewing and experiencing collections and exhibitions in different venues.

**Grade 8**
**VA:Pr6.1.8**

Analyze why and how an exhibition or collection may influence ideas, beliefs, and experiences.

# Visual Arts/Responding

**#VA:Re7.1**
**Process Component:** Share
**Anchor Standard:** Perceive and analyze artistic work.

**Grade K**
**VA:Re7.1.K**

Identify uses of art within one's personal environment.

**Grade 1**
**VA:Re7.1.1**

Select and describe works of art that illustrate daily life experiences of one's self and other.

**Grade 2**
**VA:Re7.1.2**

Perceive and describe aesthetic characteristics of one's natural world and constructed environments.

**Grade 3**
**VA:Re7.1.3**

Speculate about processes an artist uses to create a work of art.

**Grade 4**
**VA:Re7.1.4**

Compare responses to a work of art before and after working in similar media.

**Grade 5**
**VA:Re7.1.5**

Compare one's own interpretation of a work of art with the interpretation of others.

**Grade 6**
**VA:Re7.1.6**

Identify and interpret works of art or design that reveal how people live around the world and what they value.

**Grade 7**
**VA:Re7.1.7**

Explain how the method of display, the location, and the experience of an artwork influence how it is perceived and valued.

**Grade 8**
**VA:Re7.1.8**

Explain how a person's aesthetic choices are influenced by culture and environment and impact the visual image that one conveys to others.

# Visual Arts/Responding

**#VA:Re7.2**
**Process Component:** Perceive
**Anchor Standard:** Perceive and analyze artistic work

**Grade K**
**VA:Re7.2.K**

Describe what an image represents.

**Grade 1**
**VA:Re7.2.1**

Compare images that represent the same subject.

**Grade 2**
**VA:Re7.2.2**

Categorize images based on expressive properties.

**Grade 3**
**VA:Re7.2.3**

Determine messages communicated by an image.

**Grade 4**
**VA:Re7.2.4**

Analyze components in visual imagery that convey messages.

**Grade 5**
**VA:Re7.2.5**

Identify and analyze cultural associations suggested by visual imagery.

**Grade 6**
**VA:Re7.2.6**

Analyze ways that visual components and cultural associations suggested by images influence ideas, emotions, and actions.

**Grade 7**
**VA:Re7.2.7**

Analyze multiple ways that images influence specific audiences.

**Grade 8**
**VA:Re7.2.8**

Compare and contrast contexts and media in which viewers encounter images that influence ideas, emotions, and actions.

# Visual Arts/Responding

**#VA:Re8.1**
**Process Component:** Perceive
**Anchor Standard:** Interpret intent and meaning in artistic work.

**Grade K**
**VA:Re8.1.K**

Interpret art by identifying subject matter and describing relevant details.

**Grade 1**
**VA:Re8.1.1**

Interpret art by categorizing subject matter and identifying the characteristics of form.

**Grade 2**
**VA:Re8.1.2**

Interpret art by identifying the mood suggested by a work of art and describing relevant subject matter and characteristics of form.

**Grade 3**
**VA:Re8.1.3**

Interpret art by analyzing use of media to create subject matter, characteristics of form, and mood.

**Grade 4**
**VA:Re8.1.4**

Interpret art by referring to contextual information and analyzing relevant subject matter, characteristics of form, and use of media.

**Grade 5**
**VA:Re8.1.5**

Interpret art by analyzing characteristics of form and structure, contextual information, subject matter, visual elements, and use of media to identify ideas and mood conveyed.

**Grade 6**
**VA:Re8.1.6**

Interpret art by distinguishing between relevant and non-relevant contextual information and analyzing subject matter, characteristics of form and structure, and use of media to identify ideas and mood conveyed.

**Grade 7**
**VA:Re8.1.7**

Interpret art by analyzing art-making approaches, the characteristics of form and structure, relevant contextual information, subject matter, and use of media to identify ideas and mood conveyed.

**Grade 8**
**VA:Re8.1.8**

Interpret art by analyzing how the interaction of subject matter, characteristics of form and structure, use of media, art-making approaches, and relevant contextual information contributes to understanding messages or ideas and mood conveyed.

# Visual Arts/Responding

**#VA:Re9.1**

**Process Component:** Analyze
**Anchor Standard:** Apply criteria to evaluate artistic work.

**Grade K**
**VA:Re9.1.K**

Explain reasons for selecting a preferred artwork.

**Grade 1**
**VA:Re9.1.1**

Classify artwork based on different reasons for preferences.

**Grade 2**
**VA:Re9.1.2**

Use learned art vocabulary to express preferences about artwork.

**Grade 3**
**VA:Re9.1.3**

Evaluate an artwork based on given criteria.

**Grade 4**
**VA:Re9.1.4**

Apply one set of criteria to evaluate more than one work of art.

**Grade 5**
**VA:Re9.1.5**

Recognize differences in criteria used to evaluate works of art depending on styles, genres, and media as well as historical and cultural contexts.

**Grade 6**
**VA:Re9.1.6**

Develop and apply relevant criteria to evaluate a work of art.

**Grade 7**
**VA:Re9.1.7**

Compare and explain the difference between an evaluation of an artwork based on personal criteria and an evaluation of an artwork based on a set of established criteria.

**Grade 8**
**VA:Re9.1.8**

Create a convincing and logical argument to support an evaluation of art.

# College and Career Readiness Anchor Standards for Reading

The K–5 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

## Key Ideas and details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

## Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

## Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.*
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

## Range of reading and Level of text Complexity

10. Read and comprehend complex literary and informational texts independently and proficiently.

*Please see "Research to Build and Present Knowledge" in Writing and "Comprehension and Collaboration" in Speaking and Listening for additional standards relevant to gathering, assessing, and applying information from print and digital sources.

### Note on range and content of student reading

*To build a foundation for college and career readiness, students must read widely and deeply from among a broad range of high-quality, increasingly challenging literary and informational texts. Through extensive reading of stories, dramas, poems, and myths from diverse cultures and different time periods, students gain literary and cultural knowledge as well as familiarity with various text structures and elements. By reading texts in history/social studies, science, and other disciplines, students build a foundation of knowledge in these fields that will also give them the background to be better readers in all content areas. Students can only gain this foundation when the curriculum is intentionally and coherently structured to develop rich content knowledge within and across grades. Students also acquire the habits of reading independently and closely, which are essential to their future success.*

# Reading Standards for Literature K–5

RL

The following standards offer a focus for instruction each year and help ensure that students gain adequate exposure to a range of texts and tasks. Rigor is also infused through the requirement that students read increasingly complex texts through the grades. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.*

| Kindergartners: | Grade 1 students: | Grade 2 students: |
|---|---|---|
| **Key Ideas and details** | | |
| 1. With prompting and support, ask and answer questions about key details in a text. | 1. Ask and answer questions about key details in a text. | 1. Ask and answer such questions as *who*, *what*, *where*, *when*, *why*, and *how* to demonstrate understanding of key details in a text. |
| 2. With prompting and support, retell familiar stories, including key details. | 2. Retell stories, including key details, and demonstrate understanding of their central message or lesson. | 2. Recount stories, including fables and folktales from diverse cultures, and determine their central message, lesson, or moral. |
| 3. With prompting and support, identify characters, settings, and major events in a story. | 3. Describe characters, settings, and major events in a story, using key details. | 3. Describe how characters in a story respond to major events and challenges. |
| **Craft and Structure** | | |
| 4. Ask and answer questions about unknown words in a text. | 4. Identify words and phrases in stories or poems that suggest feelings or appeal to the senses. | 4. Describe how words and phrases (e.g., regular beats, alliteration, rhymes, repeated lines) supply rhythm and meaning in a story, poem, or song. |
| 5. Recognize common types of texts (e.g., storybooks, poems). | 5. Explain major differences between books that tell stories and books that give information, drawing on a wide reading of a range of text types. | 5. Describe the overall structure of a story, including describing how the beginning introduces the story and the ending concludes the action. |
| 6. With prompting and support, name the author and illustrator of a story and define the role of each in telling the story. | 6. Identify who is telling the story at various points in a text. | 6. Acknowledge differences in the points of view of characters, including by speaking in a different voice for each character when reading dialogue aloud. |
| **Integration of Knowledge and Ideas** | | |
| 7. With prompting and support, describe the relationship between illustrations and the story in which they appear (e.g., what moment in a story an illustration depicts). | 7. Use illustrations and details in a story to describe its characters, setting, or events. | 7. Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot. |
| 8. (Not applicable to literature) | 8. (Not applicable to literature) | 8. (Not applicable to literature) |
| 9. With prompting and support, compare and contrast the adventures and experiences of characters in familiar stories. | 9. Compare and contrast the adventures and experiences of characters in stories. | 9. Compare and contrast two or more versions of the same story (e.g., Cinderella stories) by different authors or from different cultures. |
| **range of reading and Level of text Complexity** | | |
| 10. Actively engage in group reading activities with purpose and understanding. | 10. With prompting and support, read prose and poetry of appropriate complexity for grade 1. | 10. By the end of the year, read and comprehend literature, including stories and poetry, in the grades 2–3 text complexity band proficiently, with scaffolding as needed at the high end of the range. |

# Reading Standards for Literature K–5

RL

| Grade 3 students: | Grade 4 students: | Grade 5 students: |
|---|---|---|
| **Key Ideas and details** | | |
| 1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. | 1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. | 1. Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. |
| 2. Recount stories, including fables, folktales, and myths from diverse cultures; determine the central message, lesson, or moral and explain how it is conveyed through key details in the text. | 2. Determine a theme of a story, drama, or poem from details in the text; summarize the text. | 2. Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to challenges or how the speaker in a poem reflects upon a topic; summarize the text. |
| 3. Describe characters in a story (e.g., their traits, motivations, or feelings) and explain how their actions contribute to the sequence of events. | 3. Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text (e.g., a character's thoughts, words, or actions). | 3. Compare and contrast two or more characters, settings, or events in a story or drama, drawing on specific details in the text (e.g., how characters interact). |
| **Craft and Structure** | | |
| 4. Determine the meaning of words and phrases as they are used in a text, distinguishing literal from nonliteral language. | 4. Determine the meaning of words and phrases as they are used in a text, including those that allude to significant characters found in mythology (e.g., Herculean). | 4. Determine the meaning of words and phrases as they are used in a text, including figurative language such as metaphors and similes. |
| 5. Refer to parts of stories, dramas, and poems when writing or speaking about a text, using terms such as chapter, scene, and stanza; describe how each successive part builds on earlier sections. | 5. Explain major differences between poems, drama, and prose, and refer to the structural elements of poems (e.g., verse, rhythm, meter) and drama (e.g., casts of characters, settings, descriptions, dialogue, stage directions) when writing or speaking about a text. | 5. Explain how a series of chapters, scenes, or stanzas fits together to provide the overall structure of a particular story, drama, or poem. |
| 6. Distinguish their own point of view from that of the narrator or those of the characters. | 6. Compare and contrast the point of view from which different stories are narrated, including the difference between first- and third-person narrations. | 6. Describe how a narrator's or speaker's point of view influences how events are described. |
| **Integration of Knowledge and Ideas** | | |
| 7. Explain how specific aspects of a text's illustrations contribute to what is conveyed by the words in a story (e.g., create mood, emphasize aspects of a character or setting). | 7. Make connections between the text of a story or drama and a visual or oral presentation of the text, identifying where each version reflects specific descriptions and directions in the text. | 7. Analyze how visual and multimedia elements contribute to the meaning, tone, or beauty of a text (e.g., graphic novel, multimedia presentation of fiction, folktale, myth, poem). |
| 8. (Not applicable to literature) | 8. (Not applicable to literature) | 8. (Not applicable to literature) |
| 9. Compare and contrast the themes, settings, and plots of stories written by the same author about the same or similar characters (e.g., in books from a series). | 9. Compare and contrast the treatment of similar themes and topics (e.g., opposition of good and evil) and patterns of events (e.g., the quest) in stories, myths, and traditional literature from different cultures. | 9. Compare and contrast stories in the same genre (e.g., mysteries and adventure stories) on their approaches to similar themes and topics. |
| **range of reading and Level of text Complexity** | | |
| 10. By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 2–3 text complexity band independently and proficiently. | 10. By the end of the year, read and comprehend literature, including stories, dramas, and poetry, in the grades 4–5 text complexity band proficiently, with scaffolding as needed at the high end of the range. | 10. By the end of the year, read and comprehend literature, including stories, dramas, and poetry, at the high end of the grades 4–5 text complexity band independently and proficiently. |

# Reading Standards for Informational Text K–5



| Kindergartners: | Grade 1 students: | Grade 2 students: |
|---|---|---|
| **Key Ideas and details** | | |
| 1. With prompting and support, ask and answer questions about key details in a text. | 1. Ask and answer questions about key details in a text. | 1. Ask and answer such questions as *who, what, where, when, why,* and *how* to demonstrate understanding of key details in a text. |
| 2. With prompting and support, identify the main topic and retell key details of a text. | 2. Identify the main topic and retell key details of a text. | 2. Identify the main topic of a multiparagraph text as well as the focus of specific paragraphs within the text. |
| 3. With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text. | 3. Describe the connection between two individuals, events, ideas, or pieces of information in a text. | 3. Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. |
| **Craft and Structure** | | |
| 4. With prompting and support, ask and answer questions about unknown words in a text. | 4. Ask and answer questions to help determine or clarify the meaning of words and phrases in a text. | 4. Determine the meaning of words and phrases in a text relevant to a *grade 2 topic or subject area*. |
| 5. Identify the front cover, back cover, and title page of a book. | 5. Know and use various text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) to locate key facts or information in a text. | 5. Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently. |
| 6. Name the author and illustrator of a text and define the role of each in presenting the ideas or information in a text. | 6. Distinguish between information provided by pictures or other illustrations and information provided by the words in a text. | 6. Identify the main purpose of a text, including what the author wants to answer, explain, or describe. |
| **Integration of Knowledge and Ideas** | | |
| 7. With prompting and support, describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts). | 7. Use the illustrations and details in a text to describe its key ideas. | 7. Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text. |
| 8. With prompting and support, identify the reasons an author gives to support points in a text. | 8. Identify the reasons an author gives to support points in a text. | 8. Describe how reasons support specific points the author makes in a text. |
| 9. With prompting and support, identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures). | 9. Identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures). | 9. Compare and contrast the most important points presented by two texts on the same topic. |
| **range of reading and Level of text Complexity** | | |
| 10. Actively engage in group reading activities with purpose and understanding. | 10. With prompting and support, read informational texts appropriately complex for grade 1. | 10. By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 2–3 text complexity band proficiently, with scaffolding as needed at the high end of the range. |

# Reading Standards for Informational Text K–5



| Grade 3 students: | Grade 4 students: | Grade 5 students: |
|---|---|---|
| **Key Ideas and details** | | |
| 1. Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. | 1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. | 1. Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. |
| 2. Determine the main idea of a text; recount the key details and explain how they support the main idea. | 2. Determine the main idea of a text and explain how it is supported by key details; summarize the text. | 2. Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. |
| 3. Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. | 3. Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. | 3. Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text. |
| **Craft and Structure** | | |
| 4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a *grade 3 topic or subject area*. | 4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a *grade 4 topic or subject area*. | 4. Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a *grade 5 topic or subject area*. |
| 5. Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently. | 5. Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text. | 5. Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts. |
| 6. Distinguish their own point of view from that of the author of a text. | 6. Compare and contrast a firsthand and secondhand account of the same event or topic; describe the differences in focus and the information provided. | 6. Analyze multiple accounts of the same event or topic, noting important similarities and differences in the point of view they represent. |
| **Integration of Knowledge and Ideas** | | |
| 7. Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). | 7. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. | 7. Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. |
| 8. Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence). | 8. Explain how an author uses reasons and evidence to support particular points in a text. | 8. Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). |
| 9. Compare and contrast the most important points and key details presented in two texts on the same topic. | 9. Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. | 9. Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. |
| **Range of reading and Level of text Complexi ty** | | |
| 10. By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 2–3 text complexity band independently and proficiently. | 10. By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4–5 text complexity band proficiently, with scaffolding as needed at the high end of the range. | 10. By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4–5 text complexity band independently and proficiently. |

# Reading Standards: Foundational Skills (K–5)

RF

These standards are directed toward fostering students' understanding and working knowledge of concepts of print, the alphabetic principle, and other basic conventions of the English writing system. These foundational skills are not an end in and of themselves; rather, they are necessary and important components of an effective, comprehensive reading program designed to develop proficient readers with the capacity to comprehend texts across a range of types and disciplines. Instruction should be differentiated: good readers will need much less practice with these concepts than struggling readers will. The point is to teach students what they need to learn and not what they already know—to discern when particular children or activities warrant more or less attention.

***Note: In kindergarten, children are expected to demonstrate increasing awareness and competence in the areas that follow.***

| Kindergartners: | Grade 1 students: |
|---|---|
| **Print Concepts** | |
| 1. Demonstrate understanding of the organization and basic features of print.<br>a. Follow words from left to right, top to bottom, and page by page.<br>b. Recognize that spoken words are represented in written language by specific sequences of letters.<br>c. Understand that words are separated by spaces in print.<br>d. Recognize and name all upper- and lowercase letters of the alphabet. | 1. Demonstrate understanding of the organization and basic features of print.<br>a. Recognize the distinguishing features of a sentence (e.g., first word, capitalization, ending punctuation). |
| **Phonological awareness** | |
| 2. Demonstrate understanding of spoken words, syllables, and sounds (phonemes).<br>a. Recognize and produce rhyming words.<br>b. Count, pronounce, blend, and segment syllables in spoken words.<br>c. Blend and segment onsets and rimes of single-syllable spoken words.<br>d. Isolate and pronounce the initial, medial vowel, and final sounds (phonemes) in three-phoneme (consonant-vowel-consonant, or CVC) words.* (This does not include CVCs ending with /l/, /r/, or /x/.)<br>e. Add or substitute individual sounds (phonemes) in simple, one-syllable words to make new words. | 2. Demonstrate understanding of spoken words, syllables, and sounds (phonemes).<br>a. Distinguish long from short vowel sounds in spoken single-syllable words.<br>b. Orally produce single-syllable words by blending sounds (phonemes), including consonant blends.<br>c. Isolate and pronounce initial, medial vowel, and final sounds (phonemes) in spoken single-syllable words.<br>d. Segment spoken single-syllable words into their complete sequence of individual sounds (phonemes). |

*Words, syllables, or phonemes written in /slashes/ refer to their pronunciation or phonology. Thus, /CVC/ is a word with three phonemes regardless of the number of letters in the spelling of the word.

# Reading Standards: Foundational Skills (K–5)

RF

***Note: In kindergarten children are expected to demonstrate increasing awareness and competence in the areas that follow.***

| Kindergartners: | Grade 1 students: | Grade 2 students: |
|---|---|---|
| **Phonics and Word Recognition** | | |
| 3. Know and apply grade-level phonics and word analysis skills in decoding words.<br>a. Demonstrate basic knowledge of one-to-one letter-sound correspondences by producing the primary sound or many of the most frequent sounds for each consonant.<br>b. Associate the long and short sounds with common spellings (graphemes) for the five major vowels.<br>c. Read common high-frequency words by sight (e.g., *the*, *of*, *to*, *you*, *she*, *my*, *is*, *are*, *do*, *does*).<br>d. Distinguish between similarly spelled words by identifying the sounds of the letters that differ. | 3. Know and apply grade-level phonics and word analysis skills in decoding words.<br>a. Know the spelling-sound correspondences for common consonant digraphs.<br>b. Decode regularly spelled one-syllable words.<br>c. Know final -e and common vowel team conventions for representing long vowel sounds.<br>d. Use knowledge that every syllable must have a vowel sound to determine the number of syllables in a printed word.<br>e. Decode two-syllable words following basic patterns by breaking the words into syllables.<br>f. Read words with inflectional endings.<br>g. Recognize and read grade-appropriate irregularly spelled words. | 3. Know and apply grade-level phonics and word analysis skills in decoding words.<br>a. Distinguish long and short vowels when reading regularly spelled one-syllable words.<br>b. Know spelling-sound correspondences for additional common vowel teams.<br>c. Decode regularly spelled two-syllable words with long vowels.<br>d. Decode words with common prefixes and suffixes.<br>e. Identify words with inconsistent but common spelling-sound correspondences.<br>f. Recognize and read grade-appropriate irregularly spelled words. |
| **Fluency** | | |
| 4. Read emergent-reader texts with purpose and understanding. | 4. Read with sufficient accuracy and fluency to support comprehension.<br>a. Read grade-level text with purpose and understanding.<br>b. Read grade-level text orally with accuracy, appropriate rate, and expression on successive readings.<br>c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary. | 4. Read with sufficient accuracy and fluency to support comprehension.<br>a. Read grade-level text with purpose and understanding.<br>b. Read grade-level text orally with accuracy, appropriate rate, and expression on successive readings.<br>c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary. |

# Reading Standards: Foundational Skills (K–5)



| Grade 3 students: | Grade 4 students: | Grade 5 students: |
|---|---|---|
| **Phonics and Word Recognition** | | |
| 3. Know and apply grade-level phonics and word analysis skills in decoding words.<br>a. Identify and know the meaning of the most common prefixes and derivational suffixes.<br>b. Decode words with common Latin suffixes.<br>c. Decode multisyllable words.<br>d. Read grade-appropriate irregularly spelled words. | 3. Know and apply grade-level phonics and word analysis skills in decoding words.<br>a. Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context. | 3. Know and apply grade-level phonics and word analysis skills in decoding words.<br>a. Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context. |
| **Fluency** | | |
| 4. Read with sufficient accuracy and fluency to support comprehension.<br>a. Read grade-level text with purpose and understanding.<br>b. Read grade-level prose and poetry orally with accuracy, appropriate rate, and expression on successive readings<br>c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary. | 4. Read with sufficient accuracy and fluency to support comprehension.<br>a. Read grade-level text with purpose and understanding.<br>b. Read grade-level prose and poetry orally with accuracy, appropriate rate, and expression on successive readings.<br>c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary. | 4. Read with sufficient accuracy and fluency to support comprehension.<br>a. Read grade-level text with purpose and understanding.<br>b. Read grade-level prose and poetry orally with accuracy, appropriate rate, and expression on successive readings.<br>c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary. |

# College and Career Readiness anchor Standards for Writing

The K–5 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

## text types and Purposes*

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

## Production and distribution of Writing

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

## Research to Build and Present Knowledge

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

## Range of Writing

10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

*These broad types of writing include many subgenres. See Appendix A for definitions of key writing types.

### Note on range and content of student writing

*To build a foundation for college and career readiness, students need to learn to use writing as a way of offering and supporting opinions, demonstrating understanding of the subjects they are studying, and conveying real and imagined experiences and events. They learn to appreciate that a key purpose of writing is to communicate clearly to an external, sometimes unfamiliar audience, and they begin to adapt the form and content of their writing to accomplish a particular task and purpose. They develop the capacity to build knowledge on a subject through research projects and to respond analytically to literary and informational sources. To meet these goals, students must devote significant time and effort to writing, producing numerous pieces over short and extended time frames throughout the year.*

# Writing Standards K–5



The following standards for K–5 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. Each year in their writing, students should demonstrate increasing sophistication in all aspects of language use, from vocabulary and syntax to the development and organization of ideas, and they should address increasingly demanding content and sources. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.* The expected growth in student writing ability is reflected both in the standards themselves and in the collection of annotated student writing samples in Appendix C.

| Kindergartners: | Grade 1 students: | Grade 2 students: |
|---|---|---|
| **text types and Purposes** | | |
| 1. Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book (e.g., *My favorite book is . . .*). | 1. Write opinion pieces in which they introduce the topic or name the book they are writing about, state an opinion, supply a reason for the opinion, and provide some sense of closure. | 1. Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., *because*, *and*, *also*) to connect opinion and reasons, and provide a concluding statement or section. |
| 2. Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. | 2. Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. | 2. Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section. |
| 3. Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened. | 3. Write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure. | 3. Write narratives in which they recount a well-elaborated event or short sequence of events, include details to describe actions, thoughts, and feelings, use temporal words to signal event order, and provide a sense of closure. |
| **Production and distribution of Writing** | | |
| 4. (Begins in grade 3) | 4. (Begins in grade 3) | 4. (Begins in grade 3) |
| 5. With guidance and support from adults, respond to questions and suggestions from peers and add details to strengthen writing as needed. | 5. With guidance and support from adults, focus on a topic, respond to questions and suggestions from peers, and add details to strengthen writing as needed. | 5. With guidance and support from adults and peers, focus on a topic and strengthen writing as needed by revising and editing. |
| 6. With guidance and support from adults, explore a variety of digital tools to produce and publish writing, including in collaboration with peers. | 6. With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. | 6. With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. |
| **Research to Build and Present Knowledge** | | |
| 7. Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). | 7. Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). | 7. Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). |
| 8. With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. | 8. With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. | 8. Recall information from experiences or gather information from provided sources to answer a question. |
| 9. (Begins in grade 4) | 9. (Begins in grade 4) | 9. (Begins in grade 4) |
| **Range of Writing** | | |
| 10. (Begins in grade 3) | 10. (Begins in grade 3) | 10. (Begins in grade 3) |

# Writing Standards K–5

## text types and Purposes

| Grade 3 students: | Grade 4 students: | Grade 5 students: |
|---|---|---|
| 1. Write opinion pieces on topics or texts, supporting a point of view with reasons.<br>a. Introduce the topic or text they are writing about, state an opinion, and create an organizational structure that lists reasons.<br>b. Provide reasons that support the opinion.<br>c. Use linking words and phrases (e.g., *because*, *therefore*, *since*, *for example*) to connect opinion and reasons.<br>d. Provide a concluding statement or section. | 1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.<br>a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which related ideas are grouped to support the writer's purpose.<br>b. Provide reasons that are supported by facts and details.<br>c. Link opinion and reasons using words and phrases (e.g., *for instance*, *in order to*, *in addition*).<br>d. Provide a concluding statement or section related to the opinion presented. | 1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.<br>a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped to support the writer's purpose.<br>b. Provide logically ordered reasons that are supported by facts and details.<br>c. Link opinion and reasons using words, phrases, and clauses (e.g., *consequently*, *specifically*).<br>d. Provide a concluding statement or section related to the opinion presented. |
| 2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.<br>a. Introduce a topic and group related information together; include illustrations when useful to aiding comprehension.<br>b. Develop the topic with facts, definitions, and details.<br>c. Use linking words and phrases (e.g., *also*, *another*, *and*, *more*, *but*) to connect ideas within categories of information.<br>d. Provide a concluding statement or section. | 2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.<br>a. Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.<br>b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.<br>c. Link ideas within categories of information using words and phrases (e.g., *another*, *for example*, *also*, *because*).<br>d. Use precise language and domain-specific vocabulary to inform about or explain the topic.<br>e. Provide a concluding statement or section related to the information or explanation presented. | 2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.<br>a. Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.<br>b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.<br>c. Link ideas within and across categories of information using words, phrases, and clauses (e.g., *in contrast*, *especially*).<br>d. Use precise language and domain-specific vocabulary to inform about or explain the topic.<br>e. Provide a concluding statement or section related to the information or explanation presented. |
| 3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.<br>a. Establish a situation and introduce a narrator and/or characters; organize an event sequence that unfolds naturally.<br>b. Use dialogue and descriptions of actions, thoughts, and feelings to develop experiences and events or show the response of characters to situations.<br>c. Use temporal words and phrases to signal event order.<br>d. Provide a sense of closure. | 3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.<br>a. Orient the reader by establishing a situationand introducing a narrator and/or characters; organize an event sequence that unfolds naturally.<br>b. Use dialogue and description to develop experiences and events or show the responses of characters to situations.<br>c. Use a variety of transitional words and phrases to manage the sequence of events.<br>d. Use concrete words and phrases and sensory details to convey experiences and events precisely.<br>e. Provide a conclusion that follows from the narrated experiences or events. | 3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.<br>a. Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally.<br>b. Use narrative techniques, such as dialogue, description, and pacing, to develop experiences and events or show the responses of characters to situations.<br>c. Use a variety of transitional words, phrases, and clauses to manage the sequence of events.<br>d. Use concrete words and phrases and sensory details to convey experiences and events precisely.<br>e. Provide a conclusion that follows from the narrated experiences or events. |

# Writing Standards K–5

| Grade 3 students: | Grade 4 students: | Grade 5 students: |
|---|---|---|
| **Production and Distribution of Writing** | | |
| 4. With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. (Grade-specific expectations for writing types are defined in standards 1–3 above.) | 4. Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.) | 4. Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.) |
| 5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 3 on page 29.) | 5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 4 on page 29.) | 5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 5 on page 29.) |
| 6. With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others. | 6. With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of one page in a single sitting. | 6. With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of two pages in a single sitting. |
| **Research to Build and Present Knowledge** | | |
| 7. Conduct short research projects that build knowledge about a topic. | 7. Conduct short research projects that build knowledge through investigation of different aspects of a topic. | 7. Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. |
| 8. Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. | 8. Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. | 8. Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. |
| 9. (Begins in grade 4) | 9. Draw evidence from literary or informational texts to support analysis, reflection, and research.<br>a. Apply *grade 4 Reading standards* to literature (e.g., "Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text [e.g., a character's thoughts, words, or actions].").<br>b. Apply *grade 4 Reading standards* to informational texts (e.g., "Explain how an author uses reasons and evidence to support particular points in a text"). | 9. Draw evidence from literary or informational texts to support analysis, reflection, and research.<br>a. Apply *grade 5 Reading standards* to literature (e.g., "Compare and contrast two or more characters, settings, or events in a story or a drama, drawing on specific details in the text [e.g., how characters interact]").<br>b. Apply *grade 5 Reading standards* to informational texts (e.g., "Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point[s]"). |
| **Range of Writing** | | |
| 10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. | 10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. | 10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. |

# College and Career Readiness Anchor Standards for Speaking and Listening

The K–5 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

## Comprehension and Collaboration

1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

## Presentation of Knowledge and Ideas

4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
6. Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

### Note on range and content of student speaking and listening

*To build a foundation for college and career readiness, students must have ample opportunities to take part in a variety of rich, structured conversations—as part of a whole class, in small groups, and with a partner. Being productive members of these conversations requires that students contribute accurate, relevant information; respond to and develop what others have said; make comparisons and contrasts; and analyze and synthesize a multitude of ideas in various domains.*

*New technologies have broadened and expanded the role that speaking and listening play in acquiring and sharing knowledge and have tightened their link to other forms of communication. Digital texts confront students with the potential for continually updated content and dynamically changing combinations of words, graphics, images, hyperlinks, and embedded video and audio.*

# Speaking and Listening Standards K–5



The following standards for K–5 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.*

| Kindergartners: | Grade 1 students: | Grade 2 students: |
|---|---|---|
| **Comprehension and Collaboration** | | |
| 1. Participate in collaborative conversations with diverse partners about *kindergarten topics and texts* with peers and adults in small and larger groups.<br>a. Follow agreed-upon rules for discussions (e.g., listening to others and taking turns speaking about the topics and texts under discussion).<br>b. Continue a conversation through multiple exchanges. | 1. Participate in collaborative conversations with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.<br>a. Follow agreed-upon rules for discussions (e.g., listening to others with care, speaking one at a time about the topics and texts under discussion).<br>b. Build on others' talk in conversations by responding to the comments of others through multiple exchanges.<br>c. Ask questions to clear up any confusion about the topics and texts under discussion. | 1. Participate in collaborative conversations with diverse partners about *grade 2 topics and texts* with peers and adults in small and larger groups.<br>a. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).<br>b. Build on others' talk in conversations by linking their comments to the remarks of others.<br>c. Ask for clarification and further explanation as needed about the topics and texts under discussion. |
| 2. Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood. | 2. Ask and answer questions about key details in a text read aloud or information presented orally or through other media. | 2. Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. |
| 3. Ask and answer questions in order to seek help, get information, or clarify something that is not understood. | 3. Ask and answer questions about what a speaker says in order to gather additional information or clarify something that is not understood. | 3. Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue. |
| **Presentation of Knowledge and Ideas** | | |
| 4. Describe familiar people, places, things, and events and, with prompting and support, provide additional detail. | 4. Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly. | 4. Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences. |
| 5. Add drawings or other visual displays to descriptions as desired to provide additional detail. | 5. Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings. | 5. Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. |
| 6. Speak audibly and express thoughts, feelings, and ideas clearly. | 6. Produce complete sentences when appropriate to task and situation. (See grade 1 Language standards 1 and 3 on page 26 for specific expectations.) | 6. Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See grade 2 Language standards 1 and 3 on page 26 for specific expectations.) |

# Speaking and Listening Standards K–5



| Grade 3 students: | Grade 4 students: | Grade 5 students: |
|---|---|---|
| **Comprehension and Collaboration** | | |
| 1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 3 topics and texts*, building on others' ideas and expressing their own clearly.<br>a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.<br>b. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).<br>c. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.<br>d. Explain their own ideas and understanding in light of the discussion. | 1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 4 topics and texts*, building on others' ideas and expressing their own clearly.<br>a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.<br>b. Follow agreed-upon rules for discussions and carry out assigned roles.<br>c. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.<br>d. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion. | 1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly.<br>a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.<br>b. Follow agreed-upon rules for discussions and carry out assigned roles.<br>c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others.<br>d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions. |
| 2. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. | 2. Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. | 2. Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. |
| 3. Ask and answer questions about information from a speaker, offering appropriate elaboration and detail. | 3. Identify the reasons and evidence a speaker provides to support particular points. | 3. Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence. |
| **Presentation of Knowledge and Ideas** | | |
| 4. Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. | 4. Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace. | 4. Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace. |
| 5. Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details. | 5. Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. | 5. Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. |
| 6. Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See grade 3 Language standards 1 and 3 on page 28 for specific expectations.) | 6. Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion); use formal English when appropriate to task and situation. (See grade 4 Language standards 1 on page 28 for specific expectations.) | 6. Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation. (See grade 5 Language standards 1 and 3 on page 28 for specific expectations.) |

# College and Career readiness anchor Standards for Language

The K–5 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

## Conventions of Standard english

1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

## Knowledge of Language

3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

## Vocabulary acquisition and Use

4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
6. Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.

### Note on range and content of student language use

*To build a foundation for college and career readiness in language, students must gain control over many conventions of standard English grammar, usage, and mechanics as well as learn other ways to use language to convey meaning effectively. They must also be able to determine or clarify the meaning of grade-appropriate words encountered through listening, reading, and media use; come to appreciate that words have nonliteral meanings, shadings of meaning, and relationships to other words; and expand their vocabulary in the course of studying content. The inclusion of Language standards in their own strand should not be taken as an indication that skills related to conventions, effective language use, and vocabulary are unimportant to reading, writing, speaking, and listening; indeed, they are inseparable from such contexts.*

# Language Standards K–5



The following standards for grades K–5 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.* Beginning in grade 3, skills and understandings that are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking are marked with an asterisk (*). See the table on page 30 for a complete list and Appendix A for an example of how these skills develop in sophistication.

| Kindergartners: | Grade 1 students: | Grade 2 students: |
|---|---|---|
| **Conventions of Standard english** | | |
| 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.<br>a. Print many upper- and lowercase letters.<br>b. Use frequently occurring nouns and verbs.<br>c. Form regular plural nouns orally by adding /s/ or /es/ (e.g., *dog, dogs*; *wish, wishes*).<br>d. Understand and use question words (interrogatives) (e.g., *who, what, where, when, why, how*).<br>e. Use the most frequently occurring prepositions (e.g., *to, from, in, out, on, off, for, of, by, with*).<br>f. Produce and expand complete sentences in shared language activities. | 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.<br>a. Print all upper- and lowercase letters.<br>b. Use common, proper, and possessive nouns.<br>c. Use singular and plural nouns with matching verbs in basic sentences (e.g., *He hops*; *We hop*).<br>d. Use personal, possessive, and indefinite pronouns (e.g., *I, me, my; they, them, their; anyone, everything*).<br>e. Use verbs to convey a sense of past, present, and future (e.g., *Yesterday I walked home; Today I walk home; Tomorrow I will walk home*).<br>f. Use frequently occurring adjectives.<br>g. Use frequently occurring conjunctions (e.g., *and, but, or, so, because*).<br>h. Use determiners (e.g., articles, demonstratives).<br>i. Use frequently occurring prepositions (e.g., *during, beyond, toward*).<br>j. Produce and expand complete simple and compound declarative, interrogative, imperative, and exclamatory sentences in response to prompts. | 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.<br>a. Use collective nouns (e.g., *group*).<br>b. Form and use frequently occurring irregular plural nouns (e.g., *feet, children, teeth, mice, fish*).<br>c. Use reflexive pronouns (e.g., *myself, ourselves*).<br>d. Form and use the past tense of frequently occurring irregular verbs (e.g., *sat, hid, told*).<br>e. Use adjectives and adverbs, and choose between them depending on what is to be modified.<br>f. Produce, expand, and rearrange complete simple and compound sentences (e.g., *The boy watched the movie; The little boy watched the movie; The action movie was watched by the little boy*). |
| 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.<br>a. Capitalize the first word in a sentence and the pronoun *I*.<br>b. Recognize and name end punctuation.<br>c. Write a letter or letters for most consonant and short-vowel sounds (phonemes).<br>d. Spell simple words phonetically, drawing on knowledge of sound-letter relationships. | 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.<br>a. Capitalize dates and names of people.<br>b. Use end punctuation for sentences.<br>c. Use commas in dates and to separate single words in a series.<br>d. Use conventional spelling for words with common spelling patterns and for frequently occurring irregular words.<br>e. Spell untaught words phonetically, drawing on phonemic awareness and spelling conventions. | 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.<br>a. Capitalize holidays, product names, and geographic names.<br>b. Use commas in greetings and closings of letters.<br>c. Use an apostrophe to form contractions and frequently occurring possessives.<br>d. Generalize learned spelling patterns when writing words (e.g., cage → badge; boy → boil).<br>e. Consult reference materials, including beginning dictionaries, as needed to check and correct spellings. |

# Language Standards K–5

| Kindergartners: | Grade 1 students: | Grade 2 students: |
|---|---|---|
| **Knowledge of Language** | | |
| 3. (Begins in grade 2) | 3. (Begins in grade 2) | 3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.<br>a. Compare formal and informal uses of English. |
| **Vocabulary acquisition and Use** | | |
| 4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *kindergarten reading and content*.<br>a. Identify new meanings for familiar words and apply them accurately (e.g., knowing *duck* is a bird and learning the verb *to duck*).<br>b. Use the most frequently occurring inflections and affixes (e.g., *-ed*, *-s*, *re-*, *un-*, *pre-*, *-ful*, *-less*) as a clue to the meaning of an unknown word. | 4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 1 reading and content*, choosing flexibly from an array of strategies.<br>a. Use sentence-level context as a clue to the meaning of a word or phrase.<br>b. Use frequently occurring affixes as a clue to the meaning of a word.<br>c. Identify frequently occurring root words (e.g., *look*) and their inflectional forms (e.g., *looks*, *looked*, *looking*). | 4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 2 reading and content*, choosing flexibly from an array of strategies.<br>a. Use sentence-level context as a clue to the meaning of a word or phrase.<br>b. Determine the meaning of the new word formed when a known prefix is added to a known word (e.g., *happy/unhappy*, *tell/retell*).<br>c. Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., *addition*, *additional*).<br>d. Use knowledge of the meaning of individual words to predict the meaning of compound words (e.g., *birdhouse, lighthouse, housefly; bookshelf, notebook, bookmark*).<br>e. Use glossaries and beginning dictionaries, both print and digital, to determine or clarify the meaning of words and phrases. |
| 5. With guidance and support from adults, explore word relationships and nuances in word meanings.<br>a. Sort common objects into categories (e.g., shapes, foods) to gain a sense of the concepts the categories represent.<br>b. Demonstrate understanding of frequently occurring verbs and adjectives by relating them to their opposites (antonyms).<br>c. Identify real-life connections between words and their use (e.g., note places at school that are *colorful*).<br>d. Distinguish shades of meaning among verbs describing the same general action (e.g., *walk, march, strut, prance*) by acting out the meanings. | 5. With guidance and support from adults, demonstrate understanding of word relationships and nuances in word meanings.<br>a. Sort words into categories (e.g., colors, clothing) to gain a sense of the concepts the categories represent.<br>b. Define words by category and by one or more key attributes (e.g., a *duck* is a bird that swims; a *tiger* is a large cat with stripes).<br>c. Identify real-life connections between words and their use (e.g., note places at home that are *cozy*).<br>d. Distinguish shades of meaning among verbs differing in manner (e.g., *look, peek, glance, stare, glare, scowl*) and adjectives differing in intensity (e.g., *large, gigantic*) by defining or choosing them or by acting out the meanings. | 5. Demonstrate understanding of word relationships and nuances in word meanings.<br>a. Identify real-life connections between words and their use (e.g., describe foods that are *spicy* or *juicy*).<br>b. Distinguish shades of meaning among closely related verbs (e.g., *toss, throw, hurl*) and closely related adjectives (e.g., *thin, slender, skinny, scrawny*). |
| 6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts. | 6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships (e.g., *because*). | 6. Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using adjectives and adverbs to describe (e.g., *When other kids are happy that makes me happy*). |

# Language Standards K–5

| Grade 3 students: | Grade 4 students: | Grade 5 students: |
|---|---|---|
| **Conventions of Standard english** | | |
| 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.<br>a. Explain the function of nouns, pronouns, verbs, adjectives, and adverbs in general and their functions in particular sentences.<br>b. Form and use regular and irregular plural nouns.<br>c. Use abstract nouns (e.g., *childhood*).<br>d. Form and use regular and irregular verbs.<br>e. Form and use the simple (e.g., *I walked; I walk; I will walk*) verb tenses.<br>f. Ensure subject-verb and pronoun-antecedent agreement.*<br>g. Form and use comparative and superlative adjectives and adverbs, and choose between them depending on what is to be modified.<br>h. Use coordinating and subordinating conjunctions.<br>i. Produce simple, compound, and complex sentences. | 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.<br>a. Use relative pronouns (*who, whose, whom, which, that*) and relative adverbs (*where, when, why*).<br>b. Form and use the progressive (e.g., *I was walking; I am walking; I will be walking*) verb tenses.<br>c. Use modal auxiliaries (e.g., *can, may, must*) to convey various conditions.<br>d. Order adjectives within sentences according to conventional patterns (e.g., *a small red bag* rather than *a red small bag*).<br>e. Form and use prepositional phrases.<br>f. Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons.*<br>g. Correctly use frequently confused words (e.g., *to, too, two; there, their*).* | 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.<br>a. Explain the function of conjunctions, prepositions, and interjections in general and their function in particular sentences.<br>b. Form and use the perfect (e.g., *I had walked; I have walked; I will have walked*) verb tenses.<br>c. Use verb tense to convey various times, sequences, states, and conditions.<br>d. Recognize and correct inappropriate shifts in verb tense.*<br>e. Use correlative conjunctions (e.g., *either/or, neither/nor*). |
| 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.<br>a. Capitalize appropriate words in titles.<br>b. Use commas in addresses.<br>c. Use commas and quotation marks in dialogue.<br>d. Form and use possessives.<br>e. Use conventional spelling for high-frequency and other studied words and for adding suffixes to base words (e.g., *sitting, smiled, cries, happiness*).<br>f. Use spelling patterns and generalizations (e.g., word families, position-based spellings, syllable patterns, ending rules, meaningful word parts) in writing words.<br>g. Consult reference materials, including beginning dictionaries, as needed to check and correct spellings. | 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.<br>a. Use correct capitalization.<br>b. Use commas and quotation marks to mark direct speech and quotations from a text.<br>c. Use a comma before a coordinating conjunction in a compound sentence.<br>d. Spell grade-appropriate words correctly, consulting references as needed. | 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.<br>a. Use punctuation to separate items in a series.*<br>b. Use a comma to separate an introductory element from the rest of the sentence.<br>c. Use a comma to set off the words *yes* and *no* (e.g., *Yes, thank you*), to set off a tag question from the rest of the sentence (e.g., *It's true, isn't it?*), and to indicate direct address (e.g., *Is that you, Steve?*).<br>d. Use underlining, quotation marks, or italics to indicate titles of works.<br>e. Spell grade-appropriate words correctly, consulting references as needed. |

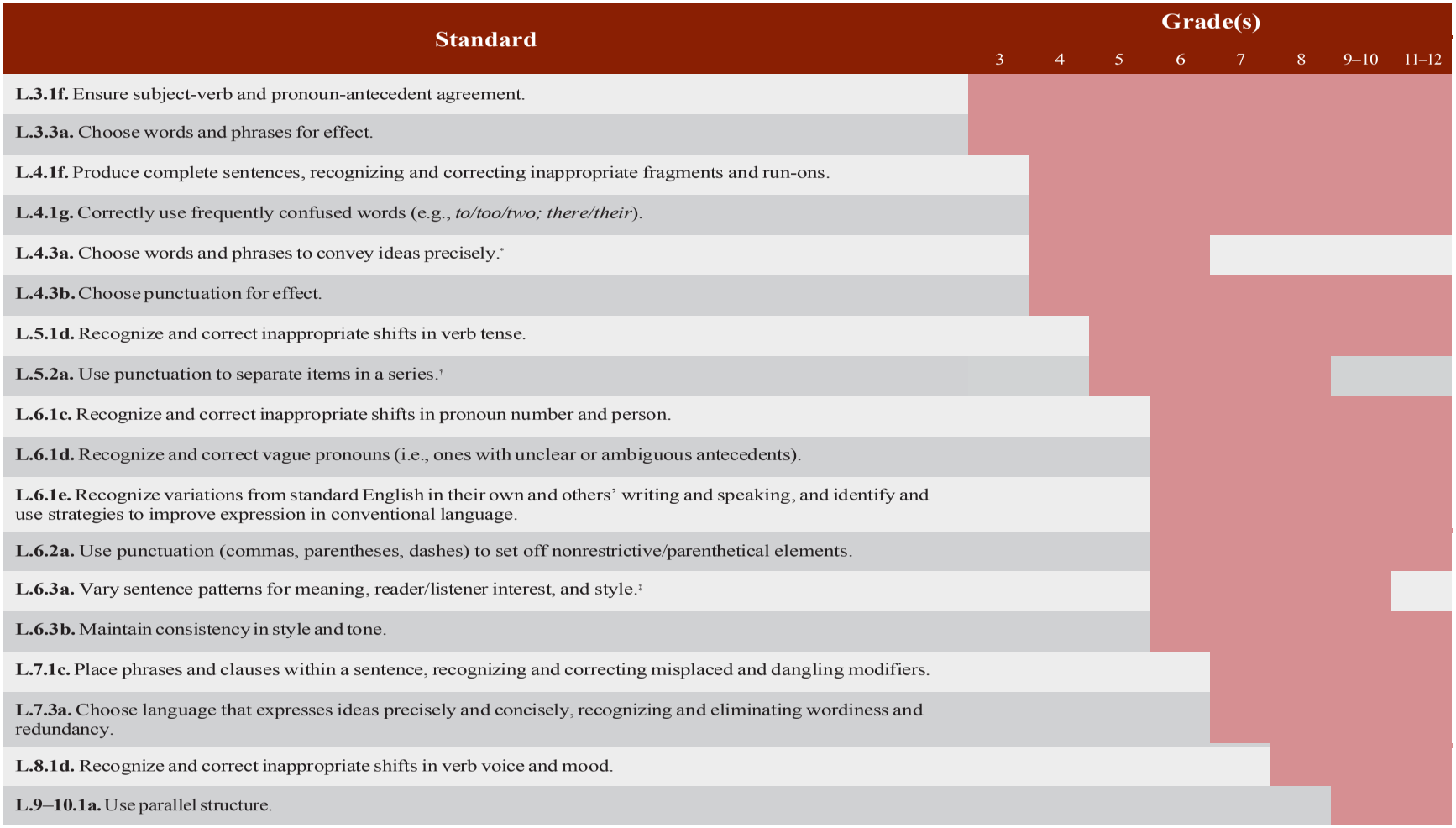
# Language Standards K–5



| Grade 3 students: | Grade 4 students: | Grade 5 students: |
|---|---|---|
| **Knowledge of Language** | | |
| 3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.<br>a. Choose words and phrases for effect.*<br>b. Recognize and observe differences between the conventions of spoken and written standard English. | 3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.<br>a. Choose words and phrases to convey ideas precisely.*<br>b. Choose punctuation for effect.*<br>c. Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion). | 3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.<br>a. Expand, combine, and reduce sentences for meaning, reader/listener interest, and style.<br>b. Compare and contrast the varieties of English (e.g., dialects, registers) used in stories, dramas, or poems. |
| **Vocabulary acquisition and Use** | | |
| 4. Determine or clarify the meaning of unknown and multiple-meaning word and phrases based on *grade 3 reading and content,* choosing flexibly from a range of strategies.<br>a. Use sentence-level context as a clue to the meaning of a word or phrase.<br>b. Determine the meaning of the new word formed when a known affix is added to a known word (e.g., *agreeable/disagreeable, comfortable/uncomfortable, care/careless, heat/preheat*).<br>c. Use a known root word as a clue to the meaning of an unknown word with the same root (e.g., *company, companion*).<br>d. Use glossaries or beginning dictionaries, both print and digital, to determine or clarify the precise meaning of key words and phrases. | 4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 4 reading and content,* choosing flexibly from a range of strategies.<br>a. Use context (e.g., definitions, examples, or restatements in text) as a clue to the meaning of a word or phrase.<br>b. Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., *telegraph, photograph, autograph*).<br>c. Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases. | 4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 5 reading and content,* choosing flexibly from a range of strategies.<br>a. Use context (e.g., cause/effect relationships and comparisons in text) as a clue to the meaning of a word or phrase.<br>b. Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., *photograph, photosynthesis*).<br>c. Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases. |
| 5. Demonstrate understanding of word relationships and nuances in word meanings.<br>a. Distinguish the literal and nonliteral meanings of words and phrases in context (e.g., *take steps*).<br>b. Identify real-life connections between words and their use (e.g., describe people who are *friendly* or *helpful*).<br>c. Distinguish shades of meaning among related words that describe states of mind or degrees of certainty (e.g., *knew, believed, suspected, heard, wondered*). | 5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.<br>a. Explain the meaning of simple similes and metaphors (e.g., *as pretty as a picture*) in context.<br>b. Recognize and explain the meaning of common idioms, adages, and proverbs.<br>c. Demonstrate understanding of words by relating them to their opposites (antonyms) and to words with similar but not identical meanings (synonyms). | 5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.<br>a. Interpret figurative language, including similes and metaphors, in context.<br>b. Recognize and explain the meaning of common idioms, adages, and proverbs.<br>c. Use the relationship between particular words (e.g., synonyms, antonyms, homographs) to better understand each of the words. |
| 6. Acquire and use accurately grade-appropriate conversational, general academic, and domain-specific words and phrases, including those that signal spatial and temporal relationships (e.g., *After dinner that night we went looking for them*). | 6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., *quizzed, whined, stammered*) and that are basic to a particular topic (e.g., *wildlife, conservation,* and *endangered* when discussing animal preservation). | 6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal contrast, addition, and other logical relationships (e.g., *however, although, nevertheless, similarly, moreover, in addition*). |

# Language Progressive Skills, by Grade

The following skills, marked with an asterisk (*) in Language standards 1–3, are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking.




*Subsumed by L.7.3a
†Subsumed by L.9–10.1a
‡Subsumed by L.11–12.3a

# College and Career Readiness Anchor Standards for Reading, 6-8

The grades 6–8 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

## Key Ideas and details

1. Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.
2. Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
3. Analyze how and why individuals, events, and ideas develop and interact over the course of a text.

## Craft and Structure

4. Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
5. Analyze the structure of texts, including how specific sentences, paragraphs, and larger portions of the text (e.g., a section, chapter, scene, or stanza) relate to each other and the whole.
6. Assess how point of view or purpose shapes the content and style of a text.

## Integration of Knowledge and Ideas

7. Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.*
8. Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.
9. Analyze how two or more texts address similar themes or topics in order to build knowledge or to compare the approaches the authors take.

## Range of reading and Level of text Complexity

10. Read and comprehend complex literary and informational texts independently and proficiently.

*Please see "Research to Build Knowledge" in Writing and "Comprehension and Collaboration" in Speaking and Listening for additional standards relevant to gathering, assessing, and applying information from print and digital sources.

### Note on range and content of student reading

*To become college and career ready, students must grapple with works of exceptional craft and thought whose range extends across genres, cultures, and centuries. Such works offer profound insights into the human condition and serve as models for students' own thinking and writing. Along with high-quality contemporary works, these texts should be chosen from among seminal U.S. documents, the classics of American literature, and the timeless dramas of Shakespeare. Through wide and deep reading of literature and literary nonfiction of steadily increasing sophistication, students gain a reservoir of literary and cultural knowledge, references, and images; the ability to evaluate intricate arguments; and the capacity to surmount the challenges posed by complex texts.*

# Reading Standards for Literature 6–8

RL

The following standards offer a focus for instruction each year and help ensure that students gain adequate exposure to a range of texts and tasks. Rigor is also infused through the requirement that students read increasingly complex texts through the grades. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.*

| Grade 6 students: | Grade 7 students: | Grade 8 students: |
|---|---|---|
| **Key Ideas and details** | | |
| 1. Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. | 1. Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. | 1. Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text. |
| 2. Determine a theme or central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments. | 2. Determine a theme or central idea of a text and analyze its development over the course of the text; provide an objective summary of the text. | 2. Determine a theme or central idea of a text and analyze its development over the course of the text, including its relationship to the characters, setting, and plot; provide an objective summary of the text. |
| 3. Describe how a particular story's or drama's plot unfolds in a series of episodes as well as how the characters respond or change as the plot moves toward a resolution. | 3. Analyze how particular elements of a story or drama interact (e.g., how setting shapes the characters or plot). | 3. Analyze how particular lines of dialogue or incidents in a story or drama propel the action, reveal aspects of a character, or provoke a decision. |
| **Cra t and Structure** | | |
| 4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of a specific word choice on meaning and tone. | 4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of rhymes and other repetitions of sounds (e.g., alliteration) on a specific verse or stanza of a poem or section of a story or drama. | 4. Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts. |
| 5. Analyze how a particular sentence, chapter, scene, or stanza fits into the overall structure of a text and contributes to the development of the theme, setting, or plot. | 5. Analyze how a drama's or poem's form or structure (e.g., soliloquy, sonnet) contributes to its meaning. | 5. Compare and contrast the structure of two or more texts and analyze how the differing structure of each text contributes to its meaning and style. |
| 6. Explain how an author develops the point of view of the narrator or speaker in a text. | 6. Analyze how an author develops and contrasts the points of view of different characters or narrators in a text. | 6. Analyze how differences in the points of view of the characters and the audience or reader (e.g., created through the use of dramatic irony) create such effects as suspense or humor. |

# Reading Standards for Literature 6–8

RL

| Grade 6 students: | Grade 7 students: | Grade 8 students: |
|---|---|---|
| **Integration of Knowledge and Ideas** | | |
| 7. Compare and contrast the experience of reading a story, drama, or poem to listening to or viewing an audio, video, or live version of the text, including contrasting what they "see" and "hear" when reading the text to what they perceive when they listen or watch. | 7. Compare and contrast a written story, drama, or poem to its audio, filmed, staged, or multimedia version, analyzing the effects of techniques unique to each medium (e.g., lighting, sound, color, or camera focus and angles in a film). | 7. Analyze the extent to which a filmed or live production of a story or drama stays faithful to or departs from the text or script, evaluating the choices made by the director or actors. |
| 8. (Not applicable to literature) | 8. (Not applicable to literature) | 8. (Not applicable to literature) |
| 9. Compare and contrast texts in different forms or genres (e.g., stories and poems; historical novels and fantasy stories) in terms of their approaches to similar themes and topics. | 9. Compare and contrast a fictional portrayal of a time, place, or character and a historical account of the same period as a means of understanding how authors of fiction use or alter history. | 9. Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new. |
| **Range of Reading and Level of text Complexity** | | |
| 10. By the end of the year, read and comprehend literature, including stories, dramas, and poems, in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range. | 10. By the end of the year, read and comprehend literature, including stories, dramas, and poems, in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range. | 10. By the end of the year, read and comprehend literature, including stories, dramas, and poems, at the high end of grades 6–8 text complexity band independently and proficiently. |

# Reading Standards for Informational Text 6–8

RI

| Grade 6 students: | Grade 7 students: | Grade 8 students: |
|---|---|---|
| **Key Ideas and Details** | | |
| 1. Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. | 1. Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. | 1. Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text. |
| 2. Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments. | 2. Determine two or more central ideas in a text and analyze their development over the course of the text; provide an objective summary of the text. | 2. Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text. |
| 3. Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes). | 3. Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events). | 3. Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, or categories). |
| **Cr t and Structure** | | |
| 4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings. | 4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone. | 4. Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts. |
| 5. Analyze how a particular sentence, paragraph, chapter, or section fits into the overall structure of a text and contributes to the development of the ideas. | 5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to the development of the ideas. | 5. Analyze in detail the structure of a specific paragraph in a text, including the role of particular sentences in developing and refining a key concept. |
| 6. Determine an author's point of view or purpose in a text and explain how it is conveyed in the text. | 6. Determine an author's point of view or purpose in a text and analyze how the author distinguishes his or her position from that of others. | 6. Determine an author's point of view or purpose in a text and analyze how the author acknowledges and responds to conflicting evidence or viewpoints. |
| **Integration of Knowledge and Ideas** | | |
| 7. Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue. | 7. Compare and contrast a text to an audio, video, or multimedia version of the text, analyzing each medium's portrayal of the subject (e.g., how the delivery of a speech affects the impact of the words). | 7. Evaluate the advantages and disadvantages of using different mediums (e.g., print or digital text, video, multimedia) to present a particular topic or idea. |
| 8. Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not. | 8. Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. | 8. Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced. |
| 9. Compare and contrast one author's presentation of events with that of another (e.g., a memoir written by and a biography on the same person). | 9. Analyze how two or more authors writing about the same topic shape their presentations of key information by emphasizing different evidence or advancing different interpretations of facts. | 9. Analyze a case in which two or more texts provide conflicting information on the same topic and identify where the texts disagree on matters of fact or interpretation. |
| **Range of Reading and Level of Text Complexity** | | |
| 10. By the end of the year, read and comprehend literary nonfiction in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range. | 10. By the end of the year, read and comprehend literary nonfiction in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range. | 10. By the end of the year, read and comprehend literary nonfiction at the high end of the grades 6–8 text complexity band independently and proficiently. |

# College and Career readiness anchor Standards for Writing

The grades 6–8 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

## Text types and Purposes*

1. Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
2. Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
3. Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.

## Production and distribution of Writing

4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach.
6. Use technology, including the Internet, to produce and publish writing and to interact and collaborate with others.

## Research to Build and Present Knowledge

7. Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.
8. Gather relevant information from multiple print and digital sources, assess the credibility and accuracy of each source, and integrate the information while avoiding plagiarism.
9. Draw evidence from literary or informational texts to support analysis, reflection, and research.

## Range of Writing

10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

*These broad types of writing include many subgenres. See Appendix A for definitions of key writing types.

### Note on range and content of student writing

*For students, writing is a key means of asserting and defending claims, showing what they know about a subject, and conveying what they have experienced, imagined, thought, and felt. To be college- and career-ready writers, students must take task, purpose, and audience into careful consideration, choosing words, information, structures, and formats deliberately. They need to know how to combine elements of different kinds of writing—for example, to use narrative strategies within argument and explanation within narrative—to produce complex and nuanced writing. They need to be able to use technology strategically when creating, refining, and collaborating on writing. They have to become adept at gathering information, evaluating sources, and citing material accurately, reporting findings from their research and analysis of sources in a clear and cogent manner. They must have the flexibility, concentration, and fluency to produce high-quality first-draft text under a tight deadline as well as the capacity to revisit and make improvements to a piece of writing over multiple drafts when circumstances encourage or require it.*

# Writing Standards 6–8



The following standards for grades 6–8 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. Each year in their writing, students should demonstrate increasing sophistication in all aspects of language use, from vocabulary and syntax to the development and organization of ideas, and they should address increasingly demanding content and sources. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades*. The expected growth in student writing ability is reflected both in the standards themselves and in the collection of annotated student writing samples in Appendix C.

| Grade 6 students: | Grade 7 students: | Grade 8 students: |
|---|---|---|
| **text types and Purposes** | | |
| 1. Write arguments to support claims with clear reasons and relevant evidence.<br>a. Introduce claim(s) and organize the reasons and evidence clearly.<br>b. Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.<br>c. Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons.<br>d. Establish and maintain a formal style.<br>e. Provide a concluding statement or section that follows from the argument presented. | 1. Write arguments to support claims with clear reasons and relevant evidence.<br>a. Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically.<br>b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.<br>c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence.<br>d. Establish and maintain a formal style.<br>e. Provide a concluding statement or section that follows from and supports the argument presented. | 1. Write arguments to support claims with clear reasons and relevant evidence.<br>a. Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.<br>b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.<br>c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.<br>d. Establish and maintain a formal style.<br>e. Provide a concluding statement or section that follows from and supports the argument presented. |
| 2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.<br>a. Introduce a topic; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.<br>b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.<br>c. Use appropriate transitions to clarify the relationships among ideas and concepts.<br>d. Use precise language and domain-specific vocabulary to inform about or explain the topic.<br>e. Establish and maintain a formal style.<br>f. Provide a concluding statement or section that follows from the information or explanation presented. | 2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.<br>a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.<br>b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.<br>c. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.<br>d. Use precise language and domain-specific vocabulary to inform about or explain the topic.<br>e. Establish and maintain a formal style.<br>f. Provide a concluding statement or section that follows from and supports the information or explanation presented. | 2. Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.<br>a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.<br>b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.<br>c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.<br>d. Use precise language and domain-specific vocabulary to inform about or explain the topic.<br>e. Establish and maintain a formal style.<br>f. Provide a concluding statement or section that follows from and supports the information or explanation presented. |

# Writing Standards 6–8



| Grade 6 students: | Grade 7 students: | Grade 8 students: |
|---|---|---|
| **Text Types and Purposes (continued)** | | |
| 3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.<br>a. Engage and orient the reader by establishing a context and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically.<br>b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters.<br>c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another.<br>d. Use precise words and phrases, relevant descriptive details, and sensory language to convey experiences and events.<br>e. Provide a conclusion that follows from the narrated experiences or events. | 3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.<br>a. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically.<br>b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters.<br>c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another.<br>d. Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.<br>e. Provide a conclusion that follows from and reflects on the narrated experiences or events. | 3. Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.<br>a. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically.<br>b. Use narrative techniques, such as dialogue, pacing, description, and reflection, to develop experiences, events, and/or characters.<br>c. Use a variety of transition words, phrases, and clauses to convey sequence, signal shifts from one time frame or setting to another, and show the relationships among experiences and events.<br>d. Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.<br>e. Provide a conclusion that follows from and reflects on the narrated experiences or events. |
| **Production and Distribution of Writing** | | |
| 4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.) | 4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.) | 4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.) |
| 5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 6 on page 53.) | 5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 7 on page 53.) | 5. With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 8 on page 53.) |
| 6. Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting. | 6. Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources. | 6. Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas efficiently as well as to interact and collaborate with others. |

# Writing Standards 6–8



| Grade 6 students: | Grade 7 students: | Grade 8 students: |
|---|---|---|
| **research to Build and Present Knowledge** | | |
| 7. Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate. | 7. Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation. | 7. Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. |
| 8. Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. | 8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. | 8. Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. |
| 9. Draw evidence from literary or informational texts to support analysis, reflection, and research.<br>a. Apply *grade 6 Reading standards* to literature (e.g., "Compare and contrast texts in different forms or genres [e.g., stories and poems; historical novels and fantasy stories] in terms of their approaches to similar themes and topics").<br>b. Apply *grade 6 Reading standards* to literary nonfiction (e.g., "Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not"). | 9. Draw evidence from literary or informational texts to support analysis, reflection, and research.<br>a. Apply *grade 7 Reading standards* to literature (e.g., "Compare and contrast a fictional portrayal of a time, place, or character and a historical account of the same period as a means of understanding how authors of fiction use or alter history").<br>b. Apply *grade 7 Reading standards* to literary nonfiction (e.g. "Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims"). | 9. Draw evidence from literary or informational texts to support analysis, reflection, and research.<br>a. Apply *grade 8 Reading standards* to literature (e.g., "Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new").<br>b. Apply *grade 8 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced"). |
| **Range of Writing** | | |
| 10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. | 10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. | 10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. |

# College and Career readiness anchor Standards for Speaking and Listening, 6-8

The grades 6–8 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

## Comprehension and Collaboration

1. Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.
3. Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric.

## Presentation of Knowledge and Ideas

4. Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.
5. Make strategic use of digital media and visual displays of data to express information and enhance understanding of presentations.
6. Adapt speech to a variety of contexts and communicative tasks, demonstrating command of formal English when indicated or appropriate.

### Note on range and content of student speaking and listening

*To become college and career ready, students must have ample opportunities to take part in a variety of rich, structured conversations—as part of a whole class, in small groups, and with a partner—built around important content in various domains. They must be able to contribute appropriately to these conversations, to make comparisons and contrasts, and to analyze and synthesize a multitude of ideas in accordance with the standards of evidence appropriate to a particular discipline. Whatever their intended major or profession, high school graduates will depend heavily on their ability to listen attentively to others so that they are able to build on others' meritorious ideas while expressing their own clearly and persuasively.*

*New technologies have broadened and expanded the role that speaking and listeningplayin acquiring and sharing knowledge and have tightened their link to other forms of communication. The Internet has accelerated the speed at which connections between speaking, listening, reading, andwriting can be made, requiring that students be ready to use these modalities nearly simultaneously. Technology itself is changing quickly, creating a new urgency for students to be adaptable in response to change.*

# Speaking and Listening Standards 6–8



The following standards for grades 6–8 offer a focus for instruction in each year to help ensure that students gain adequate mastery of a range of skills and applications. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.*

| Grade 6 students: | Grade 7 students: | Grade 8 students: |
|---|---|---|
| **Comprehension and Collaboration** | | |
| 1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 6 topics, texts, and issues*, building on others' ideas and expressing their own clearly.<br>a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.<br>b. Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed.<br>c. Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.<br>d. Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing. | 1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 7 topics, texts, and issues,* building on others' ideas and expressing their own clearly.<br>a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.<br>b. Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed.<br>c. Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.<br>d. Acknowledge new information expressed by others and, when warranted, modify their own views. | 1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 8 topics, texts, and issues,* building on others' ideas and expressing their own clearly.<br>a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.<br>b. Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.<br>c. Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.<br>d. Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented. |
| 2. Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study. | 2. Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study. | 2. Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation. |
| 3. Delineate a speaker's argument and specific claims, distinguishing claims that are supported by reasons and evidence from claims that are not. | 3. Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence. | 3. Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced. |
| **Presentation of Knowledge and Ideas** | | |
| 4. Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation. | 4. Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation. | 4. Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. |
| 5. Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information. | 5. Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. | 5. Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. |
| 6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 6 Language standards 1 and 3 on page 53 for specific expectations.) | 6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 7 Language standards 1 and 3 on page 53 for specific expectations.) | 6. Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 8 Language standards 1 and 3 on page 53 for specific expectations.) |

# College and Career readiness anchor Standards for Language

The grades 6–8 standards on the following pages define what students should understand and be able to do by the end of each grade. They correspond to the College and Career Readiness (CCR) anchor standards below by number. The CCR and grade-specific standards are necessary complements—the former providing broad standards, the latter providing additional specificity—that together define the skills and understandings that all students must demonstrate.

## Conventions of Standard English

1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

## Knowledge of Language

3. Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.

## Vocabulary Acquisition and Use

4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.
5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
6. Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

### Note on range and content of student language use

*To be college and career ready in language, students must have firm control over the conventions of standard English. At the same time, they must come to appreciate that language is as at least as much a matter of craft as of rules and be able to choose words, syntax, and punctuation to express themselves and achieve particular functions and rhetorical effects. They must also have extensive vocabularies, built through reading and study, enabling them to comprehend complex texts and engage in purposeful writing about and conversations around content. They need to become skilled in determining or clarifying the meaning of words and phrases they encounter, choosing flexibly from an array of strategies to aid them. They must learn to see an individual word as part of a network of other words—words, for example, that have similar denotations but different connotations. The inclusion of Language standards in their own strand should not be taken as an indication that skills related to conventions, effective language use, and vocabulary are unimportant to reading, writing, speaking, and listening; indeed, they are inseparable from such contexts.*

# Language Standards 6–8



The following standards for grades 6–8 offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.* Beginning in grade 3, skills and understandings that are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking are marked with an asterisk (*). See the table on page 56 for a complete listing and Appendix A for an example of how these skills develop in sophistication.

| Grade 6 students: | Grade 7 students: | Grade 8 students: |
|---|---|---|
| **Conventions of Standard English** | | |
| 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.<br>a. Ensure that pronouns are in the proper case (subjective, objective, possessive).<br>b. Use intensive pronouns (e.g., *myself, ourselves*).<br>c. Recognize and correct inappropriate shifts in pronoun number and person.*<br>d. Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).*<br>e. Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language.* | 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.<br>a. Explain the function of phrases and clauses in general and their function in specific sentences.<br>b. Choose among simple, compound, complex, and compound-complex sentences to signal differing relationships among ideas.<br>c. Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers.* | 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.<br>a. Explain the function of verbals (gerunds, participles, infinitives) in general and their function in particular sentences.<br>b. Form and use verbs in the active and passive voice.<br>c. Form and use verbs in the indicative, imperative, interrogative, conditional, and subjunctive mood.<br>d. Recognize and correct inappropriate shifts in verb voice and mood.* |
| 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.<br>a. Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.*<br>b. Spell correctly. | 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.<br>a. Use a comma to separate coordinate adjectives (e.g., *It was a fascinating, enjoyable movie* but not *He wore an old[,] green shirt*).<br>b. Spell correctly. | 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.<br>a. Use punctuation (comma, ellipsis, dash) to indicate a pause or break.<br>b. Use an ellipsis to indicate an omission.<br>c. Spell correctly. |
| **Knowledge of Language** | | |
| 3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.<br>a. Vary sentence patterns for meaning, reader/listener interest, and style.*<br>b. Maintain consistency in style and tone.* | 3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.<br>a. Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy.* | 3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.<br>a. Use verbs in the active and passive voice and in the conditional and subjunctive mood to achieve particular effects (e.g., emphasizing the actor or the action; expressing uncertainty or describing a state contrary to fact). |

# Language Standards 6–8

| Grade 6 students: | Grade 7 students: | Grade 8 students: |
|---|---|---|
| **Vocabulary acquisition and Use** | | |
| 4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 6 reading and content*, choosing flexibly from a range of strategies.<br>a. Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.<br>b. Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., *audience, auditory, audible*).<br>c. Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.<br>d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary). | 4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 7 reading and content*, choosing flexibly from a range of strategies.<br>a. Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.<br>b. Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., *belligerent, bellicose, rebel*).<br>c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.<br>d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary). | 4. Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on *grade 8 reading and content*, choosing flexibly from a range of strategies.<br>a. Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.<br>b. Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., *precede, recede, secede*).<br>c. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.<br>d. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary). |
| 5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.<br>a. Interpret figures of speech (e.g., personification) in context.<br>b. Use the relationship between particular words (e.g., cause/effect, part/whole, item/category) to better understand each of the words.<br>c. Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., *stingy, scrimping, economical, unwasteful, thrifty*). | 5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.<br>a. Interpret figures of speech (e.g., literary, biblical, and mythological allusions) in context.<br>b. Use the relationship between particular words (e.g., synonym/antonym, analogy) to better understand each of the words.<br>c. Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., *refined, respectful, polite, diplomatic, condescending*). | 5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.<br>a. Interpret figures of speech (e.g. verbal irony, puns) in context.<br>b. Use the relationship between particular words to better understand each of the words.<br>c. Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., *bullheaded, willful, firm, persistent, resolute*). |
| 6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression. | 6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression. | 6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression. |

# Language Progressive Skills, by Grade

The following skills, marked with an asterisk (*) in Language standards 1–3, are particularly likely to require continued attention in higher grades as they are applied to increasingly sophisticated writing and speaking.

| Standard | Grade(s) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 3 | 4 | 5 | 6 | 7 | 8 | 9–10 | 11–12 |
| **L.3.1f.** Ensure subject-verb and pronoun-antecedent agreement. | | | | | | | | |
| **L.3.3a.** Choose words and phrases for effect. | | | | | | | | |
| **L.4.1f.** Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons. | | | | | | | | |
| **L.4.1g.** Correctly use frequently confused words (e.g., *to/too/two; there/their*). | | | | | | | | |
| **L.4.3a.** Choose words and phrases to convey ideas precisely.* | | | | | | | | |
| **L.4.3b.** Choose punctuation for effect. | | | | | | | | |
| **L.5.1d.** Recognize and correct inappropriate shifts in verb tense. | | | | | | | | |
| **L.5.2a.** Use punctuation to separate items in a series.† | | | | | | | | |
| **L.6.1c.** Recognize and correct inappropriate shifts in pronoun number and person. | | | | | | | | |
| **L.6.1d.** Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents). | | | | | | | | |
| **L.6.1e.** Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language. | | | | | | | | |
| **L.6.2a.** Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements. | | | | | | | | |
| **L.6.3a.** Vary sentence patterns for meaning, reader/listener interest, and style.‡ | | | | | | | | |
| **L.6.3b.** Maintain consistency in style and tone. | | | | | | | | |
| **L.7.1c.** Place phrases and clauses within a sentence, recognizing and correcting misplaced and dangling modifiers. | | | | | | | | |
| **L.7.3a.** Choose language that expresses ideas precisely and concisely, recognizing and eliminating wordiness and redundancy. | | | | | | | | |
| **L.8.1d.** Recognize and correct inappropriate shifts in verb voice and mood. | | | | | | | | |
| **L.9–10.1a.** Use parallel structure. | | | | | | | | |

* Subsumed by L.7.3a
† Subsumed by L.9–10.1a
‡ Subsumed by L.11–12.3a

**College, Career & Civic Life**
**C3 Framework**
**For Social Studies State Standards**

**TABLE 1: C3 Framework Organization**

| DIMENSION 1: DEVELOPING QUESTIONS AND PLANNING INQUIRIES | DIMENSION 2: APPLYING DISCIPLINARY TOOLS AND CONCEPTS | DIMENSION 3: EVALUATING SOURCES AND USING EVIDENCE | DIMENSION COMMUNICA CONCLUSIONS TAKING INFOR ACTION |
|---|---|---|---|
| Developing Questions and Planning Inquiries | Civics | Gathering and Evaluating Sources | Communicating and Critiquing Conclusio |
| | Economics | | |
| | Geography | Developing Claims and Using Evidence | Taking Informed Act |
| | History | | |

**TABLE 2: Dimension 2—Applying Disciplinary Tools and Concepts**

| CIVICS | ECONOMICS | GEOGRAPHY | HISTORY |
|---|---|---|---|
| Civic and Political Institutions | Economic Decision Making | Geographic Representations: Spatial Views of the World | Change, Continuity, and Context |
| Participation and Deliberation: Applying Civic Virtues and Democratic Principles | Exchange and Markets | Human-Environment Interaction: Place, Regions, and Culture | Perspectives |
| Processes, Rules, and Laws | The National Economy | Human Population: Spatial Patterns and Movements | Historical Sources and Evidence |
| | The Global Economy | Global Interconnections: Changing Spatial Patterns | Causation and Argument |

**TABLE 3: Connections between the C3 Framework and the CCR Anchor Standards in the ELA/Literacy Common Core Standards**

| | |
|---|---|
| FOUNDATIONAL | All ELA/Literacy Common Core Standards |
| SUPPORTIVE | Reading 1-10; Writing 1, 7-9; Speaking and Listening 1-6; Language 6 |
| VITAL | Reading 1; Writing 7; Speaking and Listening 1 |

**TABLE 4: Connections between the C3 Framework and the CCR Anchor Standards in the ELA/Literacy Common Core Standards**

| DIMENSION 1 | ANCHOR STANDARDS | DIMENSION 2 | ANCHOR STANDARDS | DIMENSION 3 | ANCHOR STANDARDS | DIMENSION 4 | ANCHOR STANDARDS |
|---|---|---|---|---|---|---|---|
| Developing Questions and Planning Inquiries | R1<br>W7<br>SL1 | Civics<br>Economics<br>Geography<br>History | R1-10<br>W7<br>SL1<br>L6 | Gathering and Evaluating Sources<br><br>Developing Claims and Using Evidence | R1-10<br>W1, 2, 7-10<br>SL1 | Communi-cating and Critiquing Conclusions<br><br>Taking Action | R1<br>W 1-8<br>SL1-6 |

**TABLE 5: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 1, Constructing Compelling Questions**

| BY THE END OF GRADE 2* | BY THE END OF GRADE 5* | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS CONSTRUCT COMPELLING QUESTIONS, AND … | | | |
| D1.1.K-2. Explain why the compelling question is important to the student.<br><br>D1.2.K-2. Identify disciplinary ideas associated with a compelling question. | D1.1.3-5. Explain why compelling questions are important to others (e.g., peers, adults).<br><br>D1.2.3-5. Identify disciplinary concepts and ideas associated with a compelling question that are open to different interpretations. | D1.1.6-8. Explain how a question represents key ideas in the field.<br><br>D1.2.6-8. Explain points of agreement experts have about interpretations and applications of disciplinary concepts and ideas associated with a compelling question. | D1.1.9-12. Explain how a question reflects an enduring issue in the field.<br><br>D1.2.9-12. Explain points of agreement and disagreement experts have about interpretations and applications of disciplinary concepts and ideas associated with a compelling question. |

**TABLE 6: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 1, Constructing Supporting Questions**

| BY THE END OF GRADE 2* | BY THE END OF GRADE 5* | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS CONSTRUCT SUPPORTING QUESTIONS, AND … | | | |
| D1.3.K-2. Identify facts and concepts associated with a supporting question. | D1.3.3-5. Identify the disciplinary concepts and ideas associated with a supporting question that are open to interpretation. | D1.3.6-8. Explain points of agreement experts have about interpretations and applications of disciplinary concepts and ideas associated with a supporting question. | D1.3.9-12. Explain points of agreement and disagreement experts have about interpretations and applications of disciplinary concepts and ideas associated with a supporting question. |
| D1.4.K-2. Make connections between supporting questions and compelling questions. | D1.4.3-5. Explain how supporting questions help answer compelling questions in an inquiry. | D1.4.6-8. Explain how the relationship between supporting questions and compelling questions is mutually reinforcing. | D1.4.9-12. Explain how supporting questions contribute to an inquiry and how, through engaging source work, new compelling and supporting questions emerge. |

**TABLE 7: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 1, Determining Helpful Sources**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS … | | | |
| D1.5.K-2. Determine the kinds of sources that will be helpful in answering compelling and supporting questions. | D1.5.3-5. Determine the kinds of sources that will be helpful in answering compelling and supporting questions, taking into consideration the different opinions people have about how to answer the questions. | D1.5.6-8. Determine the kinds of sources that will be helpful in answering compelling and supporting questions, taking into consideration multiple points of views represented in the sources. | D1.5.9-12. Determine the kinds of sources that will be helpful in answering compelling and supporting questions, taking into consideration multiple points of view represented in the sources, the types of sources available, and the potential uses of the sources. |

**TABLE 8: Connections between Dimension 1 and the CCR Anchor Standards in the ELA/Literacy Common Core Standards**

| | |
|---|---|
| ELA/LITERACY CCR ANCHOR STANDARDS CONNECTIONS | Anchor Reading Standard 1<br>Anchor Writing Standard 7<br>Anchor Speaking and Listening Standard 1 |
| SHARED LANGUAGE | Questioning; Argument; Explanation; Point of View |

**TABLE 9: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, Civic and Political Institutions**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.Civ.1.K-2.** Describe roles and responsibilities of people in authority. | **D2.Civ.1.3-5.** Distinguish the responsibilities and pow- ers of government officials at various levels and branches of government and in different times and places. | **D2.Civ.1.6-8.** Distinguish the powers and responsibilities of citizens, political parties, interest groups, and the media in a variety of governmental and nongovernmental contexts. | **D2.Civ.1.9-12.** Distinguish the powers and responsibilities of local, state, tribal, national, and international civic and political institutions. |
| **D2.Civ.2.K-2.** Explain how all people, not just official leaders, play important roles in a community. | **D2.Civ.2.3-5.** Explain how a democracy relies on people's responsible participation, and draw implications for how individuals should participate. | **D2.Civ.2.6-8.** Explain specific roles played by citizens (such as voters, jurors, taxpayers, members of the armed forces, petitioners, protesters, and office-holders). | **D2.Civ.2.9-12.** Analyze the role of citizens in the U.S. political system, with attention to various theories of democracy, changes in Americans' participation over time, and alternative models from other countries, past and present. |
| **D2.Civ.3.K-2.** Explain the need for and purposes of rules in various settings inside and outside of school. | **D2.Civ.3.3-5.** Examine the origins and purposes of rules, laws, and key U.S. constitutional provisions. | **D2.Civ.3.6-8.** Examine the origins, purposes, and impact of constitutions, laws, treaties, and international agreements. | **D2.Civ.3.9-12.** Analyze the impact of constitutions, laws, treaties, and international agreements on the maintenance of national and international order. |
| **D2.Civ.4.K-2.**<br>*Begins in grades 3–5* | **D2.Civ.4.3-5.** Explain how groups of people make rules to create responsibilities and protect freedoms. | **D2.Civ.4.6-8.** Explain the powers and limits of the three branches of government, public officials, and bureaucracies at different levels in the United States and in other countries. | **D2.Civ.4.9-12.** Explain how the U.S. Constitution establishes a system of government that has powers, responsibilities, and limits that have changed over time and that are still contested. |
| **D2.Civ.5.K-2.** Explain what governments are and some of their functions. | **D2.Civ.5.3-5.** Explain the origins, functions, and structure of different systems of government, including those created by the U.S. and state constitutions. | **D2.Civ.5.6-8.** Explain the origins, functions, and structure of government with reference to the U.S. Constitution, state constitutions, and selected other systems of government. | **D2.Civ.5.9-12.** Evaluate citizens' and institutions' effectiveness in addressing social and political problems at the local, state, tribal, national, and/or international level. |
| **D2.Civ.6.K-2.** Describe how communities work to accomplish common tasks, establish responsibilities, and fulfill roles of authority. | **D2.Civ.6.3-5.** Describe ways in which people benefit from and are challenged by working together, including through government, workplaces, voluntary organizations, and families. | **D2.Civ.6.6-8.** Describe the roles of political, civil, and economic organizations in shaping people's lives. | **D2.Civ.6.9-12.** Critique relationships among governments, civil societies, and economic markets. |

**TABLE 10: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, Participation and Deliberation**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.Civ.7.K-2.** Apply civic virtues when participating in school settings. | **D2.Civ.7.3-5.** Apply civic virtues and democratic principles in school settings. | **D2.Civ.7.6-8.** Apply civic virtues and democratic principles in school and community settings. | **D2.Civ.7.9-12.** Apply civic virtues and democratic principles when working with others. |
| **D2.Civ.8.K-2.** Describe democratic principles such as equality, fairness, and respect for legitimate authority and rules. | **D2.Civ.8.3-5.** Identify core civic virtues and democratic principles that guide government, society, and communities. | **D2.Civ.8.6-8.** Analyze ideas and principles contained in the founding documents of the United States, and explain how they influence the social and political system. | **D2.Civ.8.9-12.** Evaluate social and political systems in different contexts, times, and places, that promote civic virtues and enact democratic principles. |
| **D2.Civ.9.K-2.** Follow agreed-uponrulesfordis- cussions while responding attentively to others when addressing ideas andmaking decisions asa group. | **D2.Civ.9.3-5.** Use deliberative processes when making decisions or reaching judgments as a group. | **D2.Civ.9.6-8.** Compare deliberative processes used by a wide variety of groups in various settings. | **D2.Civ.9.9-12.** Use appropriate deliberative processes in multiple settings. |
| **D2.Civ.10.K-2.** Compare their own point of view with others' perspectives. | **D2.Civ.10.3-5.** Identify the beliefs, experiences, perspectives, and values that underlie their own and others' points ofview about civic issues. | **D2.Civ.10.6-8.** Explain the relevance of personal interests and perspectives, civic virtues, and democratic principles when people address issues and problems in government and civil society. | **D2.Civ.10.9-12.** Analyze the impact and the appropriate roles of personal interests and perspectives on the application of civic virtues, democraticprinciples, constitutional rights, and human rights. |

**TABLE 11: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, Processes, Rules, and Laws**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.Civ.11.K-2.** Explain how people can work together to make decisions in the classroom. | **D2.Civ.11.3-5.** Compare procedures for making decisions in a variety of settings, including classroom, school, government, and/or society. | **D2.Civ.11.6-8.** Differentiate among procedures for making decisions in the classroom, school, civil society, and local, state, and national government in terms of how civic purposes are intended. | **D2.Civ.11.9-12.** Evaluate multiple procedures for mak- ing governmental decisions at the local, state, national, and international levels in terms of the civic purposes achieved. |
| **D2.Civ.12.K-2.** Identify and explain how rules function in public (classroom and school) settings. | **D2.Civ.12.3-5.** Explain how rules and laws change society and how people change rules and laws. | **D2.Civ.12.6-8.** Assess specific rules and laws (both actual and proposed) as means of addressing public problems. | **D2.Civ.12.9-12.** Analyze how people use and challenge local, state, national, and international laws to address a variety of public issues. |
| *Begins in grades 3–5* | **D2.Civ.13.3-5.** Explain how policies are developed to address public problems. | **D2.Civ.13.6-8.** Analyze the purposes, implementation, and consequences of public policies in multiple settings. | **D2.Civ.13.9-12.** Evaluate public policies in terms of intended and unintended outcomes, and related consequences. |

**TABLE 12: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, Economic Decision Making**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.Eco.1.K-2.** Explain how scarcity necessitates decision making. | **D2.Eco.1.3-5.** Compare the benefits and costs of individual choices. | **D2.Eco.1.6-8.** Explain how economic decisions affect the well-being of individuals, businesses, and society. | **D2.Eco.1.9-12.** Analyze how incentives influence choices that may result in policies with a range of costs and benefits for different groups. |
| **D2.Eco.2.K-2.** Identify the benefits and costs of making various personal decisions. | **D2.Eco.2.3-5.** Identify positive and negative incentives that influence the decisions people make. | **D2.Eco.2.6-8.** Evaluate alternative approaches or solutions to current economic issues in terms of benefits and costs for different groups and society as a whole. | **D2.Eco.2.9-12.** Use marginal benefits and marginal costs to construct an argument for or against an approach or solution to an economic issue. |

**TABLE 13: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, Exchange and Markets**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.Eco.3.K-2.** Describe the skills and knowledge required to produce certain goods and services. | **D2.Eco.3.3-5.** Identify examples of the variety of resources (human capital, physical capital, and natural resources) that are used to produce goods and services. | **D2.Eco.3.6-8.** Explain the roles of buyers and sellers in product, labor, and financial markets. | **D2.Eco.3.9-12.** Analyze the ways in which incentives influence what is produced and distributed in a market system. |
| **D2.Eco.4.K-2.** Describe the goods and services that people in the local community produce and those that are produced in other communities. | **D2.Eco.4.3-5.** Explain why individuals and businesses specialize and trade. | **D2.Eco.4.6-8.** Describe the role of competition in the determination of prices and wages in a market economy. | **D2.Eco.4.9-12.** Evaluate the extent to which competition among sellers and among buyers exists in specific markets. |
| **D2.Eco.5.K-2.** Identify prices of products in a local market. | **D2.Eco.5.3-5.** Explain the role of money in making exchange easier. | **D2.Eco.5.6-8.** Explain ways in which money facilitates exchange by reducing transactional costs. | **D2.Eco.5.9-12.** Describe the consequences of competition in specific markets. |
| **D2.Eco.6.K-2.** Explain how people earn income. | **D2.Eco.6.3-5.** Explain the relationship between investment in human capital, productivity, and future incomes. | **D2.Eco.6.6-8.** Explain how changes in supply and demand cause changes in prices and quantities of goods and services, labor, credit, and foreign currencies. | **D2.Eco.6.9-12.** Generate possible explanations for a government role in markets when market inefficiencies exist. |
| **D2.Eco.7.K-2.** Describe examples of costs of production. | **D2.Eco.7.3-5.** Explain how profits influence sellers in markets. | **D2.Eco.7.6-8.** Analyze the role of innovation and entrepreneurship in a market economy. | **D2.Eco.7.9-12.** Use benefits and costs to evaluate the effectiveness of government policies to improve market outcomes. |

**TABLE 14: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, The National Economy**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.Eco.10.K-2.** Explain why people save. | **D2.Eco.10.3-5.** Explain what interest rates are. | **D2.Eco.10.6-8.** Explain the influence of changes in interest rates on borrowing and investing. | **D2.Eco.10.9-12.** Use current data to explain the influence of changes in spending, production, and the money supply on various economic conditions. |
| *Begins in grades 3–5* | **D2.Eco.11.3-5.** Explain the meaning of inflation, deflation, and unemployment. | **D2.Eco.11.6-8.** Use appropriate data to evaluate the state of employment, unemployment, inflation, total production, income, and economic growth in the economy. | **D2.Eco.11.9-12.** Use economic indicators to analyze the current and future state of the economy. |
| **D2.Eco.12.K-2.** Describe examples of the goods and services that governments provide. | **D2.Eco.12.3-5.** Explain the ways in which the government pays for the goods and services it provides. | **D2.Eco.12.6-8.** Explain how inflation, deflation, and unemployment affect different groups. | **D2.Eco.12.9-12.** Evaluate the selection of monetary and fiscal policies in a variety of economic conditions. |
| **D2.Eco.13.K-2.** Describe examples of capital goods and human capital. | **D2.Eco.13.3-5.** Describe ways people can increase productivity by using improved capital goods and improving their human capital. | **D2.Eco.13.6-8.** Explain why standards of living increase as productivity improves. | **D2.Eco.13.9-12.** Explain why advancements in technology and investments in capital goods and human capital increase economic growth and standards of living. |

**TABLE 15: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, The Global Economy**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.Eco.14.K-2.** Describe why people in one country trade goods and services with people in other countries. | **D2.Eco.14.3-5.** Explain how trade leads to increasing economic interdependence among nations. | **D2.Eco.14.6-8.** Explain barriers to trade and how those barriers influence trade among nations. | **D2.Eco.14.9-12.** Analyze the role of comparative advantage in international trade of goods and services. |
| **D2.Eco.15.K-2.** Describe products that are produced abroad and sold domestically and products that are produced domestically and sold abroad. | **D2.Eco.15.3-5.** Explain the effects of increasing economic interdependence on different groups within participating nations. | **D2.Eco.15.6-8.** Explain the benefits and the costs of trade policies to individuals, businesses, and society. | **D2.Eco.15.9-12.** Explain how current globalization trends and policies affect economic growth, labor markets, rights of citizens, the environment, and resource and income distribution in different nations. |

**TABLE 16: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, Geographic Representations**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.Geo.1.K-2.** Construct maps, graphs, and other representations of familiar places. | **D2.Geo.1.3-5.** Construct maps and other graphic representations of both familiar and unfamiliar places. | **D2.Geo.1.6-8.** Construct maps to represent and explain the spatial patterns of cultural and environmental characteristics. | **D2.Geo.1.9-12.** Use geospatial and related technologies to create maps to display and explain the spatial patterns of cultural and environmental characteristics. |
| **D2.Geo.2.K-2.** Use maps, graphs, photographs, and other representations to describe places and the relationships and interactions that shape them. | **D2.Geo.2.3-5.** Use maps, satellite images, photographs, and other representations to explain relationships between the locations of places and regions and their environmental characteristics. | **D2.Geo.2.6-8.** Use maps, satellite images, photographs, and other representations to explain relationships between the locations of places and regions, and changes in their environmental characteristics. | **D2.Geo.2.9-12.** Use maps, satellite images, photographs, and other representations to explain relationships between the locations of places and regions and their political, cultural, and economic dynamics. |
| **D2.Geo.3.K-2.** Use maps, globes, and other simple geographic models to identify cultural and environmental characteristics of places. | **D2.Geo.3.3-5.** Use maps of different scales to describe the locations of cultural and environmental characteristics. | **D2.Geo.3.6-8.** Use paper based and electronic mapping and graphing techniques to represent and analyze spatial patterns of different environmental and cultural characteristics. | **D2.Geo.3.9-12.** Use geographic data to analyze variations in the spatial patterns of cultural and environmental characteristics at multiple scales. |

**TABLE 17: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, Human-Environment Interaction**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.Geo.4.K-2.** Explain how weather, climate, and other environmental characteristics affect people's lives in a place or region. | **D2.Geo.4.3-5.** Explain how culture influences the way people modify and adapt to their environments. | **D2.Geo.4.6-8.** Explain how cultural patterns and economic decisions influence environments and the daily lives of people in both nearby and distant places. | **D2.Geo.4.9-12.** Analyze relationships and interactions within and between human and physical systems to explain reciprocal influences that occur among them. |
| **D2.Geo.5.K-2.** Describe how human activities affect the cultural and environmental characteristics of places or regions. | **D2.Geo.5.3-5.** Explain how the cultural and environmental characteristics of places change over time. | **D2.Geo.5.6-8.** Analyze the combinations of cultural and environmental characteristics that make places both similar to and different from other places. | **D2.Geo.5.9-12.** Evaluate how political and economic decisions throughout time have influenced cultural and environmental characteristics of various places and regions. |
| **D2.Geo.6.K-2.** Identify some cultural and environmental characteristics of specific places. | **D2.Geo.6.3-5.** Describe how environmental and cultural characteristics influence population distribution in specific places or regions. | **D2.Geo.6.6-8.** Explain how the physical and human characteristics of places and regions are connected to human identities and cultures. | **D2.Geo.6.9-12.** Evaluate the impact of human settlement activities on the environmental and cultural characteristics of specific places and regions. |

**TABLE 18: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, Human Population: Spatial Patterns and Movements**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.Geo.7.K-2.** Explain why and how people, goods, and ideasmove from place to place. | **D2.Geo.7.3-5.** Explain how cultural and environmental characteristics affect the distribution and movement of people, goods, and ideas. | **D2.Geo.7.6-8.** Explain how changes in transportation and communication technology influence the spatial connections among human settlements and affect the diffusion of ideas and cultural practices. | **D2.Geo.7.9-12.** Analyze the reciprocal nature of how historical events and the spatial diffusion of ideas, technologies, and cultural practices have influenced migration patterns and the distribution of human population. |
| **D2.Geo.8.K-2.** Compare how people in different types of communities use local and distant environments to meet their daily needs. | **D2.Geo.8.3-5.** Explain how human settlements and movements relate to the locations and use of various natural resources. | **D2.Geo.8.6-8.** Analyze how relationships between humans and environments extend or contract spatial patterns of settlement and movement. | **D2.Geo.8.9-12.** Evaluate the impact of economic activities and political decisions on spatial patterns within and among urban, suburban, and rural regions. |
| **D2.Geo.9.K-2.** Describe the connections between the physical environment of a place and the economic activities found there. | **D2.Geo.9.3-5.** Analyze the effects of catastrophic environmental and technological events on human settlements and migration. | **D2.Geo.9.6-8.** Evaluate the influences of long-term human-induced environmental change on spatial patterns of conflict and cooperation. | **D2.Geo.9.9-12.** Evaluate the influence of long-term climate variability on human migration and settlement patterns, resource use, and land uses at local-to-global scales. |

**TABLE 19: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, Global Interconnections**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.Geo.10.K-2.** Describe changes in the physical and cultural characteristics of various world regions. | **D2.Geo.10.3-5.** Explain why environmental characteristics vary among different world regions. | **D2.Geo.10.6-8.** Analyze the ways in which cultural and environmental characteristics vary among various regions of the world. | **D2.Geo.10.9-12.** Evaluate how changes in the environmental and cultural characteristics of a place or region influence spatial patterns of trade and land use. |
| **D2.Geo.11.K-2.** Explain how the consumption of products connects people to distant places. | **D2.Geo.11.3-5.** Describe how the spatial patterns of economic activities in a place change over time because of interactions with nearby and distant places. | **D2.Geo.11.6-8.** Explain how the relationship between the environmental characteristics of places and production of goods influences the spatial patterns of world trade. | **D2.Geo.11.9-12.** Evaluate how economic globalization and the expanding use of scarce resources contribute to conflict and cooperation within and among countries. |
| **D2.Geo.12.K-2.** Identify ways that a catastrophic disaster may affect people living in a place. | **D2.Geo.12.3-5.** Explain how natural and human-made catastrophic events in one place affect people living in other places. | **D2.Geo.12.6-8.** Explain how global changes in population distribution patterns affect changes in land use in particular places. | **D2.Geo.12.9-12.** Evaluate the consequences of human-made and natural catastrophes on global trade, politics, and human migration. |

**Table 20: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, Change, Continuity, and Context**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.His.1.K-2.** Create a chronological sequence of multiple events. | **D2.His.1.3-5.** Create and use a chronological sequence of related events to compare developments that happened at the same time. | **D2.His.1.6-8.** Analyze connections among events and developments in broader historical contexts. | **D2.His.1.9-12.** Evaluate how historical events and developments were shaped by unique circumstances of time and place as well as broader historical contexts. |
| **D2.His.2.K-2.** Compare life in the past to life today. | **D2.His.2.3-5.** Compare life in specific historical time periods to life today. | **D2.His.2.6-8.** Classify series of historical events and developments as examples of change and/or continuity. | **D2.His.2.9-12.** Analyze change and continuity in historical eras. |
| **D2.His.3.K-2.** Generate questions about individuals and groups who have shaped a significant historical change. | **D2.His.3.3-5.** Generate questions about individuals and groups who have shaped significant historical changes and continuities. | **D2.His.3.6-8.** Use questions generated about individuals and groups to analyze why they, and the developments they shaped, are seen as historically significant. | **D2.His.3.9-12.** Use questions generated about individuals and groups to assess how the significance of their actions changes over time and is shaped by the historical context. |

**TABLE 21: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, Perspectives**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.His.4.K-2.** Compare perspectives of people in the past to those of people in the present. | **D2.His.4.3-5.** Explain why individuals and groups during the same historical period differed in their perspectives. | **D2.His.4.6-8.** Analyze multiple factors that influenced the perspectives of people during different historical eras. | **D2.His.4.9-12.** Analyze complex and interacting factors that influenced the perspectives of people during different historical eras. |
| *Begins in grades 3–5* | **D2.His.5.3-5.** Explain connections among historical contexts and people's perspectives at the time. | **D2.His.5.6-8.** Explain how and why perspectives of people have changed over time. | **D2.His.5.9-12.** Analyze how historical contexts shaped and continue to shape people's perspectives. |
| **D2.His.6.K-2.** Compare different accounts of the same historical event. | **D2.His.6.3-5.** Describe how people's perspectives shaped the historical sources they created. | **D2.His.6.6-8.** Analyze how people's perspectives influenced what information is available in the historical sources they created. | **D2.His.6.9-12.** Analyze the ways in which the perspectives of those writing history shaped the history that they produced. |
| *Begins in grades 9–12* | *Begins in grades 9–12* | *Begins in grades 9–12* | **D2.His.7.9-12.** Explain how the perspectives of people in the present shape interpretations of the past. |

**TABLE 22: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, Historical Sources and Evidence**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.His.9.K-2.** Identify different kinds of historical sources. | **D2.His.9.3-5.** Summarize how different kinds of historical sources are used to explain events in the past. | **D2.His.9.6-8.** Classify the kinds of historical sources used in a secondary interpretation. | **D2.His.9.9-12.** Analyze the relationship between historical sources and the secondary interpretations made from them. |
| **D2.His.10.K-2.** Explain how historical sources can be used to study the past. | **D2.His.10.3-5.** Compare information provided by different historical sources about the past. | **D2.His.10.6-8.** Detect possible limitations in the historical record based on evidence collected from different kinds of historical sources. | **D2.His.10.9-12.** Detect possible limitations in various kinds of historical evidence and differing secondary interpretations. |
| **D2.His.11.K-2.** Identify the maker, date, and place of origin for a historical source from information within the source itself. | **D2.His.11.3-5.** Infer the intended audience and purpose of a historical source from information within the source itself. | **D2.His.11.6-8.** Use other historical sources to infer a plausible maker, date, place of origin, and intended audience for historical sources where this information is not easily identified. | **D2.His.11.9-12.** Critique the usefulness of historical sources for a specific historical inquiry based on their maker, date, place of origin, intended audience, and purpose. |
| **D2.His.12.K-2.** Generate questions about a particular historical source as it relates to a particular historical event or development. | **D2.His.12.3-5.** Generate questions about multiple historical sources and their relationships to particular historical events and developments. | **D2.His.12.6-8.** Use questions generated about multiple historical sources to identify further areas of inquiry and additional sources. | **D2.His.12.9-12.** Use questions generated about multiple historical sources to pursue further inquiry and investigate additional sources. |
| *Begins at grade 3–5* | **D2.His.13.3-5.** Use information about a historical source, including the maker, date, place of origin, intended audience, and purpose to judge the extent to which the source is useful for studying a particular topic. | **D2.His.13.6-8.** Evaluate the relevancy and utility of a historical source based on information such as maker, date, place of origin, intended audience, and purpose. | **D2.His.13.9-12.** Critique the appropriateness of the historical sources used in a secondary interpretation. |

**TABLE 23: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 2, Causation and Argumentation**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D2.His.14.K-2.** Generate possible reasons for an event or development in the past. | **D2.His.14.3-5.** Explain probable causes and effects of events and developments. | **D2.His.14.6-8.** Explain multiple causes and effects of events and developments in the past. | **D2.His.14.9-12.** Analyze multiple and complex causes and effects of events in the past. |
| *Begins in grades 6–8* | *Begins in grades 6–8* | **D2.His.15.6-8.** Evaluate the relative influence of various causes of events and developments in the past. | **D2.His.15.9-12.** Distinguish between long-term causes and triggering events in developing a historical argument. |
| **D2.His.16.K-2.** Select which reasons might be more likely than others to explain a historical event or development. | **D2.His.16.3-5.** Use evidence to develop a claim about the past. | **D2.His.16.6-8.** Organize applicable evidence into a coherent argument about the past. | **D2.His.16.9-12.** Integrate evidence from multiple relevant historical sources and interpretations into a reasoned argument about the past. |
| *Begins in grades 3–5* | **D2.His.17.3-5.** Summarize the central claim in a secondary work of history. | **D2.His.17.6-8.** Compare the central arguments in secondary works of history on related topics in multiple media. | **D2.His.17.9-12.** Critique the central arguments in secondary works of history on related topics in multiple media in terms of their historical accuracy. |

**TABLE 24: Connections between Dimension 2 and the CCR Anchor Standards in the ELA/Literacy Common Core Standards**

| | | |
|---|---|---|
| ELA/LITERACY CCR ANCHOR STANDARDS CONNECTIONS | Civics<br>Economics<br>Geography<br>History | Anchor Reading Standards 1–10<br>Anchor Writing Standard 7<br>Anchor Speaking and Listening Standard 1<br>Anchor Language Standard 6 |
| SHARED LANGUAGE | | Analysis; Argument; Evidence; Questioning |

**TABLE 25: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 3, Gathering and Evaluating Sources**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D3.1.K-2.** Gather relevant information from one or two sources while using the origin and structure to guide the selection. | **D3.1.3-5.** Gather relevant information from multiple sources while using the origin, structure, and context to guide the selection. | **D3.1.6-8.** Gather relevant information from multiple sources while using the origin, authority, structure, context, and corroborative value of the sources to guide the selection. | **D3.1.9-12.** Gather relevant information from multiple sources representing a wide range of views while using the origin, authority, structure, context, and corroborative value of the sources to guide the selection. |
| **D3.2.K-2.** Evaluate a source by distinguishing between fact and opinion. | **D3.2.3-5.** Use distinctions among fact and opinion to determine the credibility of multiple sources. | **D3.2.6-8.** Evaluate the credibility of a source by determining its relevance and intended use. | **D3.2.9-12.** Evaluate the credibility of a source by examining how experts value the source. |

**TABLE 26: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 3, Developing Claims and Using Evidence**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| *Begins in grades 3–5* | **D3.3.3-5.** Identify evidence that draws information from multiple sources in response to compelling questions. | **D3.3.6-8.** Identify evidence that draws information from multiple sources to support claims, noting evidentiary limitations. | **D3.3.9-12.** Identify evidence that draws information directly and substantively from multiple sources to detect inconsistencies in evidence in order to revise or strengthen claims. |
| *Begins in grades 3–5* | **D3.4.3-5.** Use evidence to develop claims in response to compelling questions. | **D3.4.6-8.** Develop claims and counterclaims while pointing out the strengths and limitations of both. | **D3.4.9-12.** Refine claims and counterclaims attending to precision, significance, and knowledge conveyed through the claim while pointing out the strengths and limitations of both. |

**TABLE 27: Connections with Common Core ELA Literacy Standards Dimension 3, Developing Claims and Using Evidence**

| | | |
|---|---|---|
| ELA/LITERACY CCR ANCHOR STANDARDS CONNECTIONS | Gathering and Evaluating Sources<br><br>Developing Claims and Using Evidence | Reading 1–10<br>Writing 1, 2, 7–10<br>Speaking and Listening 1 |
| SHARED LANGUAGE | | Argument; Sources; Evidence; Claims, Counterclaims; Gather |

**TABLE 28: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 4, Communicating Conclusions**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS USE WRITING, VISUALIZING, AND SPEAKING TO… | | | |
| **D4.1.K-2.** Construct an argument with reasons. | **D4.1.3-5.** Construct arguments using claims and evidence from multiple sources. | **D4.1.6-8.** Construct arguments using claims and evidence from multiple sources, while acknowledging the strengths and limitations of the arguments. | **D4.1.9-12.** Construct arguments using precise and knowledgeable claims, with evidence from multiple sources, while acknowledging counterclaims and evidentiary weaknesses. |
| **D4.2.K-2.** Construct explanations using correct sequence and relevant information. | **D4.2.3-5.** Construct explanations using reasoning, correct sequence, examples, and details with relevant information and data. | **D4.2.6-8.** Construct explanations using reasoning, correct sequence, examples, and details with relevant information and data, while acknowledging the strengths and weaknesses of the explanations. | **D4.2.9-12.** Construct explanations using sound reasoning, correct sequence (linear or non-linear), examples, and details with significant and pertinent information and data, while acknowledging the strengths and weaknesses of the explanation given its purpose (e.g., cause and effect, chronological, procedural, technical). |
| **D4.3.K-2.** Present a summary of an argument using print, oral, and digital technologies. | **D4.3.3-5.** Present a summary of arguments and explanations to others outside the classroom using print and oral technologies (e.g., posters, essays, letters, debates, speeches, and reports) and digital technologies (e.g., Internet, social media, and digitaldocumentary). | **D4.3.6-8.** Present adaptations of arguments and explanations on topics of interest to others to reach audiences and venues outside the classroom using print and oral technologies (e.g., posters, essays, letters, debates, speeches, reports, and maps) and digital technologies (e.g., Internet, social media, and digitaldocumentary). | **D4.3.9-12.** Present adaptations of arguments and explanations that feature evocative ideas and perspectives on issues and topics to reach a range of audiences and venues outside the classroom using print and oral technologies (e.g., posters, essays, letters, debates, speeches, reports, and maps) and digital technologies (e.g., Internet, social media, and digital documentary). |

**TABLE 29: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 4, Critiquing Conclusions**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D4.4.K-2.** Ask and answer questions about arguments. | **D4.4.3-5.** Critique arguments. | **D4.4.6-8.** Critique argumentsforcredibility. | **D4.4.9-12.** Critique the use of claims and evidence in arguments for credibility. |
| **D4.5.K-2.** Ask and answer questions about explanations. | **D4.5.3-5.** Critique explanations. | **D4.5.6-8.** Critique the structure of explanations. | **D4.5.9-12.** Critique the use of the reasoning, sequencing, and supporting details of explanations. |

**TABLE 30: Suggested K-12 Pathway for College, Career, and Civic Readiness Dimension 4, Taking Informed Action**

| BY THE END OF GRADE 2 | BY THE END OF GRADE 5 | BY THE END OF GRADE 8 | BY THE END OF GRADE 12 |
|---|---|---|---|
| INDIVIDUALLY AND WITH OTHERS, STUDENTS… | | | |
| **D4.6.K-2.** Identify and explain a range of local, regional, and global problems, and some ways in which people are trying to address these problems. | **D4.6.3-5.** Draw on disciplinary concepts to explain the challenges people have faced and opportunities they have created, in addressing local, regional, and global problems at various times and places. | **D4.6.6-8.** Draw on multiple disciplinary lenses to analyze how a specific problem can manifest itself at local, regional, and global levels over time, identifying its characteristics and causes, and the challenges and opportunities faced by those trying to address the problem. | **D4.6.9-12.** Use disciplinary and interdisciplinary lenses to understand the characteristics and causes of local, regional, and global problems; instances of such problems in multiple contexts; and challenges and opportunities faced by those trying to address these problems over time and place. |
| **D4.7.K-2.** Identify ways to take action to help address local, regional, and global problems. | **D4.7.3-5.** Explain different strategies and approaches students and others could take in working alone and together to address local, regional, and global problems, and predict possible results of their actions. | **D4.7.6-8.** Assess their individual and collective capacities to take action to address local, regional, and global problems, taking into account a range of possible levers of power, strategies, and potential outcomes. | **D4.7.9-12.** Assess options for individual and collective action to address local, regional, and global problems by engaging in self-reflection, strategy identification, and complex causal reasoning. |
| **D4.8.K-2.** Use listening, consensus-building, and voting procedures to decide on and take action in their classrooms. | **D4.8.3-5.** Use a range of deliberative and democratic procedures to make decisions about and act on civic problems in their classrooms and schools. | **D4.8.6-8.** Apply a range of deliberative and democratic procedures to make decisions and take action in their classrooms and schools, and in out-of-school civic contexts. | **D4.8.9-12.** Apply a range of deliberative and democratic strategies and procedures to make decisions and take action in their classrooms, schools, and out-of-school civic contexts. |

**TABLE 31: Connections between Dimension 4 and the CCR Anchor Standards in the ELA/Literacy Common Core Standards**

| | | |
|---|---|---|
| ELA/LITERACY CCR ANCHOR STANDARDS CONNECTIONS | Communicating Conclusions<br><br>Taking Informed Action | Reading 1<br>Writing 1–8<br>Speaking and Listening 1–6 |
| SHARED LANGUAGE | | Argument; Explanation; Sources; Evidence; Claims; Counterclaims; Visually/Visualize; Credibility. |

# CCSS Mathematics

## Standards for Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).

**1. Make sense of problems and persevere in solving them.**
Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

**2. Reason abstractly and quantitatively.**

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

**3. Construct viable arguments and critique the reasoning of others.**

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

**4. Model with mathematics.**

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

**5. Use appropriate tools strategically.**

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

**6. Attend to precision.**

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definition.

**7. Look for and make use of structure.**

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see $7 \times 8$ equals the well remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as $2 \times 7$ and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers $x$ and $y$.

**8. Look for and express regularity in repeated reasoning.**

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle

school students might abstract the equation $(y-2)/(x-1)=3$. Noticing the regularity in the way terms cancel when expanding $(x-1)(x+1)$, $(x-1)(x^2+x+1)$, and $(x-1)(x^3+x^2+x+1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

**Connecting the Standards for Mathematical Practice to the Standards for Mathematical Content**

The Standards for Mathematical Practice describe ways in which developing student practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years. Designers of curricula, assessments, and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.

The Standards for Mathematical Content are a balanced combination of procedure and understanding. Expectations that begin with the word "understand" are often especially good opportunities to connect the practices to the content. Students who lack understanding of a topic may rely on procedures too heavily. Without a flexible base from which to work, they may be less likely to consider analogous problems, represent problems coherently, justify conclusions, apply the mathematics to practical situations, use technology mindfully to work with the mathematics, explain the mathematics accurately to other students, step back for an overview, or deviate from a known procedure to find a shortcut. In short, a lack of understanding effectively prevents a student from engaging in the mathematical practices.

# Grade K Overview

## Counting and Cardinality

- Know number names and the count sequence.
- Count to tell the number of objects.
- Compare numbers.

## Operations and algebraic thinking

- Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

## Number and operations in Base ten

- Work with numbers 11–19 to gain foundations for place value.

## Measurement and data

- Describe and compare measurable attributes.
- Classify objects and count the number of objects in categories.

## Geometry

- Identify and describe shapes.
- analyze, compare, create, and compose shapes.

## Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

## Counting and Cardinality K.CC

**Know number names and the count sequence.**

1. Count to 100 by ones and by tens.
2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
3. Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

**Count to tell the number of objects.**

4. Understand the relationship between numbers and quantities; connect counting to cardinality.
   a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.
   b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted.
   c. Understand that each successive number name refers to a quantity that is one larger.
5. Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1–20, count out that many objects.

**Compare numbers.**

6. Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.[1]
7. Compare two numbers between 1 and 10 presented as written numerals.

## Operations and Algebraic Thinking K.oa

**Understand addition as putting together and adding to, and under- stand subtraction as taking apart and taking from.**

1. Represent addition and subtraction with objects, fingers, mental images, drawings[2], sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
2. Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
3. Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., $5 = 2 + 3$ and $5 = 4 + 1$).

4. For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.
5. Fluently add and subtract within 5.

## Number and Operations in Base Ten K.nBt

**Work with numbers 11–19 to gain foundations for place value.**

1. Compose and decompose numbers from 11 to 19 into ten ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.

## Measurement and Data K.md

**Describe and compare measurable attributes.**

1. Describe measurable attributes of objects, such as length or weight.
2. Describe several measurable attributes of a single object.
3. Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. *For example, directly compare the heights of two children and describe one child as taller/shorter.*

**Classify objects and count the number of objects in each category.**

4. Classify objects into given categories; count the numbers of objects in each category and sort the categories by count.

## Geometry K.G

**Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).**

1. Describe objects in the environment using names of shapes, and describe the relative positions of these objects using terms such as *above*, *below*, *beside*, *in front of*, *behind*, and *next to*.
2. Correctly name shapes regardless of their orientations or overall size.
3. Identify shapes as two-dimensional (lying in a plane, "flat") or three-dimensional ("solid").

**Analyze, compare, create, and compose shapes.**

4. Analyze and compare two- and three-dimensional shapes, in different sizes and orientations, using informal language to describe their similarities, differences, parts (e.g., number of sides and vertices/"corners") and other attributes (e.g., having sides of equal length).
5. Model shapes in the world by building shapes from components (e.g., sticks and clay balls) and drawing shapes.

# Grade 1 Overview

## Operations and Algebraic thinking

- Represent and solve problems involving addition and subtraction.
- Understand and apply properties of operations and the relationship between addition and subtraction.
- Add and subtract within 20.
- Work with addition and subtraction equations.

## Number and Operations in Base ten

- Extend the counting sequence.
- Understand place value.
- Use place value understanding and properties of operations to add and subtract.

## Measurement and Data

- Measure lengths indirectly and by iterating length units.
- Tell and write time.
- Represent and interpret data.

## Geometry

- Reason with shapes and their attributes.

## Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

## Operations and Algebraic Thinking 1.oa

**Represent and solve problems involving addition and subtraction.**

1. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.[2]
2. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.

**Understand and apply properties of operations and the relationship between addition and subtraction.**

3. Apply properties of operations as strategies to add and subtract.[3] *Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6 + 4, the second two numbers can be added to make a ten, so 2 + 6 + 4 = 2 + 10 = 12. (Associative property of addition.)*
4. Understand subtraction as an unknown-addend problem. *For example, subtract 10 – 8 by finding the number that makes 10 when added to 8.*

**Add and subtract within 20.**

5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).
6. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., 8 + 6 = 8 + 2 + 4 = 10 + 4 = 14); decomposing a number leading to a ten (e.g., 13 – 4 = 13 – 3 – 1 = 10 – 1 = 9); using the relationship between addition and subtraction (e.g., knowing that 8 + 4 = 12, one knows 12 – 8 = 4); and creating equivalent but easier or known sums (e.g., adding 6 + 7 by creating the known equivalent 6 + 6 + 1 = 12 + 1 = 13).

**Work with addition and subtraction equations.**

7. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? 6 = 6, 7 = 8 – 1, 5 + 2 = 2 + 5, 4 + 1 = 5 + 2.*

8. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 + ? = 11, 5 = □ – 3, 6 + 6 = □.*

## Number and Operations in Base Ten 1.nBt

**Extend the counting sequence.**

1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

**Understand place value.**

2. Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
   a. 10 can be thought of as a bundle of ten ones — called a "ten."
   b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
   c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

3. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

**Use place value understanding and properties of operations to add and subtract.**

4. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction;
relate the strategy to a written method and explain the reasoning used. Understand that in adding two-

digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

## Measurement and Data 1.md

**Measure lengths indirectly and by iterating length units.**

1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.

2. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.*

**Tell and write time.**

3. Tell and write time in hours and half-hours using analog and digital clocks.

**Represent and interpret data.**

4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

## Geometry 1.G

**Reason with shapes and their attributes.**

1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw

shapes to possess defining attributes.

2. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.[4]

3. Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

# Grade 2 Overview

## Operations and Algebraic Thinking

- Represent and solve problems involving addition and subtraction.
- Add and subtract within 20.
- Work with equal groups of objects to gain foundations for multiplication.

## Number and Operations in Base ten

- Understand place value.
- Use place value understanding and properties of operations to add and subtract.

## Measurement and Data

- Measure and estimate lengths in standard units.
- Relate addition and subtraction to length.
- Work with time and money.
- Represent and interpret data.

## Geometry

- Reason with shapes and their attributes.

## Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

## Operations and Algebraic Thinking 2.oa

**Represent and solve problems involving addition and subtraction.**

1. Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.[1]

**Add and subtract within 20.**

2. Fluently add and subtract within 20 using mental strategies.[2] By end of Grade 2, know from memory all sums of two one-digit numbers.

**Work with equal groups of objects to gain foundations for multiplication.**

3. Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.
4. Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

## Number and Operations in Base Ten 2.nBt

**Understand place value.**

1. Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
   a. 100 can be thought of as a bundle of ten tens — called a "hundred."
   b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).
2. Count within 1000; skip-count by 5s, 10s, and 100s.
3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

4. Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

**Use place value understanding and properties of operations to add and subtract.**

5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
6. Add up to four two-digit numbers using strategies based on place value and properties of operations.
7. Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three- digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.
8. Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
9. Explain why addition and subtraction strategies work, using place value and the properties of operations.

## Measurement and Data 2.md

**Measure and estimate lengths in standard units.**

1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
2. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.
3. Estimate lengths using units of inches, feet, centimeters, and meters.
4. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

**Relate addition and subtraction to length.**

5. Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.
6. Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.

**Work with time and money.**

7. Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
8. Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. *Example: If you have 2 dimes and 3 pennies, how many cents do you have?*

**Represent and interpret data.**

9. Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.
10. Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put- together, take-apart, and compare problems[4] using information presented in a bar graph.

## Geometry 2.G

**Reason with shapes and their attributes.**

1. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.[5] Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
2. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.

3. Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words *halves*, *thirds*, *half of*, *a third of*, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

# Grade 3 Overview

## Operations and Algebraic Thinking

- represent and solve problems involving multiplication and division.
- Understand properties of multiplication and the relationship between multiplication and division.
- multiply and divide within 100.
- Solve problems involving the four operations, and identify and explain patterns in arithmetic.

## Number and Operations in Base ten

- Use place value understanding and properties of operations to perform multi-digit arithmetic.

## Number and Operations—fractions

- develop understanding of fractions as numbers.

## Measurement and Data

- Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.
- represent and interpret data.
- Geometric measurement: understand concepts of area and relate area to multiplication and to addition.
- Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.

## Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

**Represent and solve problems involving multiplication and division.**

1. Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 × 7.*
2. Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.*
3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.[1]
4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = □ ÷ 3, 6 × 6 = ?.*

**Understand properties of multiplication and the relationship between multiplication and division.**

5. Apply properties of operations as strategies to multiply and divide.[2] *Examples: If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15, then 15 × 2 = 30, or by 5 × 2 = 10, then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.)*
6. Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*

**Multiply and divide within 100.**

7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8

× 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

**Solve problems involving the four operations, and identify and explain patterns in arithmetic.**

8. Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.[3]
9. Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*

## Number and Operations in Base Ten 3.NBT

**Use place value understanding and properties of operations to perform multi-digit arithmetic.[4]**

1. Use place value understanding to round whole numbers to the nearest 10 or 100.
2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3. Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 × 80, 5 × 60) using strategies based on place value and properties of operations.

## Number and Operations—Fractions[5] 3.NF

**Develop understanding of fractions as numbers.**

1. Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by *a* parts of size 1/*b*.
2. Understand a fraction as a number on the number line; represent fractions on a number line diagram.

a. Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into $b$ equal parts. Recognize that each part has size $1/b$ and that the endpoint of the part based at 0 locates the number $1/b$ on the number line.

b. Represent a fraction $a/b$ on a number line diagram by marking off $a$ lengths $1/b$ from 1. Recognize that the resulting interval has size $a/b$ and that its endpoint locates the number $a/b$ on the number line.

3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.

a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.

b. Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3. Explain why the fractions are equivalent, e.g., by using a visual fraction model.

c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*

d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

## Measurement and Data 3.MD

**Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.**

2. Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.

2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).[6] Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.[7]

**Represent and interpret data.**

3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*
4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.

**Geometric measurement: understand concepts of area and relate area to multiplication and to addition.**

5. Recognize area as an attribute of plane figures and understand concepts of area measurement.
   a. A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area.
   b. A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.
6. Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).
7. Relate area to the operations of multiplication and addition.
   a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.

b. Multiply side lengths to find areas of rectangles with whole- number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths $a$ and $b + c$ is the sum of $a \times b$ and $a \times c$. Use area models to represent the distributive property in mathematical reasoning.

d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

**Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.**

8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

## Geometry 3.G

**Reason with shapes and their attributes.**

1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.

2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*

# Grade 4 Overview

## Operations and Algebraic Thinking

- Use the four operations with whole numbers to solve problems.
- Gain familiarity with factors and multiples.
- Generate and analyze patterns.

## Number and Operations in Base Ten

- Generalize place value understanding for multi- digit whole numbers.
- Use place value understanding and properties of operations to perform multi-digit arithmetic.

## Number and Operations—Fractions

- Extend understanding of fraction equivalence and ordering.
- Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
- Understand decimal notation for fractions, and compare decimal fractions.

## Measurement and Data

- Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
- Represent and interpret data.
- Geometric measurement: understand concepts of angle and measure angles.

## Geometry

- draw and identify lines and angles, and classify shapes by properties of their lines and angles.

### Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

## Operations and Algebraic Thinking 4.oa

**Use the four operations with whole numbers to solve problems.**

1. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.[1]
3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

**Gain familiarity with factors and multiples.**

4. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

**Generate and analyze patterns.**

5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way*

## Number and operations in Base ten$^2$ 4.nBt

**Generalize place value understanding for multi-digit whole numbers.**

1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*
2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
3. Use place value understanding to round multi-digit whole numbers to any place.

**Use place value understanding and properties of operations to perform multi-digit arithmetic.**

4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.
5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

## Number and operations—fractions[3] 4.nf

**Extend understanding of fraction equivalence and ordering.**

1. Explain why a fraction $a/b$ is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.
2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

**Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.**

3. Understand a fraction $a/b$ with $a > 1$ as a sum of fractions $1/b$.
   a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.
   b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.*
   c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations

and the relationship between addition and subtraction.

d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.

4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.

a. Understand a fraction *a*/*b* as a multiple of 1/*b*. *For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).*

b. Understand a multiple of *a*/*b* as a multiple of 1/*b*, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)*

c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*

**Understand decimal notation for fractions, and compare decimal fractions.**

5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.[4] *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.*

6. Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 1.62 on a number line diagram.*

7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only

when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.

Measurement and Data 4.md

**Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.**

1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...*
2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

**Represent and interpret data.**

4. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*

**Geometric measurement: understand concepts of angle and measure angles.**

5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
    a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.
    b. An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.
6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.

## Geometry 4.G

**Draw and identify lines and angles, and classify shapes by properties of their lines and angles.**

1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

# Grade 5 Overview

## Operations and algebraic thinking

- Write and interpret numerical expressions.
- Analyze patterns and relationships.

## Number and Operations in Base ten

- Understand the place value system.
- Perform operations with multi-digit whole numbers and with decimals to hundredths.

## Number and Operations—fractions

- Use equivalent fractions as a strategy to add and subtract fractions.
- apply and extend previous understandings of multiplication and division to multiply and divide fractions.

## Measurement and Data

- Convert like measurement units within a given measurement system.
- Represent and interpret data.
- Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

## Geometry

- Graph points on the coordinate plane to solve real-world and mathematical problems.
- Classify two-dimensional figures into categories based on their properties.

### Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

## Operations and Algebraic thinking 5.oa

**Write and interpret numerical expressions.**

1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7).Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921,without having to calculate the indicated sum or product.*

**Analyze patterns and relationships.**

3. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*

## Number and operations in Base ten 5.nBt

**Understand the place value system.**

1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
3. Read, write, and compare decimals to thousandths.

a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.

b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

4. Use place value understanding to round decimals to any place.

**Perform operations with multi-digit whole numbers and with decimals to hundredths.**

5. Fluently multiply multi-digit whole numbers using the standard algorithm.

6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

## Number and Operations—fractions 5.nf

**Use equivalent fractions as a strategy to add and subtract fractions.**

1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)*

2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction

models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*

**Apply and extend previous understandings of multiplication and division to multiply and divide fractions.**

3. Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*

4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.
   a. Interpret the product $(a/b) \times q$ as $a$ parts of a partition of $q$ into $b$ equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)*
   b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

5. Interpret multiplication as scaling (resizing), by:

a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.

b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying $a/b$ by 1.

6. Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.[1]

a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for (1/3) ÷ 4, and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.*

b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.*

c. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb*

*of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*

## Measurement and Data 5.md

**Convert like measurement units within a given measurement system.**

1. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 1.5 m), and use these conversions in solving multi-step, real world problems.

**Represent and interpret data.**

2. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*

**Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.**

3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.
   a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.
   b. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.
4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.
5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.
   a. Find the volume of a right rectangular prism with whole-number side lengths by

packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.

b. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole- number edge lengths in the context of solving real world and mathematical problems.

c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

## Geometry 5.G

**Graph points on the coordinate plane to solve real-world and mathematical problems.**

1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., $x$-axis and $x$-coordinate, $y$-axis and $y$-coordinate).

2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

**Classify two-dimensional figures into categories based on their properties.**

3. Understand that attributes belonging to a category of two- dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.*
4. Classify two-dimensional figures in a hierarchy based on properties.

# Grade 6 Overview

## Ratios and Proportional Relationships

- Understand ratio concepts and use ratio reasoning to solve problems.

## The Number System

- apply and extend previous understandings of multiplication and division to divide fractions by fractions.
- Compute fluently with multi-digit numbers and find common factors and multiples.
- Apply and extend previous understandings of numbers to the system of rational numbers.

## Expressions and Equations

- Apply and extend previous understandings of arithmetic to algebraic expressions.
- Reason about and solve one-variable equations and inequalities.
- Represent and analyze quantitative relationships between dependent and independent variables.

## Geometry

- Solve real-world and mathematical problems involving area, surface area, and volume.

## Statistics and Probability

- Develop understanding of statistical variability.
- Summarize and describe distributions.

### Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

## Ratios and Proportional relationships 6.rP

**Understand ratio concepts and use ratio reasoning to solve problems.**

1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*
2. Understand the concept of a unit rate *a*/*b* associated with a ratio *a*:*b* with *b* - 0, and use rate language in the context of a ratio relationship. *For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger."*[1]
3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
    a. Make tables of equivalent ratios relating quantities with whole- number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
    b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?*
    c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
    d. Use ratio reasoning to convert

measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

## The Number System 6.nS

**Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**

1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?*

**Compute fluently with multi-digit numbers and find common factors and multiples.**

2. Fluently divide multi-digit numbers using the standard algorithm.
3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.
4. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. *For example, express 36 + 8 as 4 (9 + 2).*

**Apply and extend previous understandings of numbers to the system of rational numbers.**

5. Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below

zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
   a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$, and that 0 is its own opposite.
   b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
   c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.
7. Understand ordering and absolute value of rational numbers.
   a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. *For example, interpret $-3 > -7$ as a statement that $-3$ is located to the right of $-7$ on a number line oriented from left to right.*
   b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. *For example, write $-3\ ^oC > -7\ ^oC$ to express the fact that $-3\ ^oC$ is warmer than $-7\ ^oC$.*
   c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as

magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars.*

d. Distinguish comparisons of absolute value from statements about order. *For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.*

8. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

## Expressions and Equations 6.ee

**Apply and extend previous understandings of arithmetic to algebraic expressions.**

1. Write and evaluate numerical expressions involving whole-number exponents.

2. Write, read, and evaluate expressions in which letters stand for numbers.

   a. Write expressions that record operations with numbers and with letters standing for numbers. *For example, express the calculation "Subtract y from 5" as 5 – y.*

   b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. *For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms.*

   c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole- number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). *For example, use the formulas $V = s^3$ and $A = 6 s^2$ to find the volume and surface area of a*

*cube with sides of length s = 1/2.*

3. Apply the properties of operations to generate equivalent expressions. *For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.*

4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). *For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.*

**Reason about and solve one-variable equations and inequalities.**

5. Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.

6. Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

7. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which $p$, $q$ and $x$ are all nonnegative rational numbers.

8. Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.

**Represent and analyze quantitative relationships between dependent and independent variables.**

9. Use variables to represent two quantities in a

real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. *For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.*

## Geometry 6.G

**Solve real-world and mathematical problems involving area, surface area, and volume.**

1. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.
2. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = l\ w\ h$ and $V = b\ h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.
3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.
4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context

of solving real-world and mathematical problems.

## Statistics and Probability 6.SP

**Develop understanding of statistical variability.**

1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. *For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.*
2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

**Summarize and describe distributions.**

4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
5. Summarize numerical data sets in relation to their context, such as by:
   a. Reporting the number of observations.
   b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
   c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
   d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

# Grade 7 Overview

## Ratios and Proportional Relationships

- Analyze proportional relationships and use them to solve real-world and mathematical problems.

## The number System

- Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

## Expressions and equations

- Use properties of operations to generate equivalent expressions.
- Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

## Geometry

- Draw, construct and describe geometrical figures and describe the relationships between them
- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

## Statistics and Probability

- Use random sampling to draw inferences about a population.
- Draw informal comparative inferences about two populations.
- Investigate chance processes and develop, use, and evaluate probability models.

## Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

## Ratios and Proportional relationships 7.rP

**Analyze proportional relationships and use them to solve real-world and mathematical problems.**

1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction $^{1/2}/_{1/4}$ miles per hour, equivalently 2 miles per hour.*
2. Recognize and represent proportional relationships between quantities.
   a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
   b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
   c. Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as $t = pn$.*
   d. Explain what a point *(x, y)* on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, *r)* where *r* is the unit rate.
3. Use proportional relationships to solve multistep ratio and percent problems. *Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.*

## The number System 7.nS

**Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.**

1. Apply and extend previous understandings of addition and subtraction to add and subtract

rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

a. Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.*

b. Understand $p + q$ as the number located a distance $|q|$ from $p$, in the positive or negative direction depending on whether $q$ is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.

c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

d. Apply properties of operations as strategies to add and subtract rational numbers.

2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If $p$ and $q$ are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real- world contexts.

c. Apply properties of operations as strategies to multiply and divide rational numbers.

d. Convert a rational number to a decimal using long division; know that the decimal

form of a rational number terminates in 0s or eventually repeats.

3. Solve real-world and mathematical problems involving the four operations with rational numbers.[1]

## Expressions and Equations 7.ee

**Use properties of operations to generate equivalent expressions.**

1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."*

**Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**

3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*
4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
   a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where $p$, $q$, and $r$ are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For*

*example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*

b. Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where $p$, $q$, and $r$ are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.*

## Geometry 7.G

**Draw, construct, and describe geometrical figures and describe the relationships between them.**

1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
3. Describe the two-dimensional figures that result from slicing three- dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

**Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.**

4. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
6. Solve real-world and mathematical problems

involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

## Statistics and Probability 7.SP

**Use random sampling to draw inferences about a population.**

1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*

**Draw informal comparative inferences about two populations.**

3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.*
4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.*

**Investigate chance processes and develop, use, and evaluate probability models.**

5. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*

7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

   a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.*

   b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*

8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

   a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.

   b. Represent sample spaces for compound events using methods such as organized

lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.

c. Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?*

# Grade 8 Overview

## The Number System

- Know that there are numbers that are not rational, and approximate them by rational numbers.

## Expressions and equations

- Work with radicals and integer exponents.
- Understand the connections between proportional relationships, lines, and linear equations.
- Analyze and solve linear equations and pairs of simultaneous linear equations.

## Functions

- Define, evaluate, and compare functions.
- Use functions to model relationships between quantities.

## Geometry

- Understand congruence and similarity using physical models, transparencies, or geometry software.
- Understand and apply the Pythagorean theorem.
- Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.

## Statistics and Probability

- Investigate patterns of association in bivariate data.

### Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

## The Number System 8.nS

**Know that there are numbers that are not rational, and approximate them by rational numbers.**

1. Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., ð2). *For example, by truncating the decimal expansion of* Ã*2, show that* Ã*2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*

## Expressions and Equations 8.ee

**Work with radicals and integer exponents.**

1. Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.
2. Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where $p$ is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.
3. Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. *For example, estimate the population of the United States as* $3 \times 10^8$ *and the population of the world as* $7 \times 10^9$*, and determine that the world population is more than 20 times larger.*

4. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

**Understand the connections between proportional relationships, lines, and linear equations.**

5. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. *For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.*

6. Use similar triangles to explain why the slope $m$ is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at $b$.

**Analyze and solve linear equations and pairs of simultaneous linear equations.**

7. Solve linear equations in one variable.
   a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where $a$ and $b$ are different numbers).
   b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

8. Analyze and solve pairs of simultaneous linear equations.
   a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
   b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.*
   c. Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*

## Functions 8.f

**Define, evaluate, and compare functions.**

1. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
2. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.*
3. Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *For example, the function $A = s^2$ giving the area of a square as a function of its side length*

*is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.*

**Use functions to model relationships between quantities.**

4. Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two $(x, y)$ values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

## Geometry 8.G

**Understand congruence and similarity using physical models, trans- parencies, or geometry software.**

1. Verify experimentally the properties of rotations, reflections, and translations:
   a. Lines are taken to lines, and line segments to line segments of the same length.
   b. Angles are taken to angles of the same measure.
   c. Parallel lines are taken to parallel lines.
2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two- dimensional figures, describe a sequence that exhibits the similarity between them.
5. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*

**Understand and apply the Pythagorean Theorem.**

6. Explain a proof of the Pythagorean Theorem and its converse.
7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

**Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.**

9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

## Statistics and Probability 8.SP

**Investigate patterns of association in bivariate data.**

1. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear

association.

2. Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
3. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. *For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.*
4. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*

# Next Generation Science Standards

## K-PS2 Motion and Stability: Forces and Interactions

**K-PS2 Motion and Stability: Forces and interactions**

Students who demonstrate understanding can:

K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. [Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.] [Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.]

K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.* [Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.] [Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Planning and Carrying Out Investigations**

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- With guidance, plan and conduct an investigation in collaboration with peers. (K-PS2-1)

**Analyzing and Interpreting Data**

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Analyze data from tests of an object or tool to determine if it works as intended. (K-PS2-2)

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Connections to Nature of Science

**Scientific Investigations Use a Variety of Methods**

- Scientists use different ways to study the world. (K-PS2-1)

### Disciplinary Core Ideas

**PS2.A: Forces and Motion**

- Pushes and pulls can have different strengths and directions. (K-PS2-1),(K-PS2-2)
- Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-1),(K-PS2-2)

**PS2.B: Types of Interactions**

- When objects touch or collide, they push on one another and can change motion. (K-PS2-1)

**PS3.C: Relationship Between Energy and Forces**

- A bigger push or pull makes things speed up or slow down more quickly. (secondary to K-PS2-1)

**ETS1.A: Defining Engineering Problems**

- A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions. (secondary to K-PS2-2)

### Crosscutting Concepts

**Cause and Effect**

- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-1),(K-PS2-2)

Connections to other DCIs in kindergarten: K.ETS1.A (K-PS2-2); K.ETS1.B (K-PS2-2)

Articulation of DCIs across grade-levels: 2.ETS1.B (K-PS2-2); 3.PS2.A (K-PS2-1),(K-PS2-2); 3.PS2.B (K-PS2-1); 4.PS3.A (K-PS2-1); 4.ETS1.A (K-PS2-2)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.K.1 | With prompting and support, ask and answer questions about key details in a text. (K-PS2-2) |
| W.K.7 | Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS2-1) |
| SL.K.3 | Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-PS2-2) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (K-PS2-1) |
| K.MD.A.1 | Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-PS2-1) |
| K.MD.A.2 | Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-PS2-1) |

# K-PS3 Energy

## K-PS3 Energy

Students who demonstrate understanding can:

K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface. [Clarification Statement: Examples of Earth's surface could include sand, soil, rocks, and water] [Assessment Boundary: Assessment of temperature is limited to relative measures such as warmer/cooler.]

K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.* [Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-1)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2)

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Connections to Nature of Science

Scientific Investigations Use a Variety of Methods

- Scientists use different ways to study the world. (K-PS3-1)

### Disciplinary Core Ideas

PS3.B: Conservation of Energy and Energy Transfer

- Sunlight warms Earth's surface. (K-PS3-1),(K-PS3-2)

### Crosscutting Concepts

Cause and Effect

- Events have causes that generate observable patterns. (K-PS3-1),(K-PS3-2)

Connections to other DCIs in kindergarten: K.ETS1.A (K-PS3-2); K.ETS1.B (K-PS3-2)

Articulation of DCIs across grade-levels: 1.PS4.B (K-PS3-1),(K-PS3-2); 2.ETS1.B (K-PS3-2), 3.ESS2.D (K-PS3-1); 4.ETS1.A (K-PS3-2)

Common Core State Standards Connections:

ELA/Literacy –

W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-PS3-1),(K-PS3-2)

Mathematics –

K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-PS3-1),(K-PS3-2)

# K-LS1 From Molecules to Organisms: Structures and Processes

**K-LS1 From Molecules to Organisms: Structures and Processes**

Students who demonstrate understanding can:

K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive. [Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

## Science and Engineering Practices

Analyzing and Interpreting Data

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-LS1-1)

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Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Scientists look for patterns and order when making observations about the world. (K-LS1-1)

## Disciplinary Core Ideas

LS1.C: Organization for Matter and Energy Flow in Organisms

- All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (K-LS1-1)

## Crosscutting Concepts

Patterns

- Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1)

Connections to other DCIs in kindergarten: N/A

Articulation of DCIs across grade-levels: 1.LS1.A (K-LS1-1); 2.LS2.A (K-LS1-1); 3.LS2.C (K-LS1-1); 3.LS4.B (K-LS1-1); 5.LS1.C (K-LS1-1); 5.LS2.A (K-LS1-1)

Common Core State Standards Connections:

ELA/Literacy –

W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-LS1-1)

Mathematics –

K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has "more of"/"less of" the attribute, and describe the difference. (K-LS1-1)

# K-ESS2 Earth's Systems

## K-ESS2 Earth's Systems

Students who demonstrate understanding can:

K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time. [Clarification Statement: Examples of qualitative observations could include descriptions of the weather (such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.] [Assessment Boundary: Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.]

K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. [Clarification Statement: Examples of plants and animals changing their environment could include a squirrel digs in the ground to hide its food and tree roots can break concrete.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Analyzing and Interpreting Data**

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1)

**Engaging in Argument from Evidence**

Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).

- Construct an argument with evidence to support a claim. (K-ESS2-2)

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Connections to Nature of Science

**Science Knowledge is Based on Empirical Evidence**

- Scientists look for patterns and order when making observations about the world. (K-ESS2-1)

### Disciplinary Core Ideas

**ESS2.D: Weather and Climate**

- Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1)

**ESS2.E: Biogeology**

- Plants and animals can change their environment. (K-ESS2-2)

**ESS3.C: Human Impacts on Earth Systems**

- Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. (secondary to K-ESS2-2)

### Crosscutting Concepts

**Patterns**

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)

**Systems and System Models**

- Systems in the natural and designed world have parts that work together. (K-ESS2-2)

Connections to other DCIs in kindergarten: N/A

Articulation of DCIs across grade-levels: 2.ESS2.A (K-ESS2-1); 3.ESS2.D (K-ESS2-1); 4.ESS2.A (K-ESS2-1); 4.ESS2.E (K-ESS2-2); 5.ESS2.A (K-ESS2-2)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.K.1 | With prompting and support, ask and answer questions about key details in a text. (K-ESS2-2) |
| W.K.1 | Use a combination of drawing, dictating, and writing to compose opinion pieces in which they tell a reader the topic or the name of the book they are writing about and state an opinion or preference about the topic or book. (K-ESS2-2) |
| W.K.2 | Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (K-ESS2-2) |
| W.K.7 | Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them). (K-ESS2-1) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (K-ESS2-1) |
| MP.4 | Model with mathematics. (K-ESS2-1) |
| K.CC.A | Know number names and the count sequence. (K-ESS2-1) |
| K.MD.A.1 | Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. (K-ESS2-1) |
| K.MD.B.3 | Classify objects into given categories; count the number of objects in each category and sort the categories by count. (K-ESS2-1) |

# K-ESS3 Earth and Human Activity

## K-ESS3 Earth and Human Activity

Students who demonstrate understanding can:

K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. [Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and, grasses need sunlight so they often grow in meadows. Plants, animals, and their surroundings make up a system.]

K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.* [Clarification Statement: Emphasis is on local forms of severe weather.]

K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.* [Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Asking Questions and Defining Problems**

Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.

- Ask questions based on observations to find more information about the designed world. (K-ESS3-2)

**Developing and Using Models**

Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, storyboard) that represent concrete events or design solutions.

- Use a model to represent relationships in the natural world. (K-ESS3-1)

**Obtaining, Evaluating, and Communicating Information**

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

- Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. (K-ESS3-2)
- Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. (K-ESS3-3)

### Disciplinary Core Ideas

**ESS3.A: Natural Resources**

- Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (K-ESS3-1)

**ESS3.B: Natural Hazards**

- Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events. (K-ESS3-2)

**ESS3.C: Human Impacts on Earth Systems**

- Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. (K-ESS3-3)

**ETS1.A: Defining and Delimiting an Engineering Problem**

- Asking questions, making observations, and gathering information are helpful in thinking about problems. (secondary to K-ESS3-2)

**ETS1.B: Developing Possible Solutions**

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (secondary to K-ESS3-3)

### Crosscutting Concepts

**Cause and Effect**

- Events have causes that generate observable patterns. (K-ESS3-2),(K-ESS3-3)

**Systems and System Models**

- Systems in the natural and designed world have parts that work together. (K-ESS3-1)

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**Connections to Engineering, Technology and Applications of Science**

**Interdependence of Science, Engineering, and Technology**

- People encounter questions about the natural world every day. (K-ESS3-2)

**Influence of Engineering, Technology, and Science on Society and the Natural World**

- People depend on various technologies in their lives; human life would be very different without technology. (K-ESS3-2)

Connections to other DCIs in kindergarten: K.ETS1.A (K-ESS3-2),(K-ESS3-3)

Articulation of DCIs across grade-levels: 1.LS1.A (K-ESS3-1); 2.ESS1.C (K-ESS3-2); 2.ETS1.B (K-ESS3-3); 3.ESS3.B (K-ESS3-2); 4.ESS3.A (K-ESS3-3); 4.ESS3.B (K-ESS3-2); 5.LS2.A (K-ESS3-1); 5.ESS2.A (K-ESS3-1); 5.ESS3.C (K-ESS3-3)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.K.1 | With prompting and support, ask and answer questions about key details in a text. (K-ESS3-2) |
| W.K.2 | Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic. (K-ESS3-3) |
| SL.K.3 | Ask and answer questions in order to seek help, get information, or clarify something that is not understood. (K-ESS3-2) |
| SL.K.5 | Add drawings or other visual displays to descriptions as desired to provide additional detail. (K-ESS3-1) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (K-ESS3-1) |
| MP.4 | Model with mathematics. (K-ESS3-1),(K-ESS3-2) |
| K.CC | Counting and Cardinality (K-ESS3-1),(K-ESS3-2) |

# K-2-ETS1 Engineering Design

K-2-ETS1 Engineering Design

Students who demonstrate understanding can:

K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

## Science and Engineering Practices

**Asking Questions and Defining Problems**

Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions.

- Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1)
- Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)

**Developing and Using Models**

Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

- Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)

**Analyzing and Interpreting Data**

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)

## Disciplinary Core Ideas

**ETS1.A: Defining and Delimiting Engineering Problems**

- A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1)
- Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)
- Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)

**ETS1.B: Developing Possible Solutions**

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2)

**ETS1.C: Optimizing the Design Solution**

- Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)

## Crosscutting Concepts

**Structure and Function**

- The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)

Connections to K-2-ETS1.A: Defining and Delimiting Engineering Problems include:
Kindergarten: K-PS2-2, K-ESS3-2

Connections to K-2-ETS1.B: Developing Possible Solutions to Problems include:
Kindergarten: K-ESS3-3, First Grade: 1-PS4-4, Second Grade: 2-LS2-2

Connections to K-2-ETS1.C: Optimizing the Design Solution include:
Second Grade: 2-ESS2-1

Articulation of DCIs across grade-bands: 3-5.ETS1.A (K-2-ETS1-1),(K-2-ETS1-2),(K-2-ETS1-3); 3-5.ETS1.B (K-2-ETS1-2),(K-2-ETS1-3); 3-5.ETS1.C (K-2-ETS1-1),(K-2-ETS1-2),( K-2-ETS1-3)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.2.1 | Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1) |
| W.2.6 | With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1),(K-2-ETS1-3) |
| W.2.8 | Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1),(K-2-ETS1-3) |
| SL.2.5 | Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (K-2-ETS1-1),(K-2-ETS1-3) |
| MP.4 | Model with mathematics. (K-2-ETS1-1),(K-2-ETS1-3) |
| MP.5 | Use appropriate tools strategically. (K-2-ETS1-1),(K-2-ETS1-3) |
| 2.MD.D.10 | Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1),(K-2-ETS1-3) |

# 1-PS4 Waves and their Applications in Technologies for Information Transfer

## 1-PS4 Waves and their Applications in Technologies for Information Transfer

Students who demonstrate understanding can:

1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can makematerialsvibrate. [Clarification Statement: Examplesofvibrating materialsthatmakesoundcouldincludetuning forks and pluckingastretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.]

1-PS4-2. Make observations to construct an evidence-based account that objects can be seen only when illuminated. [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]

1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).] [Assessment Boundary: Assessment does not include the speed of light.]

1-PS4-4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.* [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats.] [Assessment Boundary: Assessment does not include technological details for how communication devices work.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Planning and Carrying Out Investigations**

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. (1-PS4-1),(1-PS4-3)

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-PS4-2)
- Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4)

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Connections to Nature of Science

**Scientific Investigations Use a Variety of Methods**

- Science investigations begin with a question. (1-PS4-1)
- Scientists use different ways to study the world. (1-PS4-1)

### Disciplinary Core Ideas

**PS4.A: Wave Properties**

- Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)

**PS4.B: Electromagnetic Radiation**

- Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2)
- Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.) (1-PS4-3)

**PS4.C: Information Technologies and Instrumentation**

- People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)

### Crosscutting Concepts

**Cause and Effect**

- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1),(1-PS4-2),(1-PS4-3)

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Connections to Engineering, Technology, and Applications of Science

**Influence of Engineering, Technology, and Science, on Society and the Natural World**

- People depend on various technologies in their lives; human life would be very different without technology. (1-PS4-4)

Connections to other DCIs in first grade: N/A

Articulation of DCIs across grade-levels: K.ETS1.A (1-PS4-4); 2.PS1.A (1-PS4-3); 2.ETS1.B (1-PS4-4); 4.PS4.C (1-PS4-4); 4.PS4.B (1-PS4-2); 4.ETS1.A (1-PS4-4)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| W.1.2 | Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure. (1-PS4-2) |
| W.1.7 | Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-PS4-1),(1-PS4-2),(1-PS4-3),(1-PS4-4) |
| W.1.8 | With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-PS4-1),(1-PS4-2),(1-PS4-3) |
| SL.1.1 | Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. (1-PS4-1),(1-PS4-2),(1-PS4-3) |

Mathematics –

| | |
|---|---|
| MP.5 | Use appropriate tools strategically. (1-PS4-4) |
| 1.MD.A.1 | Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-PS4-4) |
| 1.MD.A.2 | Express the length of an object as a whole number of length units, by layering multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. (1-PS4-4) |

# 1-LS1 From Molecules to Organisms: Structures and Processes

## 1-LS1 From Molecules to Organisms: Structures and Processes

Students who demonstrate understanding can:

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.* [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.]

1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

- Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2)

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Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Scientists look for patterns and order when making observations about the world. (1-LS1-2)

### Disciplinary Core Ideas

LS1.A: Structure and Function

- All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1)

LS1.B: Growth and Development of Organisms

- Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)

LS1.D: Information Processing

- Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)

### Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2)

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1)

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Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. (1-LS1-1)

Connections to other DCIs in first grade: N/A

Articulation of DCIs across grade-levels: K.ETS1.A (1-LS1-1); 3.LS2.D (1-LS1-2); 4.LS1.A (1-LS1-1); 4.LS1.D (1-LS1-1); 4.ETS1.A (1-LS1-1)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.1.1 | Ask and answer questions about key details in a text. (1-LS1-2) |
| RI.1.2 | Identify the main topic and retell key details of a text. (1-LS1-2) |
| RI.1.10 | With prompting and support, read informational texts appropriately complex for grade. (1-LS1-2) |
| W.1.7 | Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS1-1) |

Mathematics –

| | |
|---|---|
| 1.NBT.B.3 | Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols !, ˝, and #. (1-LS1-2) |
| 1.NBT.C.4 | Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning uses. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. (1-LS1-2) |
| 1.NBT.C.5 | Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2) |
| 1.NBT.C.6 | Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. (1-LS1-2) |

# 1-LS3 Heredity: Inheritance and Variation of Traits

## 1-LS3 Heredity: Inheritance and Variation of Traits

Students who demonstrate understanding can:

1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. [Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.] [Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1)

### Disciplinary Core Ideas

LS3.A: Inheritance of Traits

- Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly, like their parents. (1-LS3-1)

LS3.B: Variation of Traits

- Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1)

### Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-LS3-1)

Connections to other DCIs in first grade: N/A

Articulation of DCIs across grade-levels: 3.LS3.A (1-LS3-1); 3.LS3.B (1-LS3-1)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.1.1 | Ask and answer questions about key details in a text. (1-LS3-1) |
| W.1.7 | Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-LS3-1) |
| W.1.8 | With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-LS3-1) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (1-LS3-1) |
| MP.5 | Use appropriate tools strategically. (1-LS3-1) |
| 1.MD.A.1 | Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-LS3-1) |

# 1-ESS1 Earth's Place in the Universe

## 1-ESS1 Earth's Place in the Universe

Students who demonstrate understanding can:

1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted. [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]

1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year. [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] [Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)

Analyzing and Interpreting Data

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)

### Disciplinary Core Ideas

ESS1.A: The Universe and its Stars

- Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1)

ESS1.B: Earth and the Solar System

- Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)

### Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1),(1-ESS1-2)

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Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes natural events happen today as they happened in the past. (1-ESS1-1)
- Many events are repeated. (1-ESS1-1)

Connections to other DCIs in first grade: N/A

Articulation of DCIs across grade-levels: 3.PS2.A (1-ESS1-1); 5.PS2.B (1-ESS1-1),(1-ESS1-2); 5-ESS1.B (1-ESS1-1),(1-ESS1-2)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| W.1.7 | Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-ESS1-1),(1-ESS1-2) |
| W.1.8 | With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-1),(1-ESS1-2) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (1-ESS1-2) |
| MP.4 | Model with mathematics. (1-ESS1-2) |
| MP.5 | Use appropriate tools strategically. (1-ESS1-2) |
| 1.OA.A.1 | Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations to represent the problem. (1-ESS1-2) |
| 1.MD.C.4 | Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another. (1-ESS1-2) |

# K-2-ETS1 Engineering Design

K-2-ETS1 Engineering Design

Students who demonstrate understanding can:

K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

## Science and Engineering Practices

**Asking Questions and Defining Problems**

Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions.

- Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1)
- Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)

**Developing and Using Models**

Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

- Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)

**Analyzing and Interpreting Data**

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)

## Disciplinary Core Ideas

**ETS1.A: Defining and Delimiting Engineering Problems**

- A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1)
- Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)
- Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)

**ETS1.B: Developing Possible Solutions**

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2)

**ETS1.C: Optimizing the Design Solution**

- Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)

## Crosscutting Concepts

**Structure and Function**

- The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)

Connections to K-2-ETS1.A: Defining and Delimiting Engineering Problems include:
Kindergarten: K-PS2-2, K-ESS3-2

Connections to K-2-ETS1.B: Developing Possible Solutions to Problems include:
Kindergarten: K-ESS3-3, First Grade: 1-PS4-4, Second Grade: 2-LS2-2

Connections to K-2-ETS1.C: Optimizing the Design Solution include:
Second Grade: 2-ESS2-1

Articulation of DCIs across grade-bands: 3-5.ETS1.A (K-2-ETS1-1),(K-2-ETS1-2),(K-2-ETS1-3); 3-5.ETS1.B (K-2-ETS1-2),(K-2-ETS1-3); 3-5.ETS1.C (K-2-ETS1-1),(K-2-ETS1-2),( K-2-ETS1-3)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.2.1 | Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1) |
| W.2.6 | With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1),(K-2-ETS1-3) |
| W.2.8 | Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1),(K-2-ETS1-3) |
| SL.2.5 | Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (K-2-ETS1-1),(K-2-ETS1-3) |
| MP.4 | Model with mathematics. (K-2-ETS1-1),(K-2-ETS1-3) |
| MP.5 | Use appropriate tools strategically. (K-2-ETS1-1),(K-2-ETS1-3) |
| 2.MD.D.10 | Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1),(K-2-ETS1-3) |

# 2-PS1 Matter and its Interactions

## 2-PS1 Matter and its Interactions

Students who demonstrate understanding can:

2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. [Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]

2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.* [Clarification Statement: Examples of properties could include, strength, flexibility, hardness, texture, and absorbency.][Assessment Boundary: Assessment of quantitative measurements is limited to length.]

2-PS1-3. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. [Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]

2-PS1-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. [Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-PS1-1)

Analyzing and Interpreting Data

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Analyze data from tests of an object or tool to determine if it works as intended. (2-PS1-2)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (2-PS1-3)

Engaging in Argument from Evidence

Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).

- Construct an argument with evidence to support a claim. (2-PS1-4)

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Connections to Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

- Scientists search for cause and effect relationships to explain natural events. (2-PS1-4)

### Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)
- Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3)
- A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

PS1.B: Chemical Reactions

- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)

### Crosscutting Concepts

Patterns

- Patterns in the natural and human designed world can be observed. (2-PS1-1)

Cause and Effect

- Events have causes that generate observable patterns. (2-PS1-4)
- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2)

Energy and Matter

- Objects may break into smaller pieces and be put together into larger pieces, or change shapes. (2-PS1-3)

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Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. (2-PS1-2)

Connections to other DCIs in second grade: N/A

Articulation of DCIs across grade-levels: 4.ESS2.A (2-PS1-3); 5.PS1.A (2-PS1-1),(2-PS1-2),(2-PS1-3); 5.PS1.B (2-PS1-4); 5.LS2.A (2-PS1-3)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.2.1 | Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (2-PS1-4) |
| RI.2.3 | Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-PS1-4) |
| RI.2.8 | Describe how reasons support specific points the author makes in a text. (2-PS1-2),(2-PS1-4) |
| W.2.1 | Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section. (2-PS1-4) |
| W.2.7 | Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-PS1-1),(2-PS1-2),(2-PS1-3) |
| W.2.8 | Recall information from experiences or gather information from provided sources to answer a question. (2-PS1-1),(2-PS1-2),(2-PS1-3) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (2-PS1-2) |
| MP.4 | Model with mathematics. (2-PS1-1),(2-PS1-2) |
| MP.5 | Use appropriate tools strategically. (2-PS1-2) |
| 2.MD.D.10 | Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (2-PS1-1),(2-PS1-2) |

# 2-LS2 Ecosystems: Interactions, Energy, and Dynamics

**2-LS2 Ecosystems: Interactions, Energy, and Dynamics**

Students who demonstrate understanding can:

2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow. [Assessment Boundary: Assessment is limited to testing one variable at a time.]

2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.*

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

## Science and Engineering Practices

Developing and Using Models

Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

- Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2)

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-LS2-1)

## Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems

- Plants depend on water and light to grow. (2-LS2-1)
- Plants depend on animals for pollination or to move their seeds around. (2-LS2-2)

ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (secondary to 2-LS2-2)

## Crosscutting Concepts

Cause and Effect

- Events have causes that generate observable patterns. (2-LS2-1)

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2)

Connections to other DCIs in second grade: N/A

Articulation of DCIs across grade-levels: K.LS1.C (2-LS2-1); K-ESS3.A (2-LS2-1); K.ETS1.A (2-LS2-2); 5.LS1.C (2-LS2-1); 5.LS2.A (2-LS2-2)

Common Core State Standards Connections:

ELA/Literacy –

W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-LS2-1)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-LS2-1)

SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (2-LS2-2)

Mathematics –

MP.2 Reason abstractly and quantitatively. (2-LS2-1)

MP.4 Model with mathematics. (2-LS2-1),(2-LS2-2)

MP.5 Use appropriate tools strategically. (2-LS2-1)

2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems. (2-LS2-2)

# 2-LS4 Biological Evolution: Unity and Diversity

## 2-LS4 Biological Evolution: Unity and Diversity

Students who demonstrate understanding can:

2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats. [Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.] [Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Make observations (firsthand or from media) to collect data which can be used to make comparisons. (2-LS4-1)

---

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Scientists look for patterns and order when making observations about the world. (2-LS4-1)

### Disciplinary Core Ideas

LS4.D: Biodiversity and Humans

- There are many different kinds of living things in any area, and they exist in different places on land and in water. (2-LS4-1)

### Crosscutting Concepts

Connections to other DCIs in second grade: N/A

Articulation of DCIs across grade-levels: 3.LS4.C (2-LS4-1); 3.LS4.D (2-LS4-1); 5.LS2.A (2-LS4-1)

Common Core State Standards Connections:

ELA/Literacy –

W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-LS4-1)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-LS4-1)

Mathematics –

MP.2 Reason abstractly and quantitatively. (2-LS4-1)

MP.4 Model with mathematics. (2-LS4-1)

2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems. (2-LS4-1)

# 2-ESS1 Earth's Place in the Universe

## 2-ESS1 Earth's Place in the Universe

Students who demonstrate understanding can:

2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly.

[Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.] [Assessment Boundary: Assessment does not include quantitative measurements of timescales.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Make observations from several sources to construct an evidence-based account for natural phenomena. (2-ESS1-1)

### Disciplinary Core Ideas

ESS1.C: The History of Planet Earth

- Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1-1)

### Crosscutting Concepts

Stability and Change

- Things may change slowly or rapidly. (2-ESS1-1)

Connections to other DCIs in second grade: N/A

Articulation of DCIs across grade-levels: 3.LS2.C (2-ESS1-1); 4.ESS1.C (2-ESS1-1); 4.ESS2.A (2-ESS1-1)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.2.1 | Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (2-ESS1-1) |
| RI.2.3 | Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-ESS1-1) |
| W.2.6 | With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (2-ESS1-1) |
| W.2.7 | Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-ESS1-1) |
| W.2.8 | Recall information from experiences or gather information from provided sources to answer a question. (2-ESS1-1) |
| SL.2.2 | Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. (2-ESS1-1) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (2-ESS1-1) |
| MP.4 | Model with mathematics. (2-ESS1-1) |
| 2.NBT.A | Understand place value. (2-ESS1-1) |

# 2-ESS2 Earth's Systems

## 2-ESS2 Earth's Systems

Students who demonstrate understanding can:

2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.* [Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.]

2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area. [Assessment Boundary: Assessment does not include quantitative scaling in models.]

2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid.

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Developing and Using Models**

Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

- Develop a model to represent patterns in the natural world. (2-ESS2-2)

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Compare multiple solutions to a problem. (2-ESS2-1)

**Obtaining, Evaluating, and Communicating Information**

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

- Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question. (2-ESS2-3)

### Disciplinary Core Ideas

**ESS2.A: Earth Materials and Systems**

- Wind and water can change the shape of the land. (2-ESS2-1)

**ESS2.B: Plate Tectonics and Large-Scale System Interactions**

- Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2)

**ESS2.C: The Roles of Water in Earth's Surface Processes**

- Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3)

**ETS1.C: Optimizing the Design Solution**

- Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (secondary to 2-ESS2-1)

### Crosscutting Concepts

**Patterns**

- Patterns in the natural world can be observed. (2-ESS2-2),(2-ESS2-3)

**Stability and Change**

- Things may change slowly or rapidly. (2-ESS2-1)

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**Connections to Engineering, Technology, and Applications of Science**

**Influence of Engineering, Technology, and Science on Society and the Natural World**

- Developing and using technology has impacts on the natural world. (2-ESS2-1)

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**Connections to Nature of Science**

**Science Addresses Questions About the Natural and Material World**

- Scientists study the natural and material world. (2-ESS2-1)

Connections to other DCIs in second grade: 2.PS1.A (2-ESS2-3)

Articulation of DCIs across grade-levels: K.ETS1.A (2-ESS2-1); 4.ESS2.A (2-ESS2-1); 4.ESS2.B (2-ESS2-2); 4.ETS1.A (2-ESS2-1); 4.ETS1.B (2-ESS2-1); 4.ETS1.C (2-ESS2-1); 5.ESS2.A (2-ESS2-1); 5.ESS2.C (2-ESS2-2),(2-ESS2-3)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.2.3 | Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-ESS2-1) |
| RI.2.9 | Compare and contrast the most important points presented by two texts on the same topic. (2-ESS2-1) |
| W.2.6 | With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (2-ESS2-3) |
| W.2.8 | Recall information from experiences or gather information from provided sources to answer a question. (2-ESS2-3) |
| SL.2.5 | Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (2-ESS2-2) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (2-ESS2-1),(2-ESS2-2) |
| MP.4 | Model with mathematics. (2-ESS2-1),(2-ESS2-2) |
| MP.5 | Use appropriate tools strategically. (2-ESS2-1) |
| 2.NBT.A.3 | Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. (2-ESS2-2) |
| 2.MD.B.5 | Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem. (2-ESS2-1) |

# K-2-ETS1 Engineering Design

K-2-ETS1 Engineering Design

Students who demonstrate understanding can:

K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

## Science and Engineering Practices

**Asking Questions and Defining Problems**

Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions.

- Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-ETS1-1)
- Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)

**Developing and Using Models**

Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

- Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)

**Analyzing and Interpreting Data**

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)

## Disciplinary Core Ideas

**ETS1.A: Defining and Delimiting Engineering Problems**

- A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1)
- Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1)
- Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1)

**ETS1.B: Developing Possible Solutions**

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K-2-ETS1-2)

**ETS1.C: Optimizing the Design Solution**

- Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)

## Crosscutting Concepts

**Structure and Function**

- The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)

Connections to K-2-ETS1.A: Defining and Delimiting Engineering Problems include:
Kindergarten: K-PS2-2, K-ESS3-2

Connections to K-2-ETS1.B: Developing Possible Solutions to Problems include:
Kindergarten: K-ESS3-3, First Grade: 1-PS4-4, Second Grade: 2-LS2-2

Connections to K-2-ETS1.C: Optimizing the Design Solution include:
Second Grade: 2-ESS2-1

Articulation of DCIs across grade-bands: 3-5.ETS1.A (K-2-ETS1-1),(K-2-ETS1-2),(K-2-ETS1-3); 3-5.ETS1.B (K-2-ETS1-2),(K-2-ETS1-3); 3-5.ETS1.C (K-2-ETS1-1),(K-2-ETS1-2),( K-2-ETS1-3)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.2.1 | Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (K-2-ETS1-1) |
| W.2.6 | With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (K-2-ETS1-1),(K-2-ETS1-3) |
| W.2.8 | Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1),(K-2-ETS1-3) |
| SL.2.5 | Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. (K-2-ETS1-2) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (K-2-ETS1-1),(K-2-ETS1-3) |
| MP.4 | Model with mathematics. (K-2-ETS1-1),(K-2-ETS1-3) |
| MP.5 | Use appropriate tools strategically. (K-2-ETS1-1),(K-2-ETS1-3) |
| 2.MD.D.10 | Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1),(K-2-ETS1-3) |

# 3-PS2 Motion and Stability: Forces and Interactions

## 3-PS2 Motion and Stability: Forces and Interactions

Students who demonstrate understanding can:

3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. [Clarification Statement: Examples could include an unbalanced force on one side of a ball can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all.] [Assessment Boundary: Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.]

3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. [Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw.] [Assessment Boundary: Assessment does not include technical terms such as period and frequency.]

3-PS2-3. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. [Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.] [Assessment Boundary: Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.]

3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets.* [Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Asking Questions and Defining Problems

Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Ask questions that can be investigated based on patterns such as cause and effect relationships. (3-PS2-3)
- Define a simple problem that can be solved through the development of a new or improved object or tool. (3-PS2-4)

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-PS2-1)
- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (3-PS2-2)

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Connections to Nature of Science

Science Knowledge is Based on Empirical Evidence

- Science findings are based on recognizing patterns. (3-PS2-2)

Scientific Investigations Use a Variety of Methods

- Science investigations use a variety of methods, tools, and techniques. (3-PS2-1)

### Disciplinary Core Ideas

PS2.A: Forces and Motion

- Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) (3-PS2-1)
- The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.) (3-PS2-2)

PS2.B: Types of Interactions

- Objects in contact exert forces on each other. (3-PS2-1)
- Electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. (3-PS2-3),(3-PS2-4)

### Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions. (3-PS2-2)

Cause and Effect

- Cause and effect relationships are routinely identified. (3-PS2-1)
- Cause and effect relationships are routinely identified, tested, and used to explain change. (3-PS2-3)

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Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process. (3-PS2-4)

Connections to other DCIs in third grade: N/A

Articulation of DCIs across grade-levels: K.PS2.A (3-PS2-1); K.PS2.B (3-PS2-1); K.PS3.C (3-PS2-1); K.ETS1.A (3-PS2-4); 1.ESS1.A (3-PS2-2); 4.PS4.A (3-PS2-2); 4.ETS1.A (3-PS2-4); 5.PS2.B (3-PS2-1); MS.PS2.A (3-PS2-1),(3-PS2-2); MS.PS2.B (3-PS2-3),(3-PS2-4); MS.ESS1.B (3-PS2-1),(3-PS2-2); MS.ESS2.C (3-PS2-1)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.3.1 | Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-PS2-1),(3-PS2-3) |
| RI.3.3 | Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-PS2-3) |
| RI.3.8 | Describe the logical connection between particular sentences and paragraphs in a text (e.g., comparison, cause/effect, first/second/third in a sequence). (3-PS2-3) |
| W.3.7 | Conduct short research projects that build knowledge about a topic. (3-PS2-1),(3-PS2-2) |
| W.3.8 | Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-PS2-1),(3-PS2-2) |
| SL.3.3 | Ask and answer questions about information from a speaker, offering appropriate elaboration and detail. (3-PS2-3) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (3-PS2-1) |
| MP.5 | Use appropriate tools strategically. (3-PS2-1) |
| 3.MD.A.2 | Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3-PS2-1) |

# 3-LS1 From Molecules to Organisms: Structures and Processes

## 3-LS1 From Molecules to Organisms: Structures and Processes

Students who demonstrate understanding can:

3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, anddeath. [Clarification Statement: Changes organismsgo through during theirlife formapattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Developing and Using Models

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Develop models to describe phenomena. (3-LS1-1)

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Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Science findings are based on recognizing patterns. (3-LS1-1)

### Disciplinary Core Ideas

LS1.B: Growth and Development of Organisms

- Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. (3-LS1-1)

### Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions. (3-LS1-1)

Connections to other DCIs in third grade: N/A

Articulation of DCIs across grade-levels: MS.LS1.B (3-LS1-1)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.3.7 | Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur). (3-LS1-1) |
| SL.3.5 | Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details. (3-LS1-1) |

Mathematics –

| | |
|---|---|
| MP.4 | Model with mathematics. (3-LS1-1) |
| 3.NBT | Number and Operations in Base Ten (3-LS1-1) |
| 3.NF | Number and Operations—Fractions (3-LS1-1) |

# 3-LS2 Ecosystems: Interactions, Energy, and Dynamics

## 3-LS2 Ecosystems: Interactions, Energy, and Dynamics

Students who demonstrate understanding can:

3-LS2-1. Construct an argument that some animals form groups that help members survive.

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Engaging in Argument from Evidence

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Construct an argument with evidence, data, and/or a model. (3-LS2-1)

### Disciplinary Core Ideas

LS2.D: Social Interactions and Group Behavior

- Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size (Note: Moved from K–2). (3-LS2-1)

### Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (3-LS2-1)

Connections to other DCIs in third grade: N/A

Articulation of DCIs across grade-levels: 1.LS1.B (3-LS2-1); MS.LS2.A (3-LS2-1); MS.LS2.D (3-LS2-1)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.3.1 | Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS2-1) |
| RI.3.3 | Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS2-1) |
| W.3.1 | Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS2-1) |

Mathematics –

| | |
|---|---|
| MP.4 | Model with mathematics. (3-LS2-1) |
| 3.NBT | Number and Operations in Base Ten (3-LS2-1) |

# 3-LS3 Heredity: Inheritance and Variation of Traits

## 3-LS3 Heredity: Inheritance and Variation of Traits

Students who demonstrate understanding can:

3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.]

3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment. [Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and, a pet dog that is given too much food and little exercise may become overweight.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Analyzing and Interpreting Data

Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Use evidence (e.g., observations, patterns) to support an explanation. (3-LS3-2)

### Disciplinary Core Ideas

LS3.A: Inheritance of Traits

- Many characteristics of organisms are inherited from their parents. (3-LS3-1)
- Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3-LS3-2)

LS3.B: Variation of Traits

- Different organisms vary in how they look and function because they have different inherited information. (3-LS3-1)
- The environment also affects the traits that an organism develops. (3-LS3-2)

### Crosscutting Concepts

Patterns

- Similarities and differences in patterns can be used to sort and classify natural phenomena. (3-LS3-1)

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (3-LS3-2)

Connections to other DCIs in third grade: N/A

Articulation of DCIs across grade-levels: 1.LS3.A (3-LS3-1); 1.LS3.B (3-LS3-1); MS.LS1.B (3-LS3-2); MS.LS3.A (3-LS3-1); MS.LS3.B (3-LS3-1)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.3.1 | Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS3-1),(3-LS3-2) |
| RI.3.2 | Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS3-1),(3-LS3-2) |
| RI.3.3 | Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS3-1),(3-LS3-2) |
| W.3.2 | Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS3-1),(3-LS3-2) |
| SL.3.4 | Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS3-1),(3-LS3-2) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (3-LS3-1),(3-LS3-2) |
| MP.4 | Model with mathematics. (3-LS3-1),(3-LS3-2) |
| 3.MD.B.4 | Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS3-1),(3-LS3-2) |

# 3-LS4 Biological Evolution: Unity and Diversity

## 3-LS4 Biological Evolution: Unity and Diversity

Students who demonstrate understanding can:

3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. [Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.]

3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. [Clarification Statement: Examples of cause and effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and, animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.]

3-LS4-3. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]

3-LS4-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.* [Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Analyzing and Interpreting Data**

Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS4-1)

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Use evidence (e.g., observations, patterns) to construct an explanation. (3-LS4-2)

**Engaging in Argument from Evidence**

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Construct an argument with evidence. (3-LS4-3)
- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-LS4-4)

### Disciplinary Core Ideas

**LS2.C: Ecosystem Dynamics, Functioning, and Resilience**

- When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. (secondary to 3-LS4-4)

**LS4.A: Evidence of Common Ancestry and Diversity**

- Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (Note: moved from K-2) (3-LS4-1)
- Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1)

**LS4.B: Natural Selection**

- Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)

**LS4.C: Adaptation**

- For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

**LS4.D: Biodiversity and Humans**

- Populations live in a variety of habitats, and change in those habitats affects the organisms living there. (3-LS4-4)

### Crosscutting Concepts

**Cause and Effect**

- Cause and effect relationships are routinely identified and used to explain change. (3-LS4-2),(3-LS4-3)

**Scale, Proportion, and Quantity**

- Observable phenomena exist from very short to very long time periods. (3-LS4-1)

**Systems and System Models**

- A system can be described in terms of its components and their interactions. (3-LS4-4)

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**Connections to Engineering, Technology, and Applications of Science**

**Interdependence of Science, Engineering, and Technology**

- Knowledge of relevant scientific concepts and research findings is important in engineering. (3-LS4-3)

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**Connections to Nature of Science**

**Scientific Knowledge Assumes an Order and Consistency in Natural Systems**

- Science assumes consistent patterns in natural systems. (3-LS4-1)

Connections to other DCIs in third grade: 3.LS4.C (3-LS4-2); 3.ESS2.D (3-LS4-3); 3.ESS3.B (3-LS4-4)

Articulation of DCIs across grade-levels: K.ESS3.A (3-LS4-3)(3-LS4-4); K.ETS1.A (3-LS4-4); 1.LS3.A (3-LS4-2); 2.LS2.A (3-LS4-3),(3-LS4-4); 2.LS4.D (3-LS4-3),(3-LS4-4); 4.ESS1.C (3-LS4-1); 4.ESS3.B (3-LS4-4); 4.ETS1.A (3-LS4-4); MS.LS2.A (3-LS4-1),(3-LS4-2),(3-LS4-3),(3-LS4-4); MS.LS2.C (3-LS4-4); MS.LS3.B (3-LS4-2); MS.LS4.A (3-LS4-1); MS.LS4.B (3-LS4-2),(3-LS4-3); MS.LS4.C (3-LS4-3),(3-LS4-4); MS.ESS1.C (3-LS4-1),(3-LS4-3),(3-LS4-4); MS.ESS2.B (3-LS4-1); MS.ESS3.C (3-LS4-4)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.3.1 | Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-LS4-1),(3-LS4-2),(3-LS4-3) (3-LS4-4) |
| RI.3.2 | Determine the main idea of a text; recount the key details and explain how they support the main idea. (3-LS4-1),(3-LS4-2),(3-LS4-3),(3LS4-4) |
| RI.3.3 | Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS4-1),(3-LS4-2),(3-LS4-3),(3-LS4-4) |
| W.3.1 | Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS4-1),(3-LS4-3),(3-LS4-4) |
| W.3.2 | Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-1),(3-LS4-2),(3-LS4-3),(3-LS4-4) |
| W.3.9 | Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-LS4-1) |
| SL.3.4 | Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS4-2),(3-LS4-3),(3-LS4-4) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (3-LS4-1),(3-LS4-2),(3-LS4-3),(3-LS4-4) |
| MP.4 | Model with mathematics. (3-LS4-1),(3-LS4-2),(3-LS4-3),(3-LS4-4) |
| MP.5 | Use appropriate tools strategically. (3-LS4-1) |
| 3.MD.B.3 | Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. (3-LS4-2),(3-LS4-3) |
| 3.MD.B.4 | Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (3-LS4-1) |

# 3-ESS2 Earth's Systems

## 3-ESS2 Earth's Systems

Students who demonstrate understanding can:

3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]

3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Disciplinary Core Ideas

ESS2.D: Weather and Climate

- Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1)
- Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)

### Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions. (3-ESS2-1),(3-ESS2-2)

Connections to other DCIs in third grade: N/A

Articulation of DCIs across grade-levels: K.ESS2.D (3-ESS2-1); 4.ESS2.A (3-ESS2-1); 5.ESS2.A (3-ESS2-1); MS.ESS2.C (3-ESS2-1),(3-ESS2-2); MS.ESS2.D (3-ESS2-1),(3-ESS2-2)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.3.1 | Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. (3-ESS2-2) |
| RI.3.9 | Compare and contrast the most important points and key details presented in two texts on the same topic. (3-ESS2-2) |
| W.3.9 | Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. (3-ESS2-2) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (3-ESS2-1),(3-ESS2-2) |
| MP.4 | Model with mathematics. (3-ESS2-1),(3-ESS2-2) |
| MP.5 | Use appropriate tools strategically. (3-ESS2-1) |
| 3.MD.A.2 | Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. (3-ESS2-1) |
| 3.MD.B.3 | Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in bar graphs. (3-ESS2-1) |

# 3-ESS3 Earth and Human Activity

## 3-ESS3 Earth and Human Activity

Students who demonstrate understanding can:

3-ESS3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.*

[Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Engaging in Argument from Evidence

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-ESS3-1)

### Disciplinary Core Ideas

ESS3.B: Natural Hazards

- A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1) (Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)

### Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1)

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Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). (3-ESS3-1)

---

Connections to Nature of Science

Science is a Human Endeavor

- Science affects everyday life. (3-ESS3-1)

Connections to other DCIs in third grade: N/A

Articulation of DCIs across grade-levels: K.ESS3.B (3-ESS3-1); K.ETS1.A (3-ESS3-1); 4.ESS3.B (3-ESS3-1); 4.ETS1.A (3-ESS3-1); MS.ESS3.B (3-ESS3-1)

Common Core State Standards Connections:

ELA/Literacy –

W.3.1 Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-ESS3-1)

W.3.7 Conduct short research projects that build knowledge about a topic. (3-ESS3-1)

Mathematics –

MP.2 Reason abstractly and quantitatively. (3-ESS3-1)

MP.4 Model with mathematics. (3-ESS3-1)

# 3-5-ETS1 Engineering Design

## 3-5-ETS1 Engineering Design

Students who demonstrate understanding can:

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Asking Questions and Defining Problems**

Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1)

**Planning and Carrying Out Investigations**

Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-5-ETS1-3)

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2)

### Disciplinary Core Ideas

**ETS1.A: Defining and Delimiting Engineering Problems**

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1)

**ETS1.B: Developing Possible Solutions**

- Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2)
- At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2)
- Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3)

**ETS1.C: Optimizing the Design Solution**

- Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)

### Crosscutting Concepts

**Influence of Engineering, Technology, and Science on Society and the Natural World**

- People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1)
- Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2)

Connections to 3-5-ETS1.A: Defining and Delimiting Engineering Problems include:
Fourth Grade: 4-PS3-4

Connections to 3-5-ETS1.B: Designing Solutions to Engineering Problems include:
Fourth Grade: 4-ESS3-2

Connections to 3-5-ETS1.C: Optimizing the Design Solution include:
Fourth Grade: 4-PS4-3

Articulation of DCIs across grade-bands: K-2.ETS1.A (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3); K-2.ETS1.B (3-5-ETS1-2); K-2.ETS1.C (3-5-ETS1-2),(3-5-ETS1-3); MS.ETS1.A (3-5-ETS1-1); MS.ETS1.B (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3); MS.ETS1.C (3-5-ETS1-2),(3-5-ETS1-3)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.5.1 | Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (3-5-ETS-2) |
| RI.5.7 | Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (3-5-ETS-2) |
| RI.5.9 | Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (3-5-ETS-2) |
| W.5.7 | Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (3-5-ETS1-1),(3-5-ETS1-3) |
| W.5.8 | Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (3-5-ETS1-1),(3-5-ETS1-3) |
| W.5.9 | Draw evidence from literary or informational texts to support analysis, reflection, and research. (3-5-ETS1-1),(3-5-ETS1-3) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3) |
| MP.4 | Model with mathematics. (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3) |
| MP.5 | Use appropriate tools strategically. (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3) |
| 3-5.OA | Operations and Algebraic Thinking (3-5-ETS1-1),(3-5-ETS1-2) |

# 4-PS3 Energy

## 4-PS3 Energy

Students who demonstrate understanding can:

4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object. [Assessment Boundary: Assessment does not include quantitative measures of changes in the speed of an object or on any precise or quantitative definition of energy.]

4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. [Assessment Boundary: Assessment does not include quantitative measurements of energy.]

4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide. [Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.] [Assessment Boundary: Assessment does not include quantitative measurements of energy.]

4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.* [Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and, a passive solar heater that converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.] [Assessment Boundary: Devices should be limited to those that convert motion energy to electric energy or use stored energy to cause motion or produce light or sound.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Asking Questions and Defining Problems**

Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (4-PS3-3)

**Planning and Carrying Out Investigations**

Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (4-PS3-2)

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Use evidence (e.g., measurements, observations, patterns) to construct an explanation. (4-PS3-1)
- Apply scientific ideas to solve design problems. (4-PS3-4)

### Disciplinary Core Ideas

**PS3.A: Definitions of Energy**

- The faster a given object is moving, the more energy it possesses. (4-PS3-1)
- Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2),(4-PS3-3)

**PS3.B: Conservation of Energy and Energy Transfer**

- Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2),(4-PS3-3)
- Light also transfers energy from place to place. (4-PS3-2)
- Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2),(4-PS3-4)

**PS3.C: Relationship Between Energy and Forces**

- When objects collide, the contact forces transfer energy so as to change the objects' motions. (4-PS3-3)

**PS3.D: Energy in Chemical Processes and Everyday Life**

- The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4)

**ETS1.A: Defining Engineering Problems**

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (secondary to 4-PS3-4)

### Crosscutting Concepts

**Energy and Matter**

- Energy can be transferred in various ways and between objects. (4-PS3-1),(4-PS3-2),(4-PS3-3),(4-PS3-4)

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**Connections to Engineering, Technology, and Applications of Science**

**Influence of Science, Engineering and Technology on Society and the Natural World**

- Engineers improve existing technologies or develop new ones. (4-PS3-4)

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**Connections to Nature of Science**

**Science is a Human Endeavor**

- Most scientists and engineers work in teams. (4-PS3-4)
- Science affects everyday life. (4-PS3-4)

Connections to other DCIs in fourth grade: N/A

Articulation of DCIs across grade-levels: K.PS2.B (4-PS3-3); K.ETS1.A (4-PS3-4); 2.ETS1.B (4-PS3-4); 3.PS2.A (4-PS3-3); 5.PS3.D (4-PS3-4); 5.LS1.C (4-PS3-4); MS.PS2.A (4-PS3-3); MS.PS2.B (4-PS3-2); MS.PS3.A (4-PS3-1),(4-PS3-2),(4-PS3-3),(4-PS3-4); MS.PS3.B (4-PS3-2),(4-PS3-3),(4-PS3-4); MS.PS3.C (4-PS3-3); MS.PS4.B (4-PS3-2); MS.ETS1.B (4- PS3-4); MS.ETS1.C (4-PS3-4)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.4.1 | Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-PS3-1) |
| RI.4.3 | Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. (4-PS3-1) |
| RI.4.9 | Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-PS3-1) |
| W.4.2 | Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (4-PS3-1) |
| W.4.7 | Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-PS3-2),(4-PS3-3),(4-PS3-4) |
| W.4.8 | Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-PS3-1),(4-PS3-2),(4-PS3-3),(4-PS3-4) |
| W.4.9 | Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-PS3-1) |

Mathematics –

4.OA.A.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. (4-PS3-4)

# 4-PS4 Waves and their Applications in Technologies for Information Transfer

## 4-PS4 Waves and their Applications in Technologies for Information Transfer

Students who demonstrate understanding can:

4-PS4-1. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. [Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.] [Assessment Boundary: Assessment does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.]

4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. [Assessment Boundary: Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.]

4-PS4-3. Generate and compare multiple solutions that use patterns to transfer information.* [Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Developing and Using Models

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Develop a model using an analogy, example, or abstract representation to describe a scientific principle. (4-PS4-1)
- Develop a model to describe phenomena. (4-PS4-2)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-PS4-3)

---

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Science findings are based on recognizing patterns. (4-PS4-1)

### Disciplinary Core Ideas

PS4.A: Wave Properties

- Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach. (Note: This grade band endpoint was moved from K–2.) (4-PS4-1)
- Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1)

PS4.B: Electromagnetic Radiation

- An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2)

PS4.C: Information Technologies and Instrumentation

- Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3)

ETS1.C: Optimizing The Design Solution

- Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (secondary to 4-PS4-3)

### Crosscutting Concepts

Patterns

- Similarities and differences in patterns can be used to sort and classify natural phenomena. (4-PS4-1)
- Similarities and differences in patterns can be used to sort and classify designed products. (4-PS4-3)

Cause and Effect

- Cause and effect relationships are routinely identified. (4-PS4-2)

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Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Knowledge of relevant scientific concepts and research findings is important in engineering. (4-PS4-3)

Connections to other DCIs in fourth grade: 4.PS3.A (4-PS4-1); 4.PS3.B (4-PS4-1); 4.ETS1.A (4-PS4-3)

Articulation of DCIs across grade-levels: K.ETS1.A (4-PS4-3); 1.PS4.B (4-PS4-2); 1.PS4.C (4-PS4-3); 2.ETS1.B (4-PS4-3); 2.ETS1.C (4-PS4-3); 3.PS2.A (4-PS4-3); MS.PS4.A (4-PS4-1); MS.PS4.B (4-PS4-2); MS.PS4.C (4-PS4-3); MS.LS1.D (4-PS4-2); MS.ETS1.B (4-PS4-3)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.4.1 | Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-PS4-3) |
| RI.4.9 | Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-PS4-3) |
| SL.4.5 | Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-PS4-1),(4-PS4-2) |

Mathematics –

| | |
|---|---|
| MP.4 | Model with mathematics. (4-PS4-1),(4-PS4-2) |
| 4.G.A.1 | Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. (4-PS4-1),(4-PS4-2) |

# 4-LS1 From Molecules to Organisms: Structures and Processes

## 4-LS1 From Molecules to Organisms: Structures and Processes

Students who demonstrate understanding can:

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]

4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. [Clarification Statement: Emphasis is on systems of information transfer.] [Assessment Boundary: Assessment does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Developing and Using Models**

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2)

**Engaging in Argument from Evidence**

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Construct an argument with evidence, data, and/or a model. (4-LS1-1)

### Disciplinary Core Ideas

**LS1.A: Structure and Function**

- Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)

**LS1.D: Information Processing**

- Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2)

### Crosscutting Concepts

**Systems and System Models**

- A system can be described in terms of its components and their interactions. (4-LS1-1),(4-LS1-2)

Connections to other DCIs in fourth grade: N/A

Articulation of DCIs across grade-levels: 1.LS1.A (4-LS1-1); 1.LS1.D (4-LS1-2); 3.LS3.B (4-LS1-1); MS.LS1.A (4-LS1-1),(4-LS1-2); MS.LS1.D (4-LS1-2)

Common Core State Standards Connections:

ELA/Literacy –

W.4.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (4-LS1-1)

SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. (4-LS1-2)

Mathematics –

4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line-symmetric figures and draw lines of symmetry. (4-LS1-1)

# 4-ESS1 Earth's Place in the Universe

## 4-ESS1 Earth's Place in the Universe

Students who demonstrate understanding can:

4-ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. [Clarification Statement: Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and, a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.] [Assessment Boundary: Assessment does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative time.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Identify the evidence that supports particular points in an explanation. (4-ESS1-1)

### Disciplinary Core Ideas

ESS1.C: The History of Planet Earth

- Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1)

### Crosscutting Concepts

Patterns

- Patterns can be used as evidence to support an explanation. (4-ESS1-1)

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Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems. (4-ESS1-1)

Connections to other DCIs in fourth grade: N/A

Articulation of DCIs across grade-levels: 2.ESS1.C (4-ESS1-1); 3.LS4.A (4-ESS1-1); MS.LS4.A (4-ESS1-1); MS.ESS1.C (4-ESS1-1) MS.ESS2.A (4-ESS1-1); MS.ESS2.B (4-ESS1-1)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| W.4.7 | Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS1-1) |
| W.4.8 | Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-ESS1-1) |
| W.4.9 | Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-ESS1-1) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (4-ESS1-1) |
| MP.4 | Model with mathematics. (4-ESS1-1) |
| 4.MD.A.1 | Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. (4-ESS1-1) |

# 4-ESS2 Earth's Systems

## 4-ESS2 Earth's Systems

Students who demonstrate understanding can:

4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. [Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.] [Assessment Boundary: Assessment is limited to a single form of weathering or erosion.]

4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth's features. [Clarification Statement: Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (4-ESS2-1)

Analyzing and Interpreting Data

Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2)

### Disciplinary Core Ideas

ESS2.A: Earth Materials and Systems

- Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1)

ESS2.B: Plate Tectonics and Large-Scale System Interactions

- The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth. (4-ESS2-2)

ESS2.E: Biogeology

- Living things affect the physical characteristics of their regions. (4-ESS2-1)

### Crosscutting Concepts

Patterns

- Patterns can be used as evidence to support an explanation. (4-ESS2-2)

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS2-1)

Connections to other DCIs in fourth grade: N/A

Articulation of DCIs across grade-levels: 2.ESS1.C (4-ESS2-1); 2.ESS2.A (4-ESS2-1); 2.ESS2.B (4-ESS2-2); 2.ESS2.C (4-ESS2-2); 5.ESS2.A (4-ESS2-1); 5.ESS2.C (4-ESS2-2); MS.ESS1.C (4-ESS2-2); MS.ESS2.A (4-ESS2-2); MS.ESS2.B (4-ESS2-2)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.4.7 | Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears. (4-ESS2-2) |
| W.4.7 | Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS2-1) |
| W.4.8 | Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-ESS2-1) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (4-ESS2-1) |
| MP.4 | Model with mathematics. (4-ESS2-1) |
| MP.5 | Use appropriate tools strategically. (4-ESS2-1) |
| 4.MD.A.1 | Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. (4-ESS2-1) |
| 4.MD.A.2 | Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. (4-ESS2-1),(4-ESS2-2) |

# 4-ESS3 Earth and Human Activity

## 4-ESS3 Earth and Human Activity

Students who demonstrate understanding can:

4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.]

4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.* [Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.][Assessment Boundary: Assessment is limited to earthquakes, floods, tsunamis, and volcanic eruptions.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-ESS3-2)

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluate the merit and accuracy of ideas and methods.

- Obtain and combine information from books and other reliable media to explain phenomena. (4-ESS3-1)

### Disciplinary Core Ideas

ESS3.A: Natural Resources

- Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (4-ESS3-1)

ESS3.B: Natural Hazards

- A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts. (4-ESS3-2) (Note: This Disciplinary Core Idea can also be found in 3.WC.)

ETS1.B: Designing Solutions to Engineering Problems

- Testing a solution involves investigating how well it performs under a range of likely conditions. (secondary to 4-ESS3-2)

### Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (4-ESS3-1)
- Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS3-2)

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Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Knowledge of relevant scientific concepts and research findings is important in engineering. (4-ESS3-1)

Influence of Science, Engineering and Technology on Society and the Natural World

- Over time, people's needs and wants change, as do their demands for new and improved technologies. (4-ESS3-1)
- Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands. (4-ESS3-2)

Connections to other DCIs in fourth grade: 4.ETS1.C (4-ESS3-2)

Articulation of DCIs across grade-levels: K.ETS1.A (4-ESS3-2); 2.ETS1.B (4-ESS3-2); 2.ETS1.C (4-ESS3-2); 5.ESS3.C (4-ESS3-1); MS.PS3.D (4-ESS3-1); MS.ESS2.A (4-ESS3-1),(4-ESS3-2); MS.ESS3.A (4-ESS3-1); MS.ESS3.B (4-ESS3-2); MS.ESS3.C (4-ESS3-1); MS.ESS3.D (4-ESS3-1); MS.ETS1.B (4-ESS3-2)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.4.1 | Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. (4-ESS3-2) |
| RI.4.9 | Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably. (4-ESS3-2) |
| W.4.7 | Conduct short research projects that build knowledge through investigation of different aspects of a topic. (4-ESS3-1) |
| W.4.8 | Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources. (4-ESS3-1) |
| W.4.9 | Draw evidence from literary or informational texts to support analysis, reflection, and research. (4-ESS3-1) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (4-ESS3-1),(4-ESS3-2) |
| MP.4 | Model with mathematics. (4-ESS3-1),(4-ESS3-2) |
| 4.OA.A.1 | Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations. (4-ESS3-1),(4-ESS3-2) |

# 3-5-ETS1 Engineering Design

**3-5-ETS1 Engineering Design**

Students who demonstrate understanding can:

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

## Science and Engineering Practices

**Asking Questions and Defining Problems**

Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3-5-ETS1-1)

**Planning and Carrying Out Investigations**

Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-5-ETS1-3)

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2)

## Disciplinary Core Ideas

**ETS1.A: Defining and Delimiting Engineering Problems**

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3-5-ETS1-1)

**ETS1.B: Developing Possible Solutions**

- Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3-5-ETS1-2)
- At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3-5-ETS1-2)
- Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3-5-ETS1-3)

**ETS1.C: Optimizing the Design Solution**

- Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3-5-ETS1-3)

## Crosscutting Concepts

**Influence of Engineering, Technology, and Science on Society and the Natural World**

- People's needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1)
- Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3-5-ETS1-2)

Connections to 3-5-ETS1.A: Defining and Delimiting Engineering Problems include:
Fourth Grade: 4-PS3-4

Connections to 3-5-ETS1.B: Designing Solutions to Engineering Problems include:
Fourth Grade: 4-ESS3-2

Connections to 3-5-ETS1.C: Optimizing the Design Solution include:
Fourth Grade: 4-PS4-3

Articulation of DCIs across grade-bands: K-2.ETS1.A (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3); K-2.ETS1.B (3-5-ETS1-2); K-2.ETS1.C (3-5-ETS1-2),(3-5-ETS1-3); MS.ETS1.A (3-5-ETS1-1); MS.ETS1.B (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3); MS.ETS1.C (3-5-ETS1-2),(3-5-ETS1-3)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.5.1 | Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (3-5-ETS-2) |
| RI.5.7 | Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (3-5-ETS-2) |
| RI.5.9 | Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (3-5-ETS-2) |
| W.5.7 | Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (3-5-ETS1-1),(3-5-ETS1-3) |
| W.5.8 | Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (3-5-ETS1-1),(3-5-ETS1-3) |
| W.5.9 | Draw evidence from literary or informational texts to support analysis, reflection, and research. (3-5-ETS1-1),(3-5-ETS1-3) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3) |
| MP.4 | Model with mathematics. (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3) |
| MP.5 | Use appropriate tools strategically. (3-5-ETS1-1),(3-5-ETS1-2),(3-5-ETS1-3) |
| 3-5.OA | Operations and Algebraic Thinking (3-5-ETS1-1),(3-5-ETS1-2) |

# 5-PS1 Matter and Its Interactions

## 5-PS1 Matter and Its Interactions

Students who demonstrate understanding can:

5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen. [Clarification Statement: Examples of evidence could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water.] [Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.]

5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. [Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances.] [Assessment Boundary: Assessment does not include distinguishing mass and weight.]

5-PS1-3. Make observations and measurements to identify materials based on their properties. [Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.] [Assessment Boundary: Assessment does not include density or distinguishing mass and weight.]

5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Developing and Using Models**

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Develop a model to describe phenomena. (5-PS1-1)

**Planning and Carrying Out Investigations**

Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (5-PS1-4)
- Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (5-PS1-3)

**Using Mathematics and Computational Thinking**

Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.

- Measure and graph quantities such as weight to address scientific and engineering questions and problems. (5-PS1-2)

### Disciplinary Core Ideas

**PS1.A: Structure and Properties of Matter**

- Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. (5-PS1-1)
- The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2)
- Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation.) (5-PS1-3)

**PS1.B: Chemical Reactions**

- When two or more different substances are mixed, a new substance with different properties may be formed. (5-PS1-4)
- No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) (5-PS1-2)

### Crosscutting Concepts

**Cause and Effect**

- Cause and effect relationships are routinely identified, tested, and used to explain change. (5-PS1-4)

**Scale, Proportion, and Quantity**

- Natural objects exist from the very small to the immensely large. (5-PS1-1)
- Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. (5-PS1-2),(5-PS1-3)

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**Connections to Nature of Science**

**Scientific Knowledge Assumes an Order and Consistency in Natural Systems**

- Science assumes consistent patterns in natural systems. (5-PS1-2)

Connections to other DCIs in fifth grade: N/A

Articulation of DCIs across grade-levels: 2.PS1.A (5-PS1-1),(5-PS1-2),(5-PS1-3); 2.PS1.B (5-PS1-2),(5-PS1-4); MS.PS1.A (5-PS1-1),(5-PS1-2),(5-PS1-3),(5-PS1-4); MS.PS1.B (5-PS1-2),(5-PS1-4)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.5.7 | Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-PS1-1) |
| W.5.7 | Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic. (5-PS1-2),(5-PS1-3),(5-PS1-4) |
| W.5.8 | Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-PS1-2),(5-PS1-3),(5-PS1-4) |
| W.5.9 | Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-PS1-2),(5-PS1-3),(5-PS1-4) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (5-PS1-1),(5-PS1-2),(5-PS1-3) |
| MP.4 | Model with mathematics. (5-PS1-1),(5-PS1-2),(5-PS1-3) |
| MP.5 | Use appropriate tools strategically. (5-PS1-2),(5-PS1-3) |
| 5.NBT.A.1 | Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. (5-PS1-1) |
| 5.NF.B.7 | Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (5-PS1-1) |
| 5.MD.A.1 | Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real-world problems. (5-PS1-2) |
| 5.MD.C.3 | Recognize volume as an attribute of solid figures and understand concepts of volume measurement. (5-PS1-1) |
| 5.MD.C.4 | Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units. (5-PS1-1) |

# 5-PS2 Motion and Stability: Forces and Interactions

## 5-PS2 Motion and Stability: Forces and Interactions

Students who demonstrate understanding can:

5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down. [Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth.] [Assessment Boundary: Assessment does not include mathematical representation of gravitational force.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Engaging in Argument from Evidence

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Support an argument with evidence, data, or a model. (5-PS2-1)

### Disciplinary Core Ideas

PS2.B: Types of Interactions

- The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. (5-PS2-1)

### Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (5-PS2-1)

Connections to other DCIs in fifth grade: N/A

Articulation of DCIs across grade-levels: 3.PS2.A (5-PS2-1); 3.PS2.B (5-PS2-1); MS.PS2.B (5-PS2-1); MS.ESS1.B (5-PS2-1); MS.ESS2.C (5-PS2-1)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.5.1 | Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-PS2-1) |
| RI.5.9 | Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-PS2-1) |
| W.5.1 | Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-PS2-1) |

# 5-PS3 Energy

## 5-PS3 Energy

Students who demonstrate understanding can:

5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun. [Clarification Statement: Examples of models could include diagrams, and flow charts.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Developing and Using Models

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Use models to describe phenomena. (5-PS3-1)

### Disciplinary Core Ideas

PS3.D: Energy in Chemical Processes and Everyday Life

- The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (5-PS3-1)

LS1.C: Organization for Matter and Energy Flow in Organisms

- Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary to 5-PS3-1)

### Crosscutting Concepts

Energy and Matter

- Energy can be transferred in various ways and between objects. (5-PS3-1)

Connections to other DCIs in fifth grade: N/A

Articulation of DCIs across grade-levels: K.LS1.C (5-PS3-1); 2.LS2.A (5-PS3-1); 4.PS3.A (5-PS3-1); 4.PS3.B (5-PS3-1); 4.PS3.D (5-PS3-1); MS.PS3.D (5-PS3-1); MS.PS4.B (5-PS3-1); MS.LS1.C (5-PS3-1); MS.LS2.B (5-PS3-1)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.5.7 | Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-PS3-1) |
| SL.5.5 | Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-PS3-1) |

# 5-LS1 From Molecules to Organisms: Structures and Processes

## 5-LS1 From Molecules to Organisms: Structures and Processes

Students who demonstrate understanding can:

5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water. [Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Engaging in Argument from Evidence

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Support an argument with evidence, data, or a model. (5-LS1-1)

### Disciplinary Core Ideas

LS1.C: Organization for Matter and Energy Flow in Organisms

- Plants acquire their material for growth chiefly from air and water. (5-LS1-1)

### Crosscutting Concepts

Energy and Matter

- Matter is transported into, out of, and within systems. (5-LS1-1)

Connections to other DCIs in fifth grade: 5.PS1.A (5-LS1-1)

Articulation of DCIs across grade-levels: K.LS1.C (5-LS1-1); 2.LS2.A (5-LS1-1); MS.LS1.C (5-LS1-1)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.5.1 | Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-LS1-1) |
| RI.5.9 | Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-LS1-1) |
| W.5.1 | Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-LS1-1) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (5-LS1-1) |
| MP.4 | Model with mathematics. (5-LS1-1) |
| MP.5 | Use appropriate tools strategically. (5-LS1-1) |
| 5.MD.A.1 | Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. (5-LS1-1) |

# 5-LS2 Ecosystems: Interactions, Energy, and Dynamics

## 5-LS2 Ecosystems: Interactions, Energy, and Dynamics

Students who demonstrate understanding can:

**5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.**

[Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.] [Assessment Boundary: Assessment does not include molecular explanations.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Developing and Using Models

Modeling in 3–5 builds on K–2 models and progresses to building and revising simple models and using models to represent events and design solutions.

- Develop a model to describe phenomena. (5-LS2-1)

---

Connections to Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

- Science explanations describe the mechanisms for natural events. (5-LS2-1)

### Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems

- The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)

LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

- Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1)

### Crosscutting Concepts

Systems and System Models

- A system can be described in terms of its components and their interactions. (5-LS2-1)

Connections to other DCIs in fifth grade: 5.PS1.A (5-LS2-1); 5.ESS2.A (5-LS2-1)

Articulation of DCIs across grade-levels: 2.PS1.A (5-LS2-1); 2.LS4.D (5-LS2-1); 4.ESS2.E (5-LS2-1); MS.PS3.D (5-LS2-1); MS.LS1.C (5-LS2-1); MS.LS2.A (5-LS2-1); MS.LS2.B (5-LS2-1)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.5.7 | Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-LS2-1) |
| SL.5.5 | Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-LS2-1) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (5-LS2-1) |
| MP.4 | Model with mathematics. (5-LS2-1) |

# 5-ESS1 Earth's Place in the Universe

## 5-ESS1 Earth's Place in the Universe

Students who demonstrate understanding can:

5-ESS1-1. Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth. [Assessment Boundary: Assessment is limited to relative distances, not sizes, of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, stage).]

5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. [Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.] [Assessment Boundary: Assessment does not include causes of seasons.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Analyzing and Interpreting Data**

Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. (5-ESS1-2)

**Engaging in Argument from Evidence**

Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Support an argument with evidence, data, or a model. (5-ESS1-1)

### Disciplinary Core Ideas

**ESS1.A: The Universe and its Stars**

- The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. (5-ESS1-1)

**ESS1.B: Earth and the Solar System**

- The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. (5-ESS1-2)

### Crosscutting Concepts

**Patterns**

- Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena. (5-ESS1-2)

**Scale, Proportion, and Quantity**

- Natural objects exist from the very small to the immensely large. (5-ESS1-1)

Connections to other DCIs in fifth grade: N/A

Articulation of DCIs across grade-levels: 1.ESS1.A (5-ESS1-2); 1.ESS1.B (5-ESS1-2); 3.PS2.A (5-ESS1-2); MS.ESS1.A (5-ESS1-1),(5-ESS1-2); MS.ESS1.B (5-ESS1-1),(5-ESS1-2)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.5.1 | Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-ESS1-1) |
| RI.5.7 | Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-ESS1-1) |
| RI.5.8 | Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s). (5-ESS1-1) |
| RI.5.9 | Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS1-1) |
| W.5.1 | Write opinion pieces on topics or texts, supporting a point of view with reasons and information. (5-ESS1-1) |
| SL.5.5 | Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-ESS1-2) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (5-ESS1-1),(5-ESS1-2) |
| MP.4 | Model with mathematics. (5-ESS1-1),(5-ESS1-2) |
| 5.NBT.A.2 | Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. (5-ESS1-1) |
| 5.G.A.2 | Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (5-ESS1-2) |

# 5-ESS2 Earth's Systems

## 5-ESS2 Earth's Systems

Students who demonstrate understanding can:

5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]

5-ESS2-2. Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. [Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Developing and Using Models

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Develop a model using an example to describe a scientific principle. (5-ESS2-1)

Using Mathematics and Computational Thinking

Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.

- Describe and graph quantities such as area and volume to address scientific questions. (5-ESS2-2)

### Disciplinary Core Ideas

ESS2.A: Earth Materials and Systems

- Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. (5-ESS2-1)

ESS2.C: The Roles of Water in Earth's Surface Processes

- Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. (5-ESS2-2)

### Crosscutting Concepts

Scale, Proportion, and Quantity

- Standard units are used to measure and describe physical quantities such as weight and volume. (5-ESS2-2)

Systems and System Models

- A system can be described in terms of its components and their interactions. (5-ESS2-1)

Connections to other DCIs in fifth grade: N/A

Articulation of DCIs across grade-levels: 2.ESS2.A (5-ESS2-1); 2.ESS2.C (5-ESS2-2); 3.ESS2.D (5-ESS2-1); 4.ESS2.A (5-ESS2-1); MS.ESS2.A (5-ESS2-1); MS.ESS2.C (5-ESS2-1),(5-ESS2-2); MS.ESS2.D (5-ESS2-1); MS.ESS3.A (5-ESS2-2)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.5.7 | Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. (5-ESS2-1),(5-ESS2-2) |
| W.5.8 | Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-ESS2-2) |
| SL.5.5 | Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. (5-ESS2-1),(5-ESS2-2) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (5-ESS2-1),(5-ESS2-2) |
| MP.4 | Model with mathematics. (5-ESS2-1),(5-ESS2-2) |
| 5.G.A.2 | Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (5-ESS2-1) |

# 5-ESS3 Earth and Human Activity

| 5-ESS3 Earth and Human Activity |
|---|
| Students who demonstrate understanding can:<br>5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. |

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

## Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.

- Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1)

## Disciplinary Core Ideas

ESS3.C: Human Impacts on Earth Systems

- Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)

## Crosscutting Concepts

Systems and System Models

- A system can be described in terms of its components and their interactions. (5-ESS3-1)

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Connections to Nature of Science

Science Addresses Questions About the Natural and Material World.

- Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1)

Connections to other DCIs in fifth grade: N/A

Articulation of DCIs across grade-levels: MS.ESS3.A (5-ESS3-1); MS.ESS3.C (5-ESS3-1); MS.ESS3.D (5-ESS3-1)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RI.5.1 | Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. (5-ESS3-1) |
| RI.5.7 | Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.(5-ESS3-1) |
| RI.5.9 | Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS3-1) |
| W.5.8 | Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. (5-ESS3-1) |
| W.5.9 | Draw evidence from literary or informational texts to support analysis, reflection, and research. (5-ESS3-1) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (5-ESS3-1) |
| MP.4 | Model with mathematics. (5-ESS3-1) |

# Middle School Physical Science MS-PS1 Matter and Its Interactions

## MS-PS1 Matter and Its Interactions

Students who demonstrate understanding can:

MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures. [Clarification Statement: Emphasis is on developing models of molecules that vary in complexity. Examples of simple molecules could include ammonia and methanol. Examples of extended structures could include sodium chloride or diamonds. Examples of molecular-level models could include drawings, 3D ball and stick structures, or computer representations showing different molecules with different types of atoms.] [Assessment Boundary: Assessment does not include valence electrons and bonding energy, discussing the ionic nature of subunits of complex structures, or a complete depiction of all individual atoms in a complex molecule or extended structure.]

MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. [Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.] [Assessment Boundary: Assessment is limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability, and odor.]

MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. [Clarification Statement: Emphasis is on natural resources that undergo a chemical process to form the synthetic material. Examples of new materials could include new medicine, foods, and alternative fuels.] [Assessment Boundary: Assessment is limited to qualitative information.]

MS-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. [Clarification Statement: Emphasis is on qualitative molecular-level models of solids, liquids, and gases to show that adding or removing thermal energy increases or decreases kinetic energy of the particles until a change of state occurs. Examples of models could include drawings and diagrams. Examples of particles could include molecules or inert atoms. Examples of pure substances could include water, carbon dioxide, and helium.]

MS-PS1-5. Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. [Clarification Statement: Emphasis is on law of conservation of matter and on physical models or drawings, including digital forms, that represent atoms.] [Assessment Boundary: Assessment does not include the use of atomic masses, balancing symbolic equations, or intermolecular forces.]

MS-PS1-6. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.* [Clarification Statement: Emphasis is on the design, controlling the transfer of energy to the environment, and modification of a device using factors such as type and concentration of a substance. Examples of designs could involve chemical reactions such as dissolving ammonium chloride or calcium chloride.] [Assessment Boundary: Assessment is limited to the criteria of amount, time, and temperature of substance in testing the device.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Developing and Using Models**

Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop a model to predict and/or describe phenomena. (MS-PS1-1),(MS-PS1-4)
- Develop a model to describe unobservable mechanisms. (MS-PS1-5)

**Analyzing and Interpreting Data**

Analyzing data in 6–8 builds on K–5 and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Analyze and interpret data to determine similarities and differences in findings. (MS-PS1-2)

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories.

- Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints. (MS-PS1-6)

**Obtaining, Evaluating, and Communicating Information**

Obtaining, evaluating, and communicating information in 6–8 builds on K–5 and progresses to evaluating the merit and validity of ideas and methods.

- Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (MS-PS1-3)

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Connections to Nature of Science

**Scientific Knowledge is Based on Empirical Evidence**

- Science knowledge is based upon logical and conceptual connections between evidence and

### Disciplinary Core Ideas

**PS1.A: Structure and Properties of Matter**

- Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. (MS-PS1-1)
- Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it. (MS-PS1-2),(MS-PS1-3)
- Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. (MS-PS1-4)
- In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. (MS-PS1-4)
- Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals). (MS-PS1-1)
- The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4)

**PS1.B: Chemical Reactions**

- Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. (MS-PS1-2),(MS-PS1-3),(MS-PS1-5)
- The total number of each type of atom is conserved, and thus the mass does not change. (MS-PS1-5)
- Some chemical reactions release energy, others store energy. (MS-PS1-6)

**PS3.A: Definitions of Energy**

- The term "heat" as used in everyday language refers both to thermal energy (the motion of atoms or molecules within a substance) and the transfer of that thermal energy from one object to another. In science, heat is used only for this second meaning; it refers to the energy transferred due to the temperature difference between two objects. (secondary to MS-PS1-4)
- The temperature of a system is proportional to the average internal kinetic energy and potential energy per atom or molecule (whichever is the appropriate building block for the system's material). The details of that relationship depend on the type of atom or molecule and the interactions among the atoms in the material. Temperature is not a direct measure of a system's total thermal energy. The total thermal energy (sometimes called the total internal energy) of a system depends

### Crosscutting Concepts

**Patterns**

- Macroscopic patterns are related to the nature of microscopic and atomic-level structure. (MS-PS1-2)

**Cause and Effect**

- Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-PS1-4)

**Scale, Proportion, and Quantity**

- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (MS-PS1-1)

**Energy and Matter**

- Matter is conserved because atoms are conserved in physical and chemical processes. (MS-PS1-5)
- The transfer of energy can be tracked as energy flows through a designed or natural system. (MS-PS1-6)

**Structure and Function**

- Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. (MS-PS1-3)

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Connections to Engineering, Technology, and Applications of Science

**Interdependence of Science, Engineering, and Technology**

- Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (MS-PS1-3)

**Influence of Science, Engineering and Technology on Society and the Natural World**

- The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural

# Middle School Physical Science MS-PS1 Matter and Its Interactions

| | | |
|---|---|---|
| explanations. (MS-PS1-2)<br>Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena<br>' Laws are regularities or mathematical descriptions of natural phenomena. (MS-PS1-5) | jointly on the temperature, the total number of atoms in the system, and the state of the material. (secondary to MS-PS1-4)<br>ETS1.B: Developing Possible Solutions<br>' A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. (secondary to MS-PS1-6)<br>ETS1.C: Optimizing the Design Solution<br>' Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of the characteristics may be incorporated into the new design. (secondary to MS-PS1-6)<br>' The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. (secondary to MS-PS1-6) | resources, and economic conditions. Thus technology use varies from region to region and over time. (MS-PS1-3) |

Connections to other DCIs in this grade-band: MS.PS3.D (MS-PS1-2),(MS-PS1-6); MS.LS1.C (MS-PS1-2),(MS-PS1-5); MS.LS2.A (MS-PS1-3); MS.LS2.B (MS-PS1-5); MS.LS4.D (MS-PS1-3); MS.ESS2.A (MS-PS1-2),(MS-PS1-5); MS.ESS2.C (MS-PS1-1),(MS-PS1-4); MS.ESS3.A (MS-PS1-3); MS.ESS3.C (MS-PS1-3)

Articulation across grade-bands: 5.PS1.A (MS-PS1-1); 5.PS1.B (MS-PS1-2),(MS-PS1-5); HS.PS1.A (MS-PS1-1),(MS-PS1-3),(MS-PS1-4),(MS-PS1-6); HS.PS1.B (MS-PS1-2),(MS-PS1-4),(MS-PS1-5),(MS-PS1-6); HS.PS3.A (MS-PS1-4),(MS-PS1-6); HS.PS3.B (MS-PS1-6); HS.PS3.D (MS-PS1-6); HS.LS2.A (MS-PS1-3); HS.LS4.D (MS-PS1-3); HS.ESS1.A (MS-PS1-1); HS.ESS3.A (MS-PS1-3)

Common Core State Standards Connections:

ELA/Literacy –

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|---|---|
| RST.6-8.1 | Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions (MS-PS1-2),(MS-PS1-3) |
| RST.6-8.3 | Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (MS-PS1-6) |
| RST.6-8.7 | Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-PS1-1),(MS-PS1-2),(MS-PS1-4),(MS-PS1-5) |
| WHST.6-8.7 | Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-PS1-6) |
| WHST.6-8.8 | Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation. (MS-PS1-3) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (MS-PS1-1),(MS-PS1-2),(MS-PS1-5) |
| MP.4 | Model with mathematics. (MS-PS1-1),(MS-PS1-5) |
| 6.RP.A.3 | Use ratio and rate reasoning to solve real-world and mathematical problems. (MS-PS1-1),(MS-PS1-2),(MS-PS1-5) |
| 6.NS.C.5 | Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. (MS-PS1-4) |
| 8.EE.A.3 | Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. (MS-PS1-1) |
| 6.SP.B.4 | Display numerical data in plots on a number line, including dot plots, histograms, and box plots. (MS-PS1-2) |
| 6.SP.B.5 | Summarize numerical data sets in relation to their context (MS-PS1-2) |

# Middle School Physical Science MS-PS2 Motion and Stability: Forces and Interactions

## MS-PS2 Motion and Stability: Forces and Interactions

Students who demonstrate understanding can:

**MS-PS2-1.** Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.* [Clarification Statement: Examples of practical problems could include the impact of collisions between two cars, between a car and stationary objects, and between a meteor and a space vehicle.] [Assessment Boundary: Assessment is limited to vertical or horizontal interactions in one dimension.]

**MS-PS2-2.** Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. [Clarification Statement: Emphasis is on balanced (Newton's First Law) and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion (Newton's Second Law), frame of reference, and specification of units.] [Assessment Boundary: Assessment is limited to forces and changes in motion in one-dimension in an inertial reference frame and to change in one variable at a time. Assessment does not include the use of trigonometry.]

**MS-PS2-3.** Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. [Clarification Statement: Examples of devices that use electric and magnetic forces could include electromagnets, electric motors, or generators. Examples of data could include the effect of the number of turns of wire on the strength of an electromagnet, or the effect of increasing the number or strength of magnets on the speed of an electric motor.] [Assessment Boundary: Assessment about questions that require quantitative answers is limited to proportional reasoning and algebraic thinking.]

**MS-PS2-4.** Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. [Clarification Statement: Examples of evidence for arguments could include data generated from simulations or digital tools; and charts displaying mass, strength of interaction, distance from the Sun, and orbital periods of objects within the solar system.] [Assessment Boundary: Assessment does not include Newton's Law of Gravitation or Kepler's Laws.]

**MS-PS2-5.** Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. [Clarification Statement: Examples of this phenomenon could include the interactions of magnets, electrically-charged strips of tape, and electrically-charged pith balls. Examples of investigations could include first-hand experiences or simulations.] [Assessment Boundary: Assessment is limited to electric and magnetic fields, and limited to qualitative evidence for the existence of fields.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Asking Questions and Defining Problems**

Asking questions and defining problems in grades 6–8 builds from grades K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models.

- Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles. (MS-PS2-3)

**Planning and Carrying Out Investigations**

Planning and carrying out investigations to answer questions or test solutions to problems in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or design solutions.

- Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. (MS-PS2-2)
- Conduct an investigation and evaluate the experimental design to produce data to serve as the basis for evidence that can meet the goals of the investigation. (MS-PS2-5)

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Apply scientific ideas or principles to design an object, tool, process or system. (MS-PS2-1)

**Engaging in Argument from Evidence**

Engaging in argument from evidence in 6–8 builds from K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world.

- Construct and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (MS-PS2-4)

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Connections to Nature of Science

**Scientific Knowledge is Based on Empirical Evidence**

- Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS2-2),(MS-PS2-4)

### Disciplinary Core Ideas

**PS2.A: Forces and Motion**

- For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's third law). (MS-PS2-1)
- The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the object, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion. (MS-PS2-2)
- All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared. (MS-PS2-2)

**PS2.B: Types of Interactions**

- Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects. (MS-PS2-3)
- Gravitational forces are always attractive. There is a gravitational force between any two masses, but it is very small except when one or both of the objects have large mass—e.g., Earth and the sun. (MS-PS2-4)
- Forces that act at a distance (electric, magnetic, and gravitational) can be explained by fields that extend through space and can be mapped by their effect on a test object (a charged object, or a ball, respectively). (MS-PS2-5)

### Crosscutting Concepts

**Cause and Effect**

- Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-PS2-3),(MS-PS2-5)

**Systems and System Models**

- Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems. (MS-PS2-1),(MS-PS2-4),

**Stability and Change**

- Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales. (MS-PS2-2)

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Connections to Engineering, Technology and Applications of Science

**Influence of Science, Engineering, and Technology on Society and the Natural World**

- The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. (MS-PS2-1)

Connections to other DCIs in this grade-band: MS.PS3.A (MS-PS2-2); MS.PS3.B (MS-PS2-2); MS.PS3.C (MS-PS2-1); MS.ESS1.A (MS-PS2-4); MS.ESS1.B (MS-PS2-4); MS.ESS2.C (MS-PS2-2),(MS-PS2-4)

Articulation across grade-bands: 3.PS2.A (MS-PS2-1),(MS-PS2-2); 3.PS2.B (MS-PS2-3),(MS-PS2-5); 5.PS2.B (MS-PS2-4); HS.PS2.A (MS-PS2-1),(MS-PS2-2); HS.PS2.B (MS-PS2-3),(MS-PS2-4),(MS-PS2-5); HS.PS3.A (MS-PS2-5); HS.PS3.B (MS-PS2-2),(MS-PS2-5); HS.PS3.C (MS-PS2-5); HS.ESS1.B (MS-PS2-2),(MS-PS2-4)

Common Core State Standards Connections:

ELA/Literacy –

# Middle School Physical Science MS-PS2 Motion and Stability: Forces and Interactions

| | |
|---|---|
| RST.6-8.1 | Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions (MS-PS2-1),(MS-PS2-3) |
| RST.6-8.3 | Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (MS-PS2-1),(MS-PS2-2),(MS-PS2-5) |
| WHST.6-8.1 | Write arguments focused on discipline-specific content. (MS-PS2-4) |
| WHST.6-8.7 | Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-PS2-1),(MS-PS2-2),(MS-PS2-5) |
| Mathematics – | |
| MP.2 | Reason abstractly and quantitatively. (MS-PS2-1),(MS-PS2-2),(MS-PS2-3) |
| 6.NS.C.5 | Understand that positive and negative numbers are used together to describe quantities having opposite directions or values; use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. (MS-PS2-1) |
| 6. | EE.A.2 Write, read, and evaluate expressions in which letters stand for numbers. (MS-PS2-1),(MS-PS2-2) |
| 7. | EE.B.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form, using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. (MS-PS2-1),(MS-PS2-2) |
| 7.EE.B.4 | Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (MS-PS2-1),(MS-PS2-2) |

## MS-PS3 Energy

Students who demonstrate understanding can:

MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. [Clarification Statement: Emphasis is on descriptive relationships between kinetic energy and mass separately from kinetic energy and speed. Examples could include riding a bicycle at different speeds, rolling different sizes of rocks downhill, and getting hit by a wiffle ball versus a tennis ball.]

MS-PS3-2. Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. [Clarification Statement: Emphasis is on relative amounts of potential energy, not on calculations of potential energy. Examples of objects within systems interacting at varying distances could include: the Earth and either a roller coaster cart at varying positions on a hill or objects at varying heights on shelves, changing the direction/orientation of a magnet, and a balloon with static electrical charge being brought closer to a classmate's hair. Examples of models could include representations, diagrams, pictures, and written descriptions of systems.] [Assessment Boundary: Assessment is limited to two objects and electric, magnetic, and gravitational interactions.]

MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.* [Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a Styrofoam cup.] [Assessment Boundary: Assessment does not include calculating the total amount of thermal energy transferred.]

MS-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. [Clarification Statement: Examples of experiments could include comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature, the temperature change of samples of different materials with the same mass as they cool or heat in the environment, or the same material with different masses when a specific amount of energy is added.] [Assessment Boundary: Assessment does not include calculating the total amount of thermal energy transferred.]

MS-PS3-5. Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. [Clarification Statement: Examples of empirical evidence used in arguments could include an inventory or other representation of the energy before and after the transfer in the form of temperature changes or motion of object.] [Assessment Boundary: Assessment does not include calculations of energy.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Developing and Using Models**

Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop a model to describe unobservable mechanisms. (MS-PS3-2)

**Planning and Carrying Out Investigations**

Planning and carrying out investigations to answer questions or test solutions to problems in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or design solutions.

- Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. (MS-PS3-4)

**Analyzing and Interpreting Data**

Analyzing data in 6–8 builds on K–5 and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Construct and interpret graphical displays of data to identify linear and nonlinear relationships. (MS-PS3-1)

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process or system. (MS-PS3-3)

**Engaging in Argument from Evidence**

Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed worlds.

- Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon. (MS-PS3-5)

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**Connections to Nature of Science**

**Scientific Knowledge is Based on Empirical Evidence**

- Science knowledge is based upon logical and conceptual connections between evidence and explanations (MS-PS3-4),(MS-PS3-5)

### Disciplinary Core Ideas

**PS3.A: Definitions of Energy**

- Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of its speed. (MS-PS3-1)
- A system of objects may also contain stored (potential) energy, depending on their relative positions. (MS-PS3-2)
- Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present. (MS-PS3-3),(MS-PS3-4)

**PS3.B: Conservation of Energy and Energy Transfer**

- When the motion energy of an object changes, there is inevitably some other change in energy at the same time. (MS-PS3-5)
- The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment. (MS-PS3-4)
- Energy is spontaneously transferred out of hotter regions or objects and into colder ones. (MS-PS3-3)

**PS3.C: Relationship Between Energy and Forces**

- When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object. (MS-PS3-2)

**ETS1.A: Defining and Delimiting an Engineering Problem**

- The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to limit possible solutions. (secondary to MS-PS3-3)

**ETS1.B: Developing Possible Solutions**

- A solution needs to be tested, and then modified on the basis of the test results in order to improve it. There are systematic processes for evaluating solutions with respect to how well they meet criteria and constraints of a problem. (secondary to MS-PS3-3)

### Crosscutting Concepts

**Scale, Proportion, and Quantity**

- Proportional relationships (e.g. speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes. (MS-PS3-1),(MS-PS3-4)

**Systems and System Models**

- Models can be used to represent systems and their interactions – such as inputs, processes, and outputs – and energy and matter flows within systems. (MS-PS3-2)

**Energy and Matter**

- Energy may take different forms (e.g. energy in fields, thermal energy, energy of motion). (MS-PS3-5)
- The transfer of energy can be tracked as energy flows through a designed or natural system. (MS-PS3-3)

Connections to other DCIs in this grade-band: MS.PS1.A (MS-PS3-4); MS.PS1.B (MS-PS3-3); MS.PS2.A (MS-PS3-1),(MS-PS3-4),(MS-PS3-5); MS.ESS2.A (MS-PS3-3); MS.ESS2.C (MS-PS3-3),(MS-PS3-4); MS.ESS2.D (MS-PS3-3),(MS-PS3-4); MS.ESS3.D (MS-PS3-4)

Articulation across grade-bands: 4.PS3.B (MS-PS3-1),(MS-PS3-3); 4.PS3.C (MS-PS3-4),(MS-PS3-5); HS.PS1.B (MS-PS3-4); HS.PS2.B (MS-PS3-2); HS.PS3.A (MS-PS3-1),(MS-PS3-4),(MS-PS3-5); HS.PS3.B (MS-PS3-1),(MS-PS3-2),(MS-PS3-3),(MS-PS3-4),(MS-PS3-5); HS.PS3.C (MS-PS3-2)

Common Core State Standards Connections:

| | |
|---|---|
| ELA/Literacy – | |
| RST.6-8.1 | Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions (MS-PS3-1),(MS-PS3-5) |
| RST.6-8.3 | Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. (MS-PS3-3),(MS-PS3-4) |
| RST.6-8.7 | Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-PS3-1) |
| WHST.6-8.1 | Write arguments focused on discipline content. (MS-PS3-5) |
| WHST.6-8.7 | Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-PS3-3),(MS-PS3-4) |
| SL.8.5 | Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-PS3-2) |
| Mathematics – | |
| MP.2 | Reason abstractly and quantitatively. (MS-PS3-1),(MS-PS3-4),(MS-PS3-5) |
| 6.RP.A.1 | Understand the concept of ratio and use ratio language to describe a ratio relationship between two quantities. (MS-PS3-1),(MS-PS3-5) |
| 6. | RP.A.2 Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. (MS-PS3-1) |
| 7. | RP.A.2 Recognize and represent proportional relationships between quantities. (MS-PS3-1),(MS-PS3-5) |
| 8. | EE.A.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. (MS-PS3-1) |
| 8.EE.A.2 | Use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational. (MS-PS3-1) |
| 8.F.A.3 | Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. (MS-PS3-1),(MS-PS3-5) |
| 6.SP.B.5 | Summarize numerical data sets in relation to their context. (MS-PS3-4) |

# Middle School Physical Science

## MS-PS4 Waves and Their Applications in Technologies for Information Transfer

**MS-PS4 Waves and Their Applications in Technologies for Information Transfer**

Students who demonstrate understanding can:

MS-PS4-1. Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. [Clarification Statement: Emphasis is on describing waves with both qualitative and quantitative thinking.] [Assessment Boundary: Assessment does not include electromagnetic waves and is limited to standard repeating waves.]

MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. [Clarification Statement: Emphasis is on both light and mechanical waves. Examples of models could include drawings, simulations, and written descriptions.] [Assessment Boundary: Assessment is limited to qualitative applications pertaining to light and mechanical waves.]

MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals. [Clarification Statement: Emphasis is on a basic understanding that waves can be used for communication purposes. Examples could include using fiber optic cable to transmit light pulses, radio wave pulses in wifi devices, and conversion of stored binary patterns to make sound or text on a computer screen.] [Assessment Boundary: Assessment does not include binary counting. Assessment does not include the specific mechanism of any given device.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

Developing and Using Models

Modeling in 6–8 builds on K–5 and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop and use a model to describe phenomena. (MS-PS4-2)

Using Mathematics and Computational Thinking

Mathematical and computational thinking at the 6–8 level builds on K–5 and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments.

- Use mathematical representations to describe and/or support scientific conclusions and design solutions. (MS-PS4-1)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 6-8 builds on K-5 and progresses to evaluating the merit and validity of ideas and methods.

- Integrate qualitative scientific and technical information in written text with that contained in media and visual displays to clarify claims and findings. (MS-PS4-3)

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Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS4-1)

### Disciplinary Core Ideas

PS4.A: Wave Properties

- A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude. (MS-PS4-1)
- A sound wave needs a medium through which it is transmitted. (MS-PS4-2)

PS4.B: Electromagnetic Radiation

- When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object's material and the frequency (color) of the light. (MS-PS4-2)
- The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends. (MS-PS4-2)
- A wave model of light is useful for explaining brightness, color, and the frequency-dependent bending of light at a surface between media. (MS-PS4-2)
- However, because light can travel through space, it cannot be a matter wave, like sound or water waves. (MS-PS4-2)

PS4.C: Information Technologies and Instrumentation

- Digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information. (MS-PS4-3)

### Crosscutting Concepts

Patterns

- Graphs and charts can be used to identify patterns in data. (MS-PS4-1)

Structure and Function

- Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used. (MS-PS4-2)
- Structures can be designed to serve particular functions. (MS-PS4-3)

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Connections to Engineering, Technology, and Applications of Science

Influence of Science, Engineering, and Technology on Society and the Natural World

- Technologies extend the measurement, exploration, modeling, and computational capacity of scientific investigations. (MS-PS4-3)

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Connections to Nature of Science

Science is a Human Endeavor

- Advances in technology influence the progress of science and science has influenced advances in technology. (MS-PS4-3)

Connections to other DCIs in this grade-band: MS.LS1.D (MS-PS4-2)

Articulation across grade-bands: 4.PS3.A (MS-PS4-1); 4.PS3.B (MS-PS4-1); 4.PS4.A (MS-PS4-1); 4.PS4.B (MS-PS4-2); 4.PS4.C (MS-PS4-3); HS.PS4.A (MS-PS4-1),(MS-PS4-2),(MS-PS4-3); HS.PS4.B (MS-PS4-1),(MS-PS4-2); HS.PS4.C (MS-PS4-3); HS.ESS1.A (MS-PS4-2); HS.ESS2.A (MS-PS4-2); HS.ESS2.C (MS-PS4-2); HS.ESS2.D (MS-PS4-2)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RST.6-8.1 | Cite specific textual evidence to support analysis of science and technical texts. (MS-PS4-3) |
| RST.6-8.2 | Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. (MS-PS4-3) |
| RST.6-8.9 | Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (MS-PS4-3) |
| WHST.6-8.9 | Draw evidence from informational texts to support analysis, reflection, and research. (MS-PS4-3) |
| SL.8.5 | Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-PS4-1),(MS-PS4-2) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (MS-PS4-1) |
| MP.4 | Model with mathematics. (MS-PS4-1) |
| 6.RP.A.1 | Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (MS-PS4-1) |
| 6.RP.A.3 | Use ratio and rate reasoning to solve real-world and mathematical problems. (MS-PS4-1) |
| 7.RP.A.2 | Recognize and represent proportional relationships between quantities. (MS-PS4-1) |
| 8.F.A.3 | Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. (MS-PS4-1) |

# Middle School Life Science MS-LS1 From Molecules to Organisms: Structures and Processes

## MS-LS1 From Molecules to Organisms: Structures and Processes

Students who demonstrate understanding can:

MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. [Clarification Statement: Emphasis is on developing evidence that living things are made of cells, distinguishing between living and non-living cells, and understanding that living things may be made of one cell or many and varied cells.]

MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. [Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.] [Assessment Boundary: Assessment of organelle structure/function relationships is limited to the cell wall and cell membrane. Assessment of the function of the other organelles is limited to their relationship to the whole cell. Assessment does not include the biochemical function of cells or cell parts.]

MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. [Clarification Statement: Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.] [Assessment Boundary: Assessment does not include the mechanism of one body system independent of others. Assessment is limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems.]

MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. [Clarification Statement: Examples of behaviors that affect the probability of animal reproduction could include nest building to protect young from cold, herding of animals to protect young from predators, and vocalization of animals and colorful plumage to attract mates for breeding. Examples of animal behaviors that affect the probability of plant reproduction could include transferring pollen or seeds, and creating conditions for seed germination and growth. Examples of plant structures could include bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury.]

MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. [Clarification Statement: Examples of local environmental conditions could include availability of food, light, space, and water. Examples of genetic factors could include large breed cattle and species of grass affecting growth of organisms. Examples of evidence could include drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, and fish growing larger in large ponds than they do in small ponds.] [Assessment Boundary: Assessment does not include genetic mechanisms, gene regulation, or biochemical processes.]

MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. [Clarification Statement: Emphasis is on tracing movement of matter and flow of energy.] [Assessment Boundary: Assessment does not include the biochemical mechanisms of photosynthesis.]

MS-LS1-7. Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. [Clarification Statement: Emphasis is on describing that molecules are broken apart and put back together and that in this process, energy is released.] [Assessment Boundary: Assessment does not include details of the chemical reactions for photosynthesis or respiration.]

MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. [Assessment Boundary: Assessment does not include mechanisms for the transmission of this information.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Developing and Using Models**

Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop and use a model to describe phenomena. (MS-LS1-2)
- Develop a model to describe unobservable mechanisms. (MS-LS1-7)

**Planning and Carrying Out Investigations**

Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions.

- Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation. (MS-LS1-1)

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories.

- Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (MS-LS1-5),(MS-LS1-6)

**Engaging in Argument from Evidence**

Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing

### Disciplinary Core Ideas

**LS1.A: Structure and Function**

- All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (MS-LS1-1)
- Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (MS-LS1-2)
- In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. (MS-LS1-3)

**LS1.B: Growth and Development of Organisms**

- Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4)
- Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. (MS-LS1-4)
- Genetic factors as well as local conditions affect the growth of the adult plant. (MS-LS1-5)

**LS1.C: Organization for Matter and Energy Flow in Organisms**

- Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use. (MS-LS1-6)

### Crosscutting Concepts

**Cause and Effect**

- Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8)
- Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability. (MS-LS1-4),(MS-LS1-5)

**Scale, Proportion, and Quantity**

- Phenomena that can be observed at one scale may not be observable at another scale. (MS-LS1-1)

**Systems and System Models**

- Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3)

**Energy and Matter**

- Matter is conserved because atoms are conserved in physical and chemical processes. (MS-LS1-7)
- Within a natural system, the transfer of energy drives the motion and/or cycling of matter. (MS-LS1-6)

**Structure and Function**

- Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS1-2)

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Connections to Engineering, Technology, and Applications of Science

argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).

- Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon. (MS-LS1-3)
- Use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (MS-LS1-4)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 6-8 builds on K-5 experiences and progresses to evaluating the merit and validity of ideas and methods.

- Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (MS-LS1-8)

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Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Science knowledge is based upon logical connections between evidence and explanations. (MS-LS1-6)

- Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy. (MS-LS1-7)

LS1.D: Information Processing

- Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (MS-LS1-8)

PS3.D: Energy in Chemical Processes and Everyday Life

- The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen. (secondary to MS-LS1-6)
- Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials. (secondary to MS-LS1-7)

Interdependence of Science, Engineering, and Technology

- Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (MS-LS1-1)

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Connections to Nature of Science

Science is a Human Endeavor

- Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (MS-LS1-3)

Connections to other DCIs in this grade-band: MS.PS1.B (MS-LS1-6),(MS-LS1-7); MS.LS2.A (MS-LS1-4),(MS-LS1-5); MS.LS3.A (MS-LS1-2); MS.ESS2.A (MS-LS1-6)

Articulation to DCIs across grade-bands: 3.LS1.B (MS-LS1-4),(MS-LS1-5); 3.LS3.A (MS-LS1-5); 4.LS1.A (MS-LS1-2); 4.LS1.D (MS-LS1-8); 5.PS3.D (MS-LS1-6),(MS-LS1-7); 5.LS1.C (MS-LS1-6),(MS-LS1-7); 5.LS2.A (MS-LS1-6); 5.LS2.B (MS-LS1-6),(MS-LS1-7); HS.PS1.B (MS-LS1-6),(MS-LS1-7); HS.LS1.A (MS-LS1-1),(MS-LS1-2),(MS-LS1-3),(MS-LS1-8); HS.LS1.C (MS-LS1-6),(MS-LS1-7); HS.LS2.A (MS-LS1-4),(MS-LS1-5); HS.LS2.B (MS-LS1-6),(MS-LS1-7); HS.LS2.D (MS-LS1-4); HS.ESS2.D (MS-LS1-6)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RST.6-8.1 | Cite specific textual evidence to support analysis of science and technical texts. (MS-LS1-3),(MS-LS1-4),(MS-LS1-5),(MS-LS1-6) |
| RST.6-8.2 | Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions. (MS-LS1-5),(MS-LS1-6) |
| RI.6.8 | Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not. (MS-LS1-3),(MS-LS1-4) |
| WHST.6-8.1 | Write arguments focused on discipline content. (MS-LS1-3),(MS-LS1-4) |
| WHST.6-8.2 | Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-LS1-5),(MS-LS1-6) |
| WHST.6-8.7 | Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-LS1-1) |
| WHST.6-8.8 | Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. (MS-LS1-8) |
| WHST.6-8.9 | Draw evidence from informational texts to support analysis, reflection, and research. (MS-LS1-5),(MS-LS1-6) |
| SL.8.5 | Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest. (MS-LS1-2),(MS-LS1-7) |

Mathematics –

| | |
|---|---|
| 6.EE.C.9 | Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (MS-LS1-1),(MS-LS1-2),(MS-LS1-3),(MS-LS1-6) |
| 6.SP.A.2 | Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape. (MS-LS1-4),(MS-LS1-5) |
| 6.SP.B.4 | Summarize numerical data sets in relation to their context. (MS-LS1-4),(MS-LS1-5) |

# Middle School Life Science MS-LS2 Ecosystems: Interactions, Energy, and Dynamics

## MS-LS2 Ecosystems: Interactions, Energy, and Dynamics

Students who demonstrate understanding can:

MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]

MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. [Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.]

MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.] [Assessment Boundary: Assessment does not include the use of chemical reactions to describe the processes.]

MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]

MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.* [Clarification Statement: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Developing and Using Models**

Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop a model to describe phenomena. (MS-LS2-3)

**Analyzing and Interpreting Data**

Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Analyze and interpret data to provide evidence for phenomena. (MS-LS2-1)

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena. (MS-LS2-2)

**Engaging in Argument from Evidence**

Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).

- Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (MS-LS2-4)
- Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-LS2-5)

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Connections to Nature of Science

**Scientific Knowledge is Based on Empirical Evidence**

- Science disciplines share common rules of obtaining and evaluating empirical evidence. (MS-LS2-4)

### Disciplinary Core Ideas

**LS2.A: Interdependent Relationships in Ecosystems**

- Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors. (MS-LS2-1)
- In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. (MS-LS2-1)
- Growth of organisms and population increases are limited by access to resources. (MS-LS2-1)
- Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared. (MS-LS2-2)

**LS2.B: Cycle of Matter and Energy Transfer in Ecosystems**

- Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. (MS-LS2-3)

**LS2.C: Ecosystem Dynamics, Functioning, and Resilience**

- Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. (MS-LS2-4)
- Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. (MS-LS2-5)

**LS4.D: Biodiversity and Humans**

- Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. (secondary to MS-LS2-5)

**ETS1.B: Developing Possible Solutions**

- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (secondary to MS-LS2-5)

### Crosscutting Concepts

**Patterns**

- Patterns can be used to identify cause and effect relationships. (MS-LS2-2)

**Cause and Effect**

- Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-LS2-1)

**Energy and Matter**

- The transfer of energy can be tracked as energy flows through a natural system. (MS-LS2-3)

**Stability and Change**

- Small changes in one part of a system might cause large changes in another part. (MS-LS2-4),(MS-LS2-5)

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Connections to Engineering, Technology, and Applications of Science

**Influence of Science, Engineering, and Technology on Society and the Natural World**

- The use of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time. (MS-LS2-5)

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Connections to Nature of Science

**Scientific Knowledge Assumes an Order and Consistency in Natural Systems**

- Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-LS2-3)

**Science Addresses Questions About the Natural and Material World**

- Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-LS2-5)

Connections to other DCIs in this grade-band: MS.PS1.B (MS-LS2-3); MS.LS1.B (MS-LS2-2); MS.LS4.C (MS-LS2-4); MS.LS4.D (MS-LS2-4); MS.ESS2.A (MS-LS2-3),(MS-LS2-4); MS.ESS3.A (MS-LS2-1),(MS-LS2-4); MS.ESS3.C (MS-LS2-1),(MS-LS2-4),(MS-LS2-5)

Articulation across grade-bands: 1.LS1.B (MS-LS2-2); 3.LS2.C (MS-LS2-1),(MS-LS2-4); 3.LS4.D (MS-LS2-1),(MS-LS2-4); 5.LS2.A (MS-LS2-1),(MS-LS2-3); 5.LS2.B (MS-LS2-3); HS.PS3.B (MS-LS2-3); HS.LS1.C (MS-LS2-3); HS.LS2.A (MS-LS2-1),(MS-LS2-2),(MS-LS2-5); HS.LS2.B (MS-LS2-2),(MS-LS2-3); HS.LS2.C (MS-LS2-4),(MS-LS2-5); HS.LS2.D (MS-LS2-2); HS.LS4.C (MS-LS2-1),(MS-LS2-4); HS.LS4.D (MS-LS2-1),(MS-LS2-4),(MS-LS2-5); HS.ESS2.A (MS-LS2-3); HS.ESS2.E (MS-LS2-4); HS.ESS3.A (MS-LS2-1),(MS-LS2-5);

# Middle School Life Science MS-LS2 Ecosystems: Interactions, Energy, and Dynamics

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|---|---|
| HS.ESS3.B (MS-LS2-4); HS.ESS3.C (MS-LS2-4),(MS-LS2-5); HS.ESS3.D (MS-LS2-5) | |
| Common Core State Standards Connections: | |
| ELA/Literacy – | |
| RST.6-8.1 | Cite specific textual evidence to support analysis of science and technical texts. (MS-LS2-1),(MS-LS2-2),(MS-LS2-4) |
| RST.6-8.7 | Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-LS2-1) |
| RST.6-8.8 | Distinguish among facts, reasoned judgment based on research findings, and speculation in a text. (MS-LS2-5) |
| RI.8.8 | Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims. (MS-LS-4),(MS-LS2-5) |
| WHST.6-8.1 | Write arguments to support claims with clear reasons and relevant evidence. (MS-LS2-4) |
| WHST.6-8.2 | Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-LS2-2) |
| WHST.6-8.9 | Draw evidence from literary or informational texts to support analysis, reflection, and research. (MS-LS2-2),(MS-LS2-4) |
| SL.8.1 | Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly. (MS-LS2-2) |
| SL.8.4 | Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. (MS-LS2-2) |
| SL.8.5 | Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. (MS-LS2-3) |
| Mathematics – | |
| MP.4 | Model with mathematics. (MS-LS2-5) |
| 6.RP.A.3 | Use ratio and rate reasoning to solve real-world and mathematical problems. (MS-LS2-5) |
| 6.EE.C.9 | Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (MS-LS2-3) |
| 6.SP.B.5 | Summarize numerical data sets in relation to their context. (MS-LS2-2) |

# Middle School Life Science MS-LS3 Heredity: Inheritance and Variation of Traits

**MS-LS3 Heredity: Inheritance and Variation of Traits**

Students who demonstrate understanding can:

MS-LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. [Clarification Statement: Emphasis is on conceptual understanding that changes in genetic material may result in making different proteins.] [Assessment Boundary: Assessment does not include specific changes at the molecular level, mechanisms for protein synthesis, or specific types of mutations.]

MS-LS3-2. Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. [Clarification Statement: Emphasis is on using models such as Punnett squares, diagrams, and simulations to describe the cause and effect relationship of gene transmission from parent(s) to offspring and resulting genetic variation.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

## Science and Engineering Practices

**Developing and Using Models**

Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop and use a model to describe phenomena. (MS-LS3-1),(MS-LS3-2)

## Disciplinary Core Ideas

**LS1.B: Growth and Development of Organisms**

- Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. (secondary to MS-LS3-2)

**LS3.A: Inheritance of Traits**

- Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits. (MS-LS3-1)
- Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. (MS-LS3-2)

**LS3.B: Variation of Traits**

- In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other. (MS-LS3-2)
- In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism. (MS-LS3-1)

## Crosscutting Concepts

**Cause and Effect**

- Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS3-2)

**Structure and Function**

- Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function. (MS-LS3-1)

Connections to other DCIs in this grade-band: MS.LS1.A (MS-LS3-1); MS.LS4.A (MS-LS3-1)

Articulation across grade-bands: 3.LS3.A (MS-LS3-1),(MS-LS3-2); 3.LS3.B (MS-LS3-1),(MS-LS3-2); HS.LS1.A (MS-LS3-1); HS.LS1.B (MS-LS3-1),(MS-LS3-2); HS.LS3.A (MS-LS3-1),(MS-LS3-2); HS.LS3-B (MS-LS3-1),(MS-LS3-2)

Common Core State Standards Connections:

| | |
|---|---|
| ELA/Literacy – | |
| RST.6-8.1 | Cite specific textual evidence to support analysis of science and technical texts. (MS-LS3-1),(MS-LS3-2) |
| RST.6-8.4 | Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics. (MS-LS3-1),(MS-LS3-2) |
| RST.6-8.7 | Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-LS3-1),(MS-LS3-2) |
| SL.8.5 | Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. (MS-LS3-1),(MS-LS3-2) |
| Mathematics – | |
| MP.4 | Model with mathematics. (MS-LS3-2) |
| 6.SP.B.5 | Summarize numerical data sets in relation to their context. (MS-LS3-2) |

# Middle School Life Science MS-LS4 Biological Evolution: Unity and Diversity

## MS-LS4 Biological Evolution: Unity and Diversity

Students who demonstrate understanding can:

MS-LS4-1. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. [Clarification Statement: Emphasis is on finding patterns of changes in the level of complexity of anatomical structures in organisms and the chronological order of fossil appearance in the rock layers.] [Assessment Boundary: Assessment does not include the names of individual species or geological eras in the fossil record.]

MS-LS4-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. [Clarification Statement: Emphasis is on explanations of the evolutionary relationships among organisms in terms of similarity or differences of the gross appearance of anatomical structures.]

MS-LS4-3. Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. [Clarification Statement: Emphasis is on inferring general patterns of relatedness among embryos of different organisms by comparing the macroscopic appearance of diagrams or pictures.] [Assessment Boundary: Assessment of comparisons is limited to gross appearance of anatomical structures in embryological development.]

MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. [Clarification Statement: Emphasis is on using simple probability statements and proportional reasoning to construct explanations.]

MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. [Clarification Statement: Emphasis is on synthesizing information from reliable sources about the influence of humans on genetic outcomes in artificial selection (such as genetic modification, animal husbandry, gene therapy); and, on the impacts these technologies have on society as well as the technologies leading to these scientific discoveries.]

MS-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. [Clarification Statement: Emphasis is on using mathematical models, probability statements, and proportional reasoning to support explanations of trends in changes to populations over time.] [Assessment Boundary: Assessment does not include Hardy Weinberg calculations.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Analyzing and Interpreting Data**

Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Analyze displays of data to identify linear and nonlinear relationships. (MS-LS4-3)
- Analyze and interpret data to determine similarities and differences in findings. (MS-LS4-1)

**Using Mathematics and Computational Thinking**

Mathematical and computational thinking in 6–8 builds on K–5 experiences and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments.

- Use mathematical representations to support scientific conclusions and design solutions. (MS-LS4-6)

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Apply scientific ideas to construct an explanation for real-world phenomena, examples, or events. (MS-LS4-2)
- Construct an explanation that includes qualitative or quantitative relationships between variables that describe phenomena. (MS-LS4-4)

**Obtaining, Evaluating, and Communicating Information**

Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.

- Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (MS-LS4-5)

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Connections to Nature of Science

**Scientific Knowledge is Based on Empirical Evidence**

- Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-LS4-1)

### Disciplinary Core Ideas

**LS4.A: Evidence of Common Ancestry and Diversity**

- The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth. (MS-LS4-1)
- Anatomical similarities and differences between various organisms living today and between them and organisms in the fossil record, enable the reconstruction of evolutionary history and the inference of lines of evolutionary descent. (MS-LS4-2)
- Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully-formed anatomy. (MS-LS4-3)

**LS4.B: Natural Selection**

- Natural selection leads to the predominance of certain traits in a population, and the suppression of others. (MS-LS4-4)
- In artificial selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed on to offspring. (MS-LS4-5)

**LS4.C: Adaptation**

- Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes. (MS-LS4-6)

### Crosscutting Concepts

**Patterns**

- Patterns can be used to identify cause and effect relationships. (MS-LS4-2)
- Graphs, charts, and images can be used to identify patterns in data. (MS-LS4-1),(MS-LS4-3)

**Cause and Effect**

- Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.(MS-LS4-4),(MS-LS4-5),(MS-LS4-6)

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Connections to Engineering, Technology, and Applications of Science

**Interdependence of Science, Engineering, and Technology**

- Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (MS-LS4-5)

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Connections to Nature of Science

**Scientific Knowledge Assumes an Order and Consistency in Natural Systems**

- Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-LS4-1),(MS-LS4-2)

**Science Addresses Questions About the Natural and Material World**

- Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-LS4-5)

Connections to other DCIs in this grade-band: MS.LS2.A (MS-LS4-4),(MS-LS4-6); MS.LS2.C (MS-LS4-6); MS.LS3.A (MS-LS4-2),(MS-LS4-4); MS.LS3.B (MS-LS4-2),(MS-LS4-4),(MS-LS4-6); MS.ESS1.C (MS-LS4-1),(MS-LS4-2),(MS-LS4-6); MS.ESS2.B (MS-LS4-1)

# Middle School Life Science MS-LS4 Biological Evolution: Unity and Diversity

Articulation across grade-bands: 3.LS3.B (MS-LS4-4); 3.LS4.A (MS-LS4-1),(MS-LS4-2); 3. LS4.B (MS-LS4-4); 3.LS4.C (MS-LS4-6); HS.LS2.A (MS-LS4-4),(MS-LS4-6); HS.LS2.C
(MS-LS4-6); HS.LS3.B (MS-LS4-4),(MS-LS4-5),(MS-LS4-6); HS.LS4.A (MS-LS4-1),(MS-LS4-2),(MS-LS4-3); HS.LS4.B (MS-LS4-4),(MS-LS4-6); HS.LS4.C (MS-LS4-4),(MS-LS4- 5),(MS-LS4-6); HS.ESS1.C (MS-LS4-1),(MS-LS4-2)

Common Core State
Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RST.6-8.1 | Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions (MS-LS4-1),(MS- LS4-2),(MS-LS4-3),(MS-LS4-4),(MS-LS4-5) |
| RST.6-8.7 | Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-LS4-1),(MS-LS4-3) |
| RST.6-8.9 | Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (MS-LS4-3),(MS-LS4-4) |
| WHST.6-8.2 | Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-LS4-2),(MS-LS4-4) |
| WHST.6-8.8 | Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. (MS-LS4-5) |
| WHST.6-8.9 | Draw evidence from informational texts to support analysis, reflection, and research. (MS-LS4-2),(MS-LS4-4) |
| SL.8.1 | Engage effectively in a range of collaborative discussions (one-on-one, in groups, teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. (MS-LS4-2),(MS-LS4-4) |
| SL.8.4 | Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation. (MS-LS4-2),(MS-LS4-4) |

Mathematics –

| | |
|---|---|
| MP.4 | Model with mathematics. (MS-LS4-6) |
| 6.RP.A.1 | Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (MS-LS4-4),(MS-LS4-6) |
| 6.SP.B.5 | Summarize numerical data sets in relation to their context. (MS-LS4-4),(MS-LS4-6) |
| 6.EE.B.6 | Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (MS-LS4-1),(MS-LS4-2) |
| 7.RP.A.2 | Recognize and represent proportional relationships between quantities. (MS-LS4-4),(MS-LS4-6) |

# Middle School Earth and Space Science MS-ESS1 Earth's Place in the Universe

## MS-ESS1 Earth's Place in the Universe

Students who demonstrate understanding can:

MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. [Clarification Statement: Examples of models can be physical, graphical, or conceptual.]

MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. [Clarification Statement: Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical (such as the analogy of distance along a football field or computer visualizations of elliptical orbits) or conceptual (such as mathematical proportions relative to the size of familiar objects such as students' school or state).] [Assessment Boundary: Assessment does not include Kepler's Laws of orbital motion or the apparent retrograde motion of the planets as viewed from Earth.]

MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system. [Clarification Statement: Emphasis is on the analysis of data from Earth-based instruments, space-based telescopes, and spacecraft to determine similarities and differences among solar system objects. Examples of scale properties include the sizes of an object's layers (such as crust and atmosphere), surface features (such as volcanoes), and orbital radius. Examples of data include statistical information, drawings and photographs, and models.] [Assessment Boundary: Assessment does not include recalling facts about properties of the planets and other solar system bodies.]

MS-ESS1-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. [Clarification Statement: Emphasis is on how analyses of rock formations and the fossils they contain are used to establish relative ages of major events in Earth's history. Examples of Earth's major events could range from being very recent (such as the last Ice Age or the earliest fossils of homo sapiens) to very old (such as the formation of Earth or the earliest evidence of life). Examples can include the formation of mountain chains and ocean basins, the evolution or extinction of particular living organisms, or significant volcanic eruptions.] [Assessment Boundary: Assessment does not include recalling the names of specific periods or epochs and events within them.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Developing and Using Models**

Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop and use a model to describe phenomena. (MS-ESS1-1),(MS-ESS1-2)

**Analyzing and Interpreting Data**

Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Analyze and interpret data to determine similarities and differences in findings. (MS-ESS1-3)

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (MS-ESS1-4)

### Disciplinary Core Ideas

**ESS1.A: The Universe and Its Stars**

- Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models. (MS-ESS1-1)
- Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe. (MS-ESS1-2)

**ESS1.B: Earth and the Solar System**

- The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. (MS-ESS1-2),(MS-ESS1-3)
- This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short-term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year. (MS-ESS1-1)
- The solar system appears to have formed from a disk of dust and gas, drawn together by gravity. (MS-ESS1-2)

**ESS1.C: The History of Planet Earth**

- The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. (MS-ESS1-4)

### Crosscutting Concepts

**Patterns**

- Patterns can be used to identify cause-and-effect relationships. (MS-ESS1-1)

**Scale, Proportion, and Quantity**

- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (MS-ESS1-3),(MS-ESS1-4)

**Systems and System Models**

- Models can be used to represent systems and their interactions. (MS-ESS1-2)

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**Connections to Engineering, Technology, and Applications of Science**

**Interdependence of Science, Engineering, and Technology**

- Engineering advances have led to important discoveries in virtually every field of science and scientific discoveries have led to the development of entire industries and engineered systems. (MS-ESS1-3)

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**Connections to Nature of Science**

**Scientific Knowledge Assumes an Order and Consistency in Natural Systems**

- Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-ESS1-1),(MS-ESS1-2)

Connections to other DCIs in this grade-band: MS.PS2.A (MS-ESS1-1),(MS-ESS1-2); MS.PS2.B (MS-ESS1-1),(MS-ESS1-2); MS.LS4.A (MS-ESS1-4); MS.LS4.C (MS-ESS1-4); MS.ESS2.A (MS-ESS1-3)

Articulation of DCIs across grade-bands: 3.PS2.A (MS-ESS1-1),(MS-ESS1-2); 3.LS4.A (MS-ESS1-4); 3.LS4.C (MS-ESS1-4); 3.LS4.D (MS-ESS1-4); 4.ESS1.C (MS-ESS1-4); 5.PS2.B (MS-ESS1-1),(MS-ESS1-2); 5.ESS1.A (MS-ESS1-2); 5.ESS1.B (MS-ESS1-1),(MS-ESS1-2),(5-ESS1-3); HS.PS1.C (MS-ESS1-4); HS.PS2.A (MS-ESS1-1),(MS-ESS1-2); HS.PS2.B (MS-ESS1-1),(MS-ESS1-2); HS.LS4.A (MS-ESS1-4); HS.LS4.C (MS-ESS1-4); HS.ESS1.A (MS-ESS1-2); HS.ESS1.B (MS-ESS1-1),(MS-ESS1-2),(MS-ESS1-3); HS.ESS1.C (MS-ESS1-4); HS.ESS2.A (MS-ESS1-3),(MS-ESS1-4)

Common Core State Standards Connections:

| | |
|---|---|
| ELA/Literacy – | |
| RST.6-8.1 | Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS1-3),(MS-ESS1-4) |
| RST.6-8.7 | Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-ESS1-3) |
| WHST.6-8.2 | Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-ESS1-4) |
| SL.8.5 | Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. (MS-ESS1-1),(MS-ESS1-2) |
| Mathematics – | |
| MP.2 | Reason abstractly and quantitatively. (MS-ESS1-3) |
| MP.4 | Model with mathematics. (MS-ESS1-1),(MS-ESS1-2) |
| 6.RP.A.1 | Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (MS-ESS1-1),(MS-ESS1-2),(MS-ESS1-3) |

# Middle School Earth and Space Science MS-ESS1 Earth's Place in the Universe

| | |
|---|---|
| 7.RP.A.2 | Recognize and represent proportional relationships between quantities. (MS-ESS1-1),(MS-ESS1-2),(MS-ESS1-3) |
| 6.EE.B.6 | Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (MS-ESS1-2),(MS-ESS1-4) |
| 7.EE.B.4 | Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (MS-ESS1-2),(MS-ESS1-4) |

# Middle School Earth and Space Science MS-ESS2 Earth's Systems

## MS-ESS2 Earth's Systems

Students who demonstrate understanding can:

**MS-ESS2-1.** Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. [Clarification Statement: Emphasis is on the processes of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth's materials.] [Assessment Boundary: Assessment does not include the identification and naming of minerals.]

**MS-ESS2-2.** Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. [Clarification Statement: Emphasis is on how processes change Earth's surface at time and spatial scales that can be large (such as slow plate motions or the uplift of large mountain ranges) or small (such as rapid landslides or microscopic geochemical reactions), and how many geoscience processes (such as earthquakes, volcanoes, and meteor impacts) usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.]

**MS-ESS2-3.** Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. [Clarification Statement: Examples of data include similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches).] [Assessment Boundary: Paleomagnetic anomalies in oceanic and continental crust are not assessed.]

**MS-ESS2-4.** Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. [Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle. Examples of models can be conceptual or physical.] [Assessment Boundary: A quantitative understanding of the latent heats of vaporization and fusion is not assessed.]

**MS-ESS2-5.** Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. [Clarification Statement: Emphasis is on how air masses flow from regions of high pressure to low pressure, causing weather (defined by temperature, pressure, humidity, precipitation, and wind) at a fixed location to change over time, and how sudden changes in weather can result when different air masses collide. Emphasis is on how weather can be predicted within probabilistic ranges. Examples of data can be provided to students (such as weather maps, diagrams, and visualizations) or obtained through laboratory experiments (such as with condensation).] [Assessment Boundary: Assessment does not include recalling the names of cloud types or weather symbols used on weather maps or the reported diagrams from weather stations.]

**MS-ESS2-6.** Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. [Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations.] [Assessment Boundary: Assessment does not include the dynamics of the Coriolis effect.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Developing and Using Models**

Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop and use a model to describe phenomena. (MS-ESS2-1),(MS-ESS2-6)
- Develop a model to describe unobservable mechanisms. (MS-ESS2-4)

**Planning and Carrying Out Investigations**

Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions.

- Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions. (MS-ESS2-5)

**Analyzing and Interpreting Data**

Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Analyze and interpret data to provide evidence for phenomena. (MS-ESS2-3)

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe nature operate today as they did in the past and will continue to do so in the future. (MS-ESS2-2)

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Connections to Nature of Science

**Scientific Knowledge is Open to Revision in Light of New Evidence**

### Disciplinary Core Ideas

**ESS1.C: The History of Planet Earth**

- Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. (HS.ESS1.C GBE) (secondary to MS-ESS2-3)

**ESS2.A: Earth's Materials and Systems**

- All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. (MS-ESS2-1)
- The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. (MS-ESS2-2)

**ESS2.B: Plate Tectonics and Large-Scale System Interactions**

- Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart. (MS-ESS2-3)

**ESS2.C: The Roles of Water in Earth's Surface Processes**

- Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (MS-ESS2-4)
- The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. (MS-ESS2-5)
- Global movements of water and its changes in form are propelled by sunlight and gravity. (MS-ESS2-4)
- Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (MS-ESS2-6)
- Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations. (MS-ESS2-2)

**ESS2.D: Weather and Climate**

- Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MS-ESS2-6)
- Because these patterns are so complex, weather can only be predicted probabilistically. (MS-ESS2-5)
- The ocean exerts a major influence on weather and climate by

### Crosscutting Concepts

**Patterns**

- Patterns in rates of change and other numerical relationships can provide information about natural systems. (MS-ESS2-3)

**Cause and Effect**

- Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS2-5)

**Scale Proportion and Quantity**

- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small. (MS-ESS2-2)

**Systems and System Models**

- Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems. (MS-ESS2-6)

**Energy and Matter**

- Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. (MS-ESS2-4)

**Stability and Change**

- Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale. (MS-ESS2-1)

# Middle School Earth and Space Science MS-ESS2 Earth's Systems

| | | |
|---|---|---|
| ' Science findings are frequently revised and/or reinterpreted based on new evidence. (MS-ESS2-3) | absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (MS-ESS2-6) | |

Connections to other DCIs in this grade-band: MS.PS1.A (MS-ESS2-1),(MS-ESS2-4),(MS-ESS2-5); MS.PS1.B (MS-ESS2-1),(MS-ESS2-2); MS.PS2.A (MS-ESS2-5),(MS-ESS2-6); MS.PS2.B (MS-ESS2-4); MS.PS3.A (MS-ESS2-4),(MS-ESS2-5); MS.PS3.B (MS-ESS2-1),(MS-ESS2-5),(MS-ESS2-6); MS.PS3.D (MS-ESS2-4); MS.PS4.B (MS-ESS2-6); MS.LS2.B (MS-ESS2-1),(MS-ESS2-2); MS.LS2.C (MS-ESS2-1); MS.LS4.A (MS-ESS2-3); MS.ESS1.B (MS-ESS2-1); MS.ESS3.C (MS-ESS2-1)

Articulation of DCIs across grade-bands: 3.PS2.A (MS-ESS2-4),(MS-ESS2-6); 3.LS4.A (MS-ESS2-3); 3.ESS2.D (MS-ESS2-5),(MS-ESS2-6); 3.ESS3.B (MS-ESS2-3); 4.PS3.B (MS-ESS2-1),(MS-ESS2-4); 4.ESS1.C (MS-ESS2-2),(MS-ESS2-3); 4.ESS2.A (MS-ESS2-1),(MS-ESS2-2); 4.ESS2.B (MS-ESS2-3); 4.ESS2.E (MS-ESS2-2); 4.ESS3.B (MS-ESS2-3); 5.PS2.B (MS-ESS2-4); 5.ESS2.A (MS-ESS2-1),(MS-ESS2-2),(MS-ESS2-5),(MS-ESS2-6); 5.ESS2.C (MS-ESS2-4); HS.PS1.B (MS-ESS2-1); HS.PS2.B (MS-ESS2-4),(MS-ESS2-6); HS.PS3.B (MS-ESS2-1),(MS-ESS2-4),(MS-ESS2-6); HS.PS3.D (MS-ESS2-2),(MS-ESS2-6); HS.PS4.B (MS-ESS2-4); HS.LS1.C (MS-ESS2-1); HS.LS2.B (MS-ESS2-1),(MS-ESS2-2); HS.LS4.A (MS-ESS2-3); HS.LS4.C(MS-ESS2-3);HS.ESS1.B(MS-ESS2-6);HS.ESS1.C(MS-ESS2-2),(MS-ESS2-3);HS.ESS2.A(MS-ESS2-1),(MS-ESS2-2),(MS-ESS2-3),(MS-ESS2-4),(MS-ESS2-6);HS.ESS2.B (MS-ESS2-2),(MS-ESS2-3); HS.ESS2.C (MS-ESS2-1),(MS-ESS2-2),(MS-ESS2-4),(MS-ESS2-5); HS.ESS2.D (MS-ESS2-2),(MS-ESS2-4),(MS-ESS2-5),(MS-ESS2-6); HS.ESS2.E (MS-ESS2-1),(MS-ESS2-2); HS.ESS3.D (MS-ESS2-2)

Common Core State Standards Connections:

ELA/Literacy –

| | |
|---|---|
| RST.6-8.1 | Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS2-2),(MS-ESS2-3),(MS-ESS2-5) |
| RST.6-8.7 | Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-ESS2-3) |
| RST.6-8.9 | Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic. (MS-ESS2-3),(MS-ESS2-5) |
| WHST.6-8.2 | Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. (MS-ESS2-2) |
| WHST.6-8.8 | Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. (MS-ESS2-5) |
| SL.8.5 | Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points. (MS-ESS2-1),(MS-ESS2-2),(MS-ESS2-6) |

Mathematics –

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|---|---|
| MP.2 | Reason abstractly and quantitatively. (MS-ESS2-2),(MS-ESS2-3),(MS-ESS2-5) |
| 6.NS.C.5 | Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. (MS-ESS2-5) |
| 6.EE.B.6 | Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (MS-ESS2-2),(MS-ESS2-3) |
| 7.EE.B.4 | Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (MS-ESS2-2),(MS-ESS2-3) |

# Middle School Earth and Space Science MS-ESS3 Earth and Human Activity

## MS-ESS3 Earth and Human Activity

Students who demonstrate understanding can:

MS-ESS3-1. Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes. [Clarification Statement: Emphasis is on how these resources are limited and typically non-renewable, and how their distributions are significantly changing as a result of removal by humans. Examples of uneven distributions of resources as a result of past processes include but are not limited to petroleum (locations of the burial of organic marine sediments and subsequent geologic traps), metal ores (locations of past volcanic and hydrothermal activity associated with subduction zones), and soil (locations of active weathering and/or deposition of rock).]

MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. [Clarification Statement: Emphasis is on how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable. Examples of natural hazards can be taken from interior processes (such as earthquakes and volcanic eruptions), surface processes (such as mass wasting and tsunamis), or severe weather events (such as hurricanes, tornadoes, and floods). Examples of data can include the locations, magnitudes, and frequencies of the natural hazards. Examples of technologies can be global (such as satellite systems to monitor hurricanes or forest fires) or local (such as building basements in tornado-prone regions or reservoirs to mitigate droughts).]

MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.* [Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).]

MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. [Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth's systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.]

MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. [Clarification Statement: Examples of factors include human activities (such as fossil fuel combustion, cement production, and agricultural activity) and natural processes (such as changes in incoming solar radiation or volcanic activity). Examples of evidence can include tables, graphs, and maps of global and regional temperatures, atmospheric levels of gases such as carbon dioxide and methane, and the rates of human activities. Emphasis is on the major role that human activities play in causing the rise in global temperatures.]

The performance expectations above were developed using the following elements from the NRC document A Framework for K-12 Science Education:

### Science and Engineering Practices

**Asking Questions and Defining Problems**

Asking questions and defining problems in grades 6–8 builds on grades K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models.

- Ask questions to identify and clarify evidence of an argument. (MS-ESS3-5)

**Analyzing and Interpreting Data**

Analyzing data in 6–8 builds on K–5 and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Analyze and interpret data to determine similarities and differences in findings. (MS-ESS3-2)

**Constructing Explanations and Designing Solutions**

Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. (MS-ESS3-1)
- Apply scientific principles to design an object, tool, process or system. (MS-ESS3-3)

**Engaging in Argument from Evidence**

Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).

- Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. (MS-ESS3-4)

### Disciplinary Core Ideas

**ESS3.A: Natural Resources**

- Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes. (MS-ESS3-1)

**ESS3.B: Natural Hazards**

- Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events. (MS-ESS3-2)

**ESS3.C: Human Impacts on Earth Systems**

- Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. (MS-ESS3-3)
- Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. (MS-ESS3-3),(MS-ESS3-4)

**ESS3.D: Global Climate Change**

- Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities. (MS-ESS3-5)

### Crosscutting Concepts

**Patterns**

- Graphs, charts, and images can be used to identify patterns in data. (MS-ESS3-2)

**Cause and Effect**

- Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation. (MS-ESS3-3)
- Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS3-1),(MS-ESS3-4)

**Stability and Change**

- Stability might be disturbed either by sudden events or gradual changes that accumulate over time. (MS-ESS3-5)

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Connections to Engineering, Technology, and Applications of Science

**Influence of Science, Engineering, and Technology on Society and the Natural World**

- All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ESS3-1),(MS-ESS3-4)
- The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time. (MS-ESS3-2),(MS-ESS3-3)

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Connections to Nature of Science

**Science Addresses Questions About the Natural and Material World**

- Scientific knowledge can describe the consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-ESS3-4)

Connections to other DCIs in this grade-band: MS.PS1.A (MS-ESS3-1); MS.PS1.B (MS-ESS3-1); MS.PS3.A (MS-ESS3-5); MS.PS3.C (MS-ESS3-2); MS.LS2.A (MS-ESS3-3),(MS-ESS3-4); MS.LS2.C (MS-ESS3-3),(MS-ESS3-4); MS.LS4.D (MS-ESS3-3),(MS-ESS3-4); MS.ESS2.D (MS-ESS3-1)

Articulation of DCIs across grade-bands: 3.LS2.C (MS-ESS3-3),(MS-ESS3-4); 3.LS4.D (MS-ESS3-3),(MS-ESS3-4); 3.ESS3.B (MS-ESS3-2); 4.PS3.D (MS-ESS3-1); 4.ESS3.A (MS-ESS3-1); 4.ESS3.B (MS-ESS3-2); 5.ESS3.C (MS-ESS3-3),(MS-ESS3-4); HS.PS3.B (MS-ESS3-1),(MS-ESS3-5); HS.PS4.B (MS-ESS3-5); HS.LS1.C (MS-ESS3-1); HS.LS2.A (MS-ESS3-4); HS.LS2.C

(MS-ESS3-3),(MS-ESS3-4); HS.LS4.C (MS-ESS3-3),(MS-ESS3-4); HS.LS4.D (MS-ESS3-3),(MS-ESS3-4); HS.ESS2.A (MS-ESS3-1),(MS-ESS3-5); HS.ESS2.B (MS-ESS3-1),(MS-ESS3-2);
~~HS.ESS2.C(MS-ESS3-1),(MS-ESS3-3);HS.ESS2.D(MS-ESS3-2),(MS-ESS3-3),(MS-ESS3-5);HS.ESS2.E(MS-ESS3-3),(MS-ESS3-4);HS.ESS3.A(MS-ESS3-1),(MS-ESS3-4);~~ HS.ESS3.B
(MS-ESS3-2); HS.ESS3.C (MS-ESS3-3),(MS-ESS3-4),(MS-ESS3-5); HS.ESS3.D (MS-ESS3-2);(MS-ESS3-3),(MS-ESS3-5)
CCSS
– ELA

| | |
|---|---|
| RST.6-8.1 | Cite specific textual evidence to support analysis of science and technical texts. (MS-ESS3-1),(MS-ESS3-2),(MS-ESS3-4),(MS-ESS3-5) |
| RST.6-8.7 | Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table). (MS-ESS3-2) |
| WHST.6-8.1 | Write arguments focused on discipline content. (MS-ESS3-4) |
| WHST.6-8.2 | Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection,organization, and analysis of relevant content. (MS-ESS3-1) |
| WHST.6-8.7 | Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration. (MS-ESS3-3) |
| WHST.6-8.8 | Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. (MS-ESS3-3) |
| WHST.6-8.9 | Draw evidence from informational texts to support analysis, reflection, and research. (MS-ESS3-1),(MS-ESS3-4) |

Mathematics –

| | |
|---|---|
| MP.2 | Reason abstractly and quantitatively. (MS-ESS3-2),(MS-ESS3-5) |
| 6. RP.A.1 | Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. (MS-ESS3-3),(MS-ESS3-4) |
| 7. RP.A.2 | Recognize and represent proportional relationships between quantities. (MS-ESS3-3),(MS-ESS3-4) |
| 6.EE.B.6 | Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. (MS-ESS3-1),(MS-ESS3-2),(MS-ESS3-3),(MS-ESS3-4),(MS-ESS3-5) |
| 7.EE.B.4 | Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (MS-ESS3-1),(MS-ESS3-2),(MS-ESS3-3),(MS-ESS3-4),(MS-ESS3-5) |

## Attachment E

After my Dad drops me off in the morning, I prepare for my shift on the 'Ohana Team, one of our 5th grade clubs. I take my post next to Mr. A at the curb, greeting families as they arrive. I look out for the younger kids and help them out of their cars with their backpacks. Our morning bell signals everyone to meet in the center courtyard. At 8:00 am, teachers begin strumming their ukulele and we sing our morning mele, standing side by side with our classmates. The fourth graders follow up with an oli, a chant their teacher helped them create. As I walk with my class to our 5th grade classroom, I am thinking about how much I love school.

Our classroom has a lot of open-space, with community tables on the sides, a big rug area for our active learning work, and several choices for different kinds of chairs like a comfy armchair, floor pillows, a rocking chair and a yoga ball. I think I learn best at a table with about two other classmates, so that is a choice my teacher encourages me to make. My classmates and I do our morning kuleana, our classroom jobs to open up our day. Some are checking in homework assignments, turning on computers, straightening up learning centers, checking in lunch counts, cleaning desks, etc. Mrs. L plays gentle music (this morning it is Jeff Peterson playing slack key guitar) and we transition to the rug. Mrs. L review's our day's schedule. Georgie asks a question about our STEAM project, and Kaikou tells a riddle that nobody can solve. Then we play a theatre improv game called "Yes…and…" where we add details onto a story that our whole class is telling, one sentence at a time. We reflect about how saying the "Yes… and…" routine helps us strengthen our sense of belonging (from the HA principles) by helping us be open to each other's ideas and ways of doing things. In theatre they call this, "accepting offers."

We jump into our **Arts and Humanities** project. Mrs. L projects our inquiry question on our active board: *Why did Americans of European descent feel so compelled to expand the country westward?* Mrs. L gives each group a text card, short readings on the important events that led to the Westward Expansion. Ms. L does a mini-lesson on main idea by showing us examples and non-examples. My small group reads the text and decides on the main idea of our passage. We create a tableau to show it and compose our narration to explain it. As audience members we share appreciations for each other's work, and then ask "What if?" questions about each tableau. I asked one group, "What if no gold had been found in the West?" We finish off the project by writing (we get to choose to write either independently or with a partner). We do writing in-role, from the perspective of either a Native American or settler from the 19th century. Tomorrow we'll pick music to match the mood of the writing for when we share. I do a search on my tablet for a few details so I can get the life to sound really authentic.

At lunch time, the 5th graders eat with our 2nd grade buddies today. It's our job to help out 2nd graders learn manners and have appropriate conversations. They seem to really look up to us. In the afternoon, our **STEAM** work is broken up into stations so that we get more time to talk and work together. One station is about calculating the provisions that settlers would take out West, using an actual provisions list from that time. We have to consider time, distance and space to pack for our move to the West. In another station, we figure out how the disappearance of the buffalo influenced the environment – from the plants to the people. In the last station we work on perspective drawings of the ideal landscape for settlers moving west, including at least three things that are interdependent. We do visual thinking (observe, describe, and interpret) of a famous painting of Western lands, which really inspires me to do my best work. When the bell rings, I can't believe the day is already over. We clean up, organize, pack and do our gratitude reflections. We each share our ideas and experiences: "How did I do accepting offers today? How did accepting offers help us strengthen our sense of belonging?"

**Attachment F**

I love coming to school. It's 6:45 AM and the morning is fresh and the school is quiet. My Social Studies text cards are ready, our informational reading for today. I review the text-card tableaux steps again. We will use the provisions list from the Oregon Trail site to calculate ratio in our math scenario. Our daily math problem is downloaded from the SBAC Digital Library. And lastly, the drawing paper is cut and rulers handy for perspective drawing. Mr. A smiles, "Good morning," as he heads out to the curb and I head to the office, ukulele in hand, to check in. Teachers are zipping around squeezing in "one more thing" before our day starts with our morning mele. As the pū sounds three times, everyone gathers. I glance at Kupuna Kai as she signals teacher and student musicians to play. We sing and move into our day.

My students do their morning jobs efficiently now that we have started the second quarter. I circulate and check in with the flow of my class, then invite a small group to join me. We share planners and write on post-its, one personal challenge and one celebration to share. One child asks for 1-on-1 time, which we schedule at recess. Collaborative learning time follows. Today's inquiry: "Why/How did the colonists decide to move out West"? My facilitation steps are written on a chart to help me. Today's task prepares them for tomorrow's challenge. Armed with content and specific roles to play, students will need to take a position to move out West or stay put, and they'll need to convince me with their opinions based on textual evidence. We move into small group literacy centers right after our collaborative work. I meet with another group of students in literature circles, while others either meet independently following their reading response task or sit at computers to work on essays.

At recess I meet with a student to hear a personal story, one thankfully that has a productive ending. I check in with Mr. G to be sure his class is ready for project Math with me, while my students work on Math skill building with him. He tells me they have more questions regarding important events or westward migration after the morning text cards. We exchange student reflections. Math caused some discomfort from students who want the "right answer" but most enjoyed the challenge of applying Math to their scenarios. I assess which students are having difficulty and follow up with a review of calculating fractions and ratios.

The second grade teacher and I have lunch duty today. Together we supervise lunch and help our students make appropriate social choices. Its amazing how second graders learn from the examples set by their fifth grade buddies. A few students ignore suggestions from a fifth grader and we step in to ask questions, making the problem solving visible for both ages.

Afternoons are filled with skill building in visual arts, music, PE, and Health. My lesson perspective drawing lesson calms most students, as they explore after direct instruction. The day ends in physical fitness teams with the other fifth grade class and then closes with verbal reflections to the prompt, "What was strong in my learning today?"

After school our fifth grade team reviews student work to help decide which concept needs to be retaught and which show levels of mastery. I create a story problem for the assessment, which takes me through the end of the afternoon. I leave school exhausted, with a smile, appreciating the collaboration of both my peers and students.

**Attachment G**

# Staffing Chart

Use the appropriate table below to outline the staffing plan for the proposed school. Adjust or add functions and titles and add or delete rows as needed. Include the salary and full-time employee ("FTE") equivalency (*e.g.*, 1.0 FTE, 0.5 FTE, etc.) for each position for each year.

**Elementary School Staffing Model and Rollout**

| Title | Salary and FTE Per Position Per Year | | | | | |
|---|---|---|---|---|---|---|
| | Year 1 2017 | Year 2 2018 | Year 3 2019 | Year 4 2020 | Year 5 2021 | Capacity 20__ |
| School Director | 1.0 ($130,000) | 1.0 ($131,950) | 1.0 ($133,929) | 1.0 ($135,937) | 1.0 ($137,977) | 1.0 ($140,047) |
| Arts Integration Curriculum Specialist | 1.0 ($55,000) | 1.0 ($55,825) | 1.0 ($56,662) | 1.0 ($57,512) | 1.0 ($58,375) | 1.0 ($59,251) |
| Classroom Teachers (Core Subjects) | 6.0 ($50,000) | 6.0 ($51,500) | 6.0 ($53,045) | 6.0 ($54,636) | 6.0 ($56,275) | 6.0 ($57,963) |
| Classroom Teachers (Specials) | 1.0 ($50,000) | 1.0 ($51,500) | 1.0 ($53,045) | 1.0 ($54,636) | 1.0 ($56,275) | 1.0 ($57,964) |
| Office Manager | 1.0 ($45,000) | 1.0 ($46,350) | 1.0 ($47,740) | 1.0 ($49,172) | 1.0 ($50,647) | 1.0 ($52,166) |
| Receptionist | 0.0 | 0.0 | 1.0 ($20,000) | 1.0 ($20,600) | 1.0 (21,218) | 1.0 ($21,854) |
| Teacher Aides and Assistants | 1.0 ($20,000) | 1.0 ($20,600) | 1.0 ($21,218) | 1.0 ($21,854) | 1.0 ($22,510) | 1.0 ($23,185) |
| School Operations Support Staff | 1.0 ($25,000) | 1.0 ($25,750) | 1.0 ($26,522) | 1.0 ($27,318) | 1.0 ($28,137) | 1.0 ($28,982) |
| **Total FTEs** | 12.0 | 12.0 | 13.0 | 13.0 | 13.0 | 13.0 |
| **Total Salaries** | $625,000 | $640,975 | 677,386 | $694,845 | $712,789 | $731,226 |

**Middle School Staffing Model and Rollout**

| Title | Salary and FTE Per Position Per Year | | | | | |
|---|---|---|---|---|---|---|
| | Year 1 2017 | Year 2 2018 | Year 3 2019 | Year 4 2020 | Year 5 2021 | Capacity 20__ |
| Classroom Teachers (Core Subjects) | 2.0 ($50,000) | 4.0 ($50,000-$51,500) | 6.0 ($50,000-$53,045) | 6.0 ($51,500-54,636) | 6.0 ($53,045-$56,275) | 6.0 ($54,636-$57,964) |
| Classroom Teachers (Specials) | 1.0 ($50,000) | 2.0 ($50,000- | 2.0 ($51,500- | 2.0 ($53,045- | 2.0 ($54,636- | 2.0 ($56,275- |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 51,500) | 53,045) | $54,636) | $56,275) | $57,964) |
| **Total FTEs** | **3.0** | **6.0** | **8.0** | **8.0** | **8.0** | **8.0** |
| **Total Salaries** | **$150,000** | **$304,500** | **$413,635** | **$426,043** | **$438,823** | **$451,989** |

**Attachment H**


# CESSA manual » SY 2015-16

COMPREHENSIVE EVALUATION SYSTEM FOR SCHOOL ADMINISTRATORS

# Table of Contents

## Comprehensive Evaluation System for School Administrators Overview

### Our Beliefs, Our Commitmentt

In a democratic society, education for all individuals is the great equalizer. Public education is essential to sustain a true democracy. We believe "a democratic society is dependent upon the free, full growth of individuals who will participate in the creation and development of the institutions in that society." (PhHosophy of Education – Hawaii Public Schools Policy 2000, Appendix B).The quality of public education today will touch and impact all of our Uves in the future.

Through public education, all students can dream and reach their goals regardless of where they come from, their economic status or who their families are. Public education is an opportunity for all students to access programs that insure their acquisition of knowledge relevant to living in the present as well as encouraging skills of inquiry and wonder that will be required for life in the future. It is the collective responsibilities of educators, communities and governing bodies to assure all students have equal access to a quality education that embraces the whole learner with a major emphasis on the General Learner Outcomes (GLOs) that are embedded into the school curriculum. The goal of public education is much more than the sum of test scores, rather, it is building a citizenry who can work and communicate with others, create options through problem solving, become adept at questioning and can formulate answers to questions not yet asked, all within the framework of ethical decision making. Creating students who are college, career and life ready for the 21st Century begins with a strong foundation and balances achievement and adeptness with the ability to live with and alongside of others.

We believe collaboration and effective shared leadership at all levels of our educational organization are essential in a global society of diverse cultures and beliefs. To this end, we are committed as school leaders to provide leadership necessary for all our students to become 21st Century learners. We serve as catalysts in shaping school improvement to build a strong foundation to enhance teacher effectiveness, thus impacting student achievement and growth. The Wallace Foundation's report, How Leadership Influences Student Learning boldly asserts, "Leadership is second only to teaching among school influences on student success". This is a belief shared by school leaders. Therefore, we advocate for a comprehensive evaluation system that acknowledges and differentiates support for principals, and takes into consideration the specific contextual needs of individual school leaders and the communities they serve.

NAESP and NASSP in their executive summary *of Rethinking Principal Evaluation* reports that a new paradigm in the redesign of principal evaluation advocates careful consideration to the context of a

[1] Note: "Our Beliefs, Our Commitment" is the statement created by the workinggroup of principals that contributedto the CESSA design.

school (uniqueness of students, school and community), incorporates standards that improve practice, uses evaluation to build capacity and focuses on multiple measures of performance data.[2] It is our belief that a well-designed comprehensive evaluation system for school administrators will include considerations to all of the above, while strongly emphasizing inclusion of standards and the support requisite for reaching these standards that will affect improved leadership practice.

As school leaders, our commitment is in establishing structures and systems that support teachers and school administrators to maximize student learning at every school. This is accomplished with careful consideration in the management of personnel, facilities, operations and fiscal resources. However, the "Profile of an Effective School Leader" published by the Interstate School Leaders Licensure Consortium (ISLLC) under the Council of Chief of State School Officers best expresses what we believe is at the heart of leadership. It states:

> Human relationships and capacity building within students, teachers and the wider school community is at the heart of the school leader's work. The effective school leader is committed, responsible, competent, caring and unwavering in the effort to have students reach high standards. A sense of both moral and professional commitment enables the effective school leader to promote a shared vision of service to students and to focus on the success of every learner as the desired result[3]

A bridge between what has been honored in the past and a paradigm shift to the future recognizes the importance of human relationships and capacity building ("Profile of an Effective School Leader,") with a deliberate focus on enhancing individual principal leadership development. This is the core belief that drives the commitment we as school leaders have in supporting quality public education in Hawaii. Our shared vision is for the success of every learner within the school community from principal to teacher and ultimately to the students we serve. A quality Comprehensive Evaluation System for School Administrators will focus on supporting and equipping every school leader with the necessary instructional leadership practices that build effective schools, assuring all students are college, career and especially, life ready.

## CESSA Comprehensive System of Support

"While educators have a direct impact on student achievement, a cohesive and effective system of support is necessary to create the conditions in which success is maximized."[4]

The performance contract is part of an entire system of support to improve principal leadership. A

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[2] *Rethinking Principal Evaluation: A New Paradigm Informed by Research and Practice,* Executive Summary NAESP/NASSP, 2012.

[3] Educational Leadership Policy Standards; ISLLC 2008, The Council of Chief State School Officers (CCSSO)

[4] Memorandum of Understanding between Hawaii Government Employee's Association and Hawaii Department of Education, April 10, 2012

comprehensive evaluation system for school administrators requires a comprehensive system of support that is implemented with fidelity.

The single most important piece of the new system of support is the shared belief that, "...the purpose of evaluation is to build a principal's leadership capacity and encourage professional development".[5]

With a foundation focused on improving the leadership performance and capacity of principals, vice principals, and school administrators, the system of support will be manifested in meaningful and coherent structures supported by time and resources. First and foremost is that a system of support for principals must include the "voice of principals" and a commitment to empowering school leaders. An evaluation system committed to building and growing leadership ability and capacity will include best and next practices of high quality professional development and leadership training. Examples include support in terms of descriptive, specific, and timely feedback that is at first formative and non-evaluative. Such feedback is meaningful when it is provided by supervisors who have the wisdom, experience, respect, and a proven track record of being a leader of leaders and a skilled mentor for leadership growth. Another requirement for a system of support in a large organization such as the Hawaii Department of Education is clear, open, timely, and consistent communication of school related initiatives, programs, compliance requirements - school leaders cannot perform and lead when communication is poor and information is inconsistent or unclear. In addition, support needs to be provided in the form of time and opportunities to learn and implement leadership practices that are contextually appropriate, triangulation of information and feedback to inform changes and enhancing successes. The system of support needs to be guided by research-based studies that clearly indicate, "The quality of how principal evaluations are conducted may be even more important than the content of what the evaluation contains".[6]

The current procedure of end of the year summative evaluation is an obsolete rear view mirror type of practice that must be changed. *A* comprehensive and systematic evaluation system cannot wait until the end of the year and must include what a school administrator does day in and day out. "A systemic principal evaluation system must include an assessment of principal's practice - their daily work".[7]

Reflective practice and change leadership is a key to an evaluation system that supports professional growth. The structures to support a review of a principal's practice must be part of this system and requires:

- time be provided for a supervisor to observe and monitor the daily leadership practices of a

[5] *Rethinking Principal Evaluation: A New Paradigm Informed by Research and Practice,* Executive Summary NAESP/NASSP, 2012.p.6.
[6] Ibid, p. 2.
[7] Ibid, p.S.

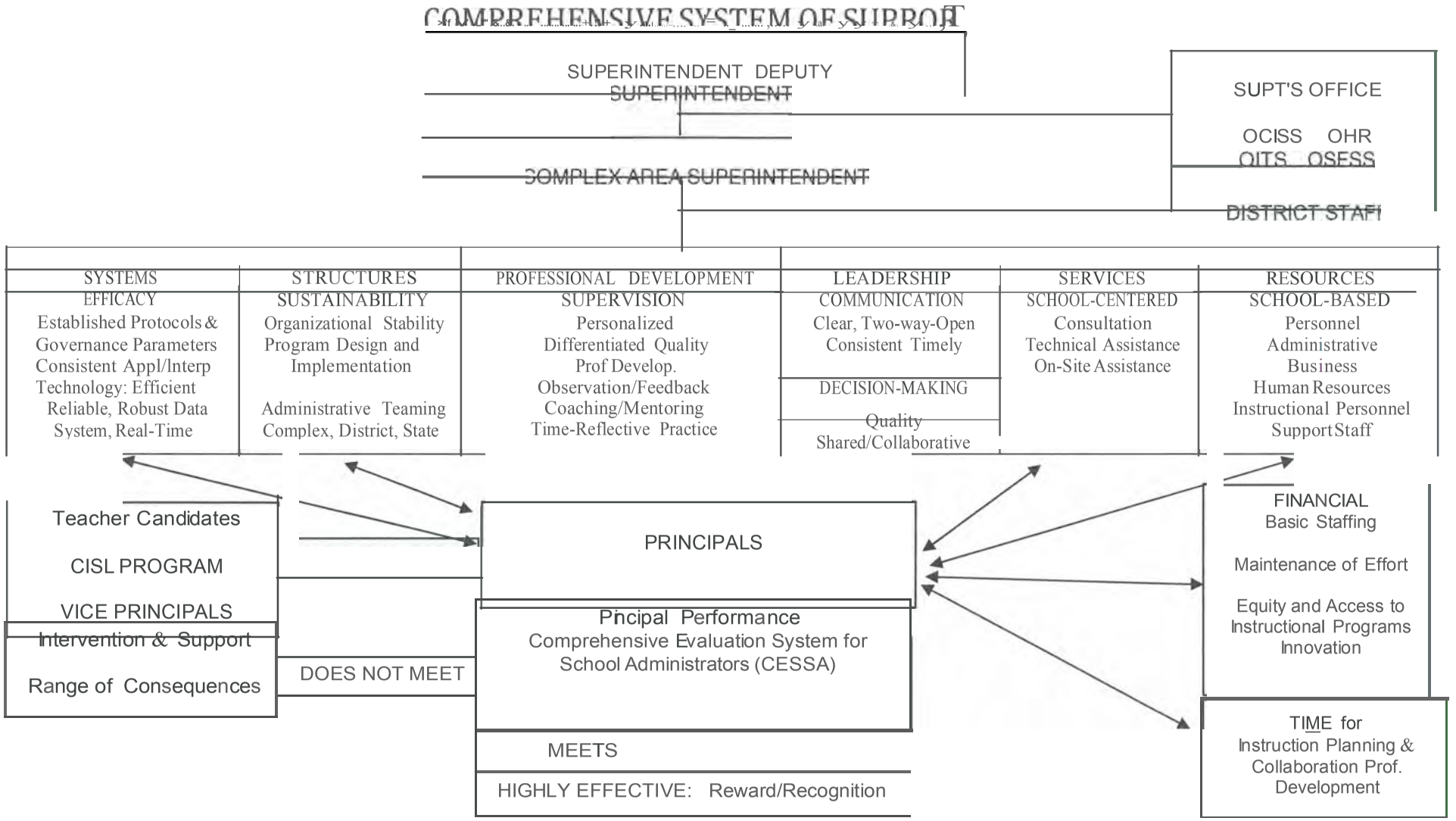
principal (communication, collaboration, capacity building, problem solving, data analysis, planning, and implementation, etc.);

- time be provided for timely reflective practice...time for developing and maintaining a portfolio of documentation and reflection;

- leaders have access to a robust data system that is reliable and has timely data a system designed specifically for and by school pri ncipals; and

- systems of support that are designed and im plemented onJy after a careful and collaborative review of a school administrator's daily, weekly, monthly, and yearly workload to assure that system of support structures are realistic and can be included in the already overflowi ng plate of responsibilities of school principals and vice principals.

I mproving principal evaluation is long overdue. School leadership is second only to teaching among school influences on student success. It is essential that a new comprehensive evaluation system for school administrators include a comprehensive, well designed, and carefu lly implemented comprehensive system of support


COMPREHENSIVE SYSTEM OF SUPPORT
SUPERINTENDENT DEPUTY SUPERINTENDENT
COMPLEX AREA SUPERINTENDENT
SUPT'S OFFICE
OCISS OHR
OITS OSESS
DISTRICT STAFF
SYSTEMS
EFFICACY
Established Protocols & Governance Parameters
Consistent Appl/Interp
Technology: Efficient Reliable, Robust Data System, Real-Time
STRUCTURES
SUSTAINABILITY
Organizational Stability
Program Design and Implementation
Administrative Teaming
Complex, District, State
PROFESSIONAL DEVELOPMENT
SUPERVISION
Personalized
Differentiated Quality
Prof Develop.
Observation/Feedback
Coaching/Mentoring
Time-Reflective Practice
LEADERSHIP
COMMUNICATION
Clear, Two-way-Open
Consistent Timely
DECISION-MAKING
Quality
Shared/Collaborative
SERVICES
SCHOOL-CENTERED
Consultation
Technical Assistance
On-Site Assistance
RESOURCES
SCHOOL-BASED
Personnel
Administrative
Business
Human Resources
Instructional Personnel
Support Staff
Teacher Candidates
CISL PROGRAM
VICE PRINCIPALS
Intervention & Support
Range of Consequences
PRINCIPALS
Pincipal Performance
Comprehensive Evaluation System for School Administrators (CESSA)
DOES NOT MEET
MEETS
HIGHLY EFFECTIVE: Reward/Recognition
FINANCIAL
Basic Staffing
Maintenance of Effort
Equity and Access to Instructional Programs
Innovation
TIME for
Instruction Planning & Collaboration Prof. Development

CESSA: What will it take for success?

The Principal:

- Understands and accepts the roles and responsibilities of leaders in the Department.
- Is committed to the vision and Philosophy of Education in Hawaii's Public Schools.
- Is committed to a belief that "the moral purpose of the highest order is having a system where all students learn, the gap between high and low performance becomes greatly reduced; and, what people learn enables them to be successful citizens and workers in a morally based knowledge society."[8]
- Focuses on student learning and understands the importance and impact of his/her leadership practices and behaviors on the people in the school.
- Reflects on his/her practices and decision-making and learns from his/her experiences.
- Understands his/her own leadership characteristics and skills, and the leadership skills others in the school.[9]

The Complex Area Superintendent:

- Cares whether the Principal understands the *vision,* direction and values of the organization.
- Believes in the positive intentions of the school administrator.
- Utilizes effective communication and process skills.
- Provides direct and system support to the Principal to enable school success.
- Supports the growth and professional development of the Principal.
- Creates opportunities for continuous improvement.

The CESSA:

- Reaffirms the importance of both Student Educational Growth Outcomes and Principal Leadership Practice,
- Recognizes that what Principals do, indirectly affects Student Educational Growth Outcomes.
- Affirms the need to continue annual evaluation, but creates a multi-tiered cumulative summative rating over five years. The annual evaluation uses a five-point rating scale to evaluate progress each year; and, the summative evaluation uses a five-point rating scale provide overall performance ratings for the five years.
- Acknowledges and understands the complexities of school improvement planning and implementation processes.
- Acknowledges and understands the need for time to strategically focus change efforts, in order to maximize acceptance, assimilation, success, sustainability and continuous improvement.

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[8] Fullan, M., *The Moral Imperative of School Leadership,* Corwin Press, 2003.

[9] Douglas Reeves, *The Learning Leader,* ASCD, 2006.

- Recognizes that levels of expertise in school leadership is developmental, occurs over time and renews when the context changes.
- Acknowledges the value of the tenured system to Hawaii schools and the organization. The tenured system aids in the recruitment and retention of employees, brings stability to the schools and workforce, supports long-term successive management goals, utilizes time, energy, materials, human and financial resources more effectively and efficiently. The CESSA incorporates a multi-tiered evaluation system to hold both Supervisor and Principal accountable for continuous improvement.

## Domains of Leadership

The Examples of Measurement are not meant to be the entire list of approved measures. The Principal and CAS may choose other measures that more accurately reflect how a descriptor is assessed.

| Domains | Descriptors | Examples of Measurement |
|---|---|---|
| Domain 1: Student Educational Outcomes | • Promotes and supports students' progress and performance<br>• Provides relevant resources to support and increase student learning<br>• Develops strong school- community leadership teams.<br>• Builds instructional leadership in teachers<br>• Identifies and implements positive changes and practices that influences student achievement<br>• Aligns management style to change initiatives<br>• Implements and supports rigorous curriculum and instruction that is meaningful and relevant<br>• Supports and models research-based assessment and accountability practices | • ACT Suite (8th through 11th grade)<br>• AP scores<br>• Chronic Absenteeism<br>• College-Going Rates<br>• Discipline<br>• Gap Rate<br>• Graduation<br>• HSA Math Proficiency<br>• HSA Reading Proficiency<br>• HSA Science Proficiency<br>• Median Student Growth Percentile<br>• Other |
| Domain 2: Professional Growth and Learning | • Initiates professional development to improve leadership practice<br>• Reflects on leadership practices<br>• Identifies strengths and areas for improvement<br>• Considers feedback from faculty, staff, parents, students and community/university partners in identifying strengths and needs<br>• Demonstrates commitment to continuous learning<br>• Promotes partnerships and alliances to strengthen leadership skills and practices | • Attendance rate<br>• Benchmark assessment<br>• Conducts and leads staff professional development<br>• Formative and summative teacher test data<br>• Incorporates new learning in school programs<br>• Multiple measures of student learning<br>• Personal journal<br>• Professional Development Plan (Mandatory, Appendix D)<br>• Professional portfolio or artifacts<br>• Scholarships<br>• Seeks and incorporates new learning in current practices<br>• Special recognition and accomplishments<br>• Use of scoring/grading rubrics<br>• Work Samples and scores<br>• Other |

| Domains | Descriptors | Examoles of Measurement |
|---|---|---|
| Domain 3: School Planning and Progress | • Develops an effective school improvement plan that is based on:<br>– *A* well-crafted needs assessment;<br>– *A* clearly defined and inclusive process for creating the plan;<br>– *A* defined implementation process, and<br>- An identified monitoring and evaluation system.<br>• Identifies a networking system to actively engage all audiences of the school community and stakeholders in the school improvement process | • Academic/Financial Plan<br>• Attendance rate<br>• Benchmark assessment<br>• Formative and summative teacher test data<br>• I nterviews/questionnaires<br>• Multiple measures of student learning<br>• Principal's reflection<br>• Professional portfolio or artifacts<br>• Scholarships<br>• School improvement Plan data and outcomes (such as student attendance, behavior, student outcomes)<br>• Special recognition and accomplishments<br>• Use of scoring/grading rubrics<br>• Work samples and scores<br>• Other |
| Domain 4: School Culture | • Develops and maintains a positive school culture<br>• Sets high expectations for all the school community<br>• Enables teachers and students to work collaboratively and cooperatively<br>• Positively influences teachers and staff working conditions<br>• Sets a tone that supports continuous professional learning | • Attendance rate<br>• Benchmark assessment<br>• Exit interviews of employees and students<br>• Formative and summative teacher test data<br>• Multiple measures of student learning<br>• News clippings, media and school publications<br>• Observations<br>• Participation in school activities<br>• Professional portfolio or artifacts<br>• Recruitment and retention of faculty and teachers<br>• Scholarships<br>• School climate surveys of faculty and staff<br>• Special recognition and accomplishments<br>• Student, parent, teachers, staff and community interviews<br>• Use of scoring/grading rubrics<br>• Work Samples and scores<br>• Other |

| Domains | Descriotors | Examoles of Measurement |
|---|---|---|
| Domain 5: Professiona l Qualities and Instructional Leadership | • Demonstrates a shared responsibility and shared vision and mission<br>• Monitors and continuously improves teaching and learning<br>• Manages the organization and systems effectively and provides resources for a safe and high performing learning environment<br>• Models integrity, fairness and high ethical standards on a consistent basis<br>• Advocates for teachers and students<br>• Promotes civic responsibilities | • Attendance rate<br>• Benchmark assessment<br>• Degree to which a principal achieves benchmark goals in the previous year's professional developm ent plan<br>• Formative and summative teacher test data<br>• Multiple measures of student learning<br>• Observations of principal's practice<br>• Professional portfolio and artifacts aligned to state and district or national professional standards<br>• Self -reflection/analysis<br>• Scholarships<br>• School Community Council evaluation of principal<br>• Special recognition and accomplishments<br>• Use of scoring/grading rubrics<br>• Work Samples and scores<br>• Other |
| Domain 6: Stakeholder Su pport and Engagement | • Initiates and facilitates parent and commun ity participation in school-wide activities and initiatives<br>• Engages openly in shared problem-solv ing and decision making, maintaining a school cultu re of transparency and trust with in the school community<br>• Promotes open, effective and collaborative modes of commu nication with staff, families, and the surrounding community<br>....._ Builds positive relationships that are cultu rally responsive to diverse stakeholders | • Leadership, Team structures<br>• Leadership Team minu tes<br>• Letters of continuing support, thank you letters, and letters of appreciation from stakeholders<br>• News releases<br>• Newsletters<br>• Professional portfolio or artifacts<br>• School Accreditation report<br>• School Assessments<br>• School Community Council Principa l evaluation<br>• School Status and Improvement Report data<br>• Special recogn ition and accomplishments<br>• Student, parent, commu nity surveys<br>• Tripod Survey<br>• Other |

## CESSA: Implementation Guidelines

**Basic Premise.**
The purpose and intent of the evaluation program in the system is to support the profess growth and development of Principals in their leadership practice.

**Evaluation Program Design.**
The evaluation program is differentiated and personalized to meet the developmental and professional needs of Principals.

**Type A. Annual Summative Evaluation for Probationary and Tenured Transferring Princ**

Duration.
The Annual Summative Evaluation is conducted for Principals each year the Principal is on probation.

Purpose.
The purpose and intent of the Annual Summative Evaluation is to ensure the Principal in his/he new position is provided the guidance and other supports necessary for success and continued professional growth. The Principal is required to develop a Professional Development Plan (Appendix C) that is used to guide his/her work during the year.

Applicability.
The Annual Summative Evaluation applies to new hire Principals; Vice Principals promoted to Principalships, and tenured Principals who are promoted to a new position and/or a new schoo (lateral transfer or promotion).

Exit Requirements.
When a tenured Principal transfers to a position prior to the end of a five-year cycle, a summati evaluation for his/her current position is completed by the Complex Area Superintendent (CAS prior to the effective date of transfer. A conference with the exiting Principal to review evidenc discuss performance must be held prior to the completion of the Summative Evaluation Form. conference is necessary to validate the performance of the Principal and communicate informat on the school's status (e.g. accomplishments, challenges, status of school improvement) and the recommended next steps for the successor Principal.

Evaluation Program Process.
Determine appropriate evaluation cycle, one year Summative **or** five year Annual lnterim/Summative.

Evaluation Conferences each year the Principal is on probation.

Prior to the beginning of the school year Oune or July), discuss the Principal's professional development needs, strategies, and plans to address each area in the domains 2-6. Address domain 1when the growth scores become available. Discuss and identify the supports that are necessary for his/her success. Complete the Pre-Evaluation Conference section of the CESSA Annual Review form (Appendix F) Period. for probationary principals and tenured principals transferring to a new school.

At the end of the school year for domains 2-6, the CAS discusses the Principals accomplishments, school's current status in school improvement, and student educational growth outcomes. This discussion will occur in the fall of the following school year, contingent on receipt of the previous school year's growth scores for domain 1.The end of year discussion should include a review of measures established
Pre-Evaluation Conference. The CAS informs the Principal of his/her rating for each domain and the rationale for the ratings during the Annual Summative Conference (Appendix F).

School Visitations.
Activities include walkthroughs, observations, meetings and/or informal meetings followed by an exit conference with the Principal.

Phone conferences **(Optional).**

## Type B. Annual Interim Evaluation with a Five Year Summative Evaluation for Tenured Principals.

Duration.
An Annual Interim Evaluation is completed for each year for four (4) years. A Summative Evaluation is completed at the end of the year for the fifth year of a cycle. Tenured Principals are placed on a five-year evaluation cycle and remain on that cycle as long as they are in their appointed position at the school.

Purpose.
The intent of the Annual Interim Evaluation is to provide the opportunity for professional dialogue between the CAS and Principal on at least one area in each of the six domains (selected by the principal with concurrence by the CAS). The evaluation is also used to assess the school's progress in school improvement, student educational growth outcomes, and identify supports necessary for next steps in the five-year continuum. The Principal is required to develop a five-year Professional Development Plan (Appendix C) that is used to guide his/her work during the year.

The Summative Evaluation is completed for tenured Principals at the end (June or July for domains 2-6 and by the fall of the following school year contingent on receipt of the previous year's growth scores) of the Principal's fifth year. The purpose and intent of the conference is to discuss the Principal's performance and leadership practices over the five-year period. This evaluation is intended to be a summary evaluation that is cumulative of the Principal's accomplishments, progress and growth over the five-year period. Prior year's evaluations and data over the five years must be considered in completing the Summative Evaluation for tenured Principals.

Applicability.
Only tenured Principals are eligible for the five-year interim/summative evaluation cycle.

Annual Interim Evaluation Conference.
Prior to the beginning of the school year, (June or July) the CAS must meet with the Principal to discuss his/her performance and practices for the previous school year for domains 2-6. This discussion should occur for domain 1by the fall of the following school year contingent on receipt of the previous school year's growth and achievement scores. During this time the CAS and Principal should discuss his/her accomplishments, progress on school improvement, and student educational growth outcomes. Review and discuss evidence and measures. Review next steps in the Professional Development Plan. Identify focus areas and supports needed for the new school year. CAS informs the Principal of his/her annual Interim Rating for the year (Appendix F).

Summative Evaluation Conferences.
During June or July, of the fifth school year, the CAS meets with the Principal to discuss his/her performance and leadership practices for the five years in each of the domains 2-6 (for domain 1, there will be only four years' worth of data pending receipt of year five's growth and achievement scores in the fall.

By the fall of the fifth year, the end of year discussion should include a review of measures established during the Pre-Evaluation Conference for domain 1. CAS informs the Principal of his/her rating for each domain and the rationale for the ratings (F).
At a follow-up meeting. the CAS will inform the Principal of his/her Summative Ratings and the rationale for the ratings. The Principal and CAS will discuss the performance goals that will guide the Principal's leadership practices and serve as a basis for his/her Professional Development Plan for the next five years. The CAS and the Principal will identify the supports that will be provided to the Principal.

School Visitations.
Activities include walkthroughs, observations, meetings and/or informal meetings followed by an exit conference with the Principal.

Phone conferences (optional).

**Maintaining Confidentiality**

All matters and documents directly related to the Principal's performance evaluation must be treated as confidential. Examples of confidential documents include evaluation forms, notes and records of CAS/principal conferences, and CAS walk-through or observation notes and forms. In the event Complex or District staff are assigned to provide support services to assist the principal and/or school, discretion must be exercised by the CAS in his/her communications with Complex or District staff Complex and District staff may not conduct walkthroughs, observations, or school visits for purposes of Principal evaluation.

**Performance Evaluation Conferences**

The manner in which the CAS conducts a conference is key to establishing rapport, building trust, conveying a message of support, and communicating his/her understanding of the complexities and challenges that the Principal faces. The Principal's performance is to some extent a reflection and indication of the professional development, personalized guidance and differentiated support that has been provided to the Principal by the CAS.

## Pre-Requisites for all Evaluation Conferences

1. Strive to understand the unique context, history, climate, and culture of the school and community.

2. Consider the Principal's influence on student achievement to understand "the direct effects of the Principal's Leadership Practice on schools and teachers, and the indirect effects on instruction and learning."[10]

3. Know and understand the basic concepts of Change. *(Assumptions of the Concerns Based Adoption Model, CBAM)*

**CHANGE:**

- Is a PROCESS, not an event
- Is made by IN DMDUALS first, then institutions
- Is a highly PERSONAL experience
- Entails DEVELOPM ENTAL growth in feelings and skills

**INTERVENTIONS MUST BE RELATED TO:**

- The people first
- The innovation second

4. Utilize the "Six Domains of Principal Leadership" in *Rethinking Principal Evaluation,* pages 1-29, as a framework for the Hawaii Comprehensive Evaluation System for School Administrators.[11]

5. Utilize the "Profile of an Effective School Leader" *(Updated Version);* Performance Expectations and Elements from "Performance Expectations and Indicators for Education Leaders" CCSSO, 2008; in relation to the *NAESP/NASSP Six Domains of Principal Leadership* to further define the leadership behaviors and practices that support successful performance in the six domains, including student educational growth outcomes and learning.

**During the Conference consider the following:**

1. **Recognize and identify accomplishments.**
   *What stages of leadership planning were completed?*
   *What programs, processes, and/or innovations that support high performance and informed decision-making by teachers and students were implemented?*
   *What structures or systems were implemented that: increases access to information; improves communication; are inclusive; and, promotes and sustains collaborative and collegial relationships, effective teamwork; and leadership?*

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[10] "The Ripple Effect: A Framework for Principal Impact." *Rethinking Principal Evaluation. A New Paradigm Informed by Research and Practice.* NAESP and NASSP, 2012, pp. 10-11

[11] Ibid, pp. 1-29.

2. Examine and analyze school data in relation to the six domains.
   *What is the Principal's performance goal(s) for each domain?*
   *What are student educational growth outcomes?*
   (Analysis is: organizing data; summarizing the data; relating data to the performance goals and student outcomes; evaluating the differences between existing and desired conditions.)
3. Discuss the programs, processes, innovations, instructional strategies or leadership strategies that will be/or were implemented to achieve the identified goals.
   *To what extent were the above implemented?*
   *Who are/were the people involved?*
   *What were the reasons for successful implementation?*
   *What; if any are/were the barriers to implementation?*

4. Discuss the Results and Impact on Principal Leadership Performance, teacher responsiveness and student learning.
   *How well did we do?*
   *What did I learn?*

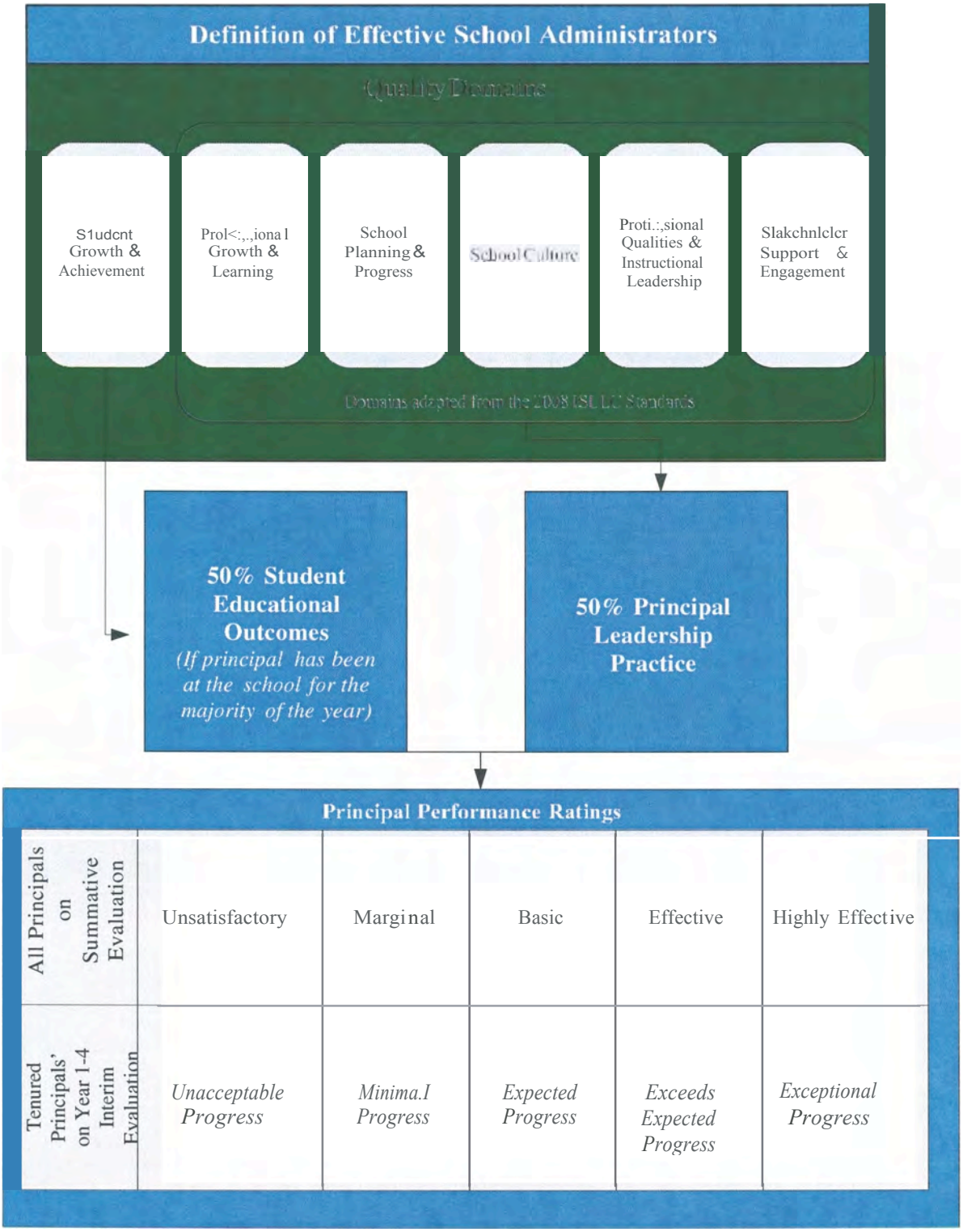
After the Conference consider the following:

t. Provide the Principal with time for Reflection and Research.
   *What did I learn? What made the difference?*
   *What might be some alternative strategies? Is there another way?*

2. Hold a Follow-up Meeting To Discuss Next Steps and Professional Development Plan.
   *What do I maintain or continue? What do I renew or change?*
   *What supports do I need?*

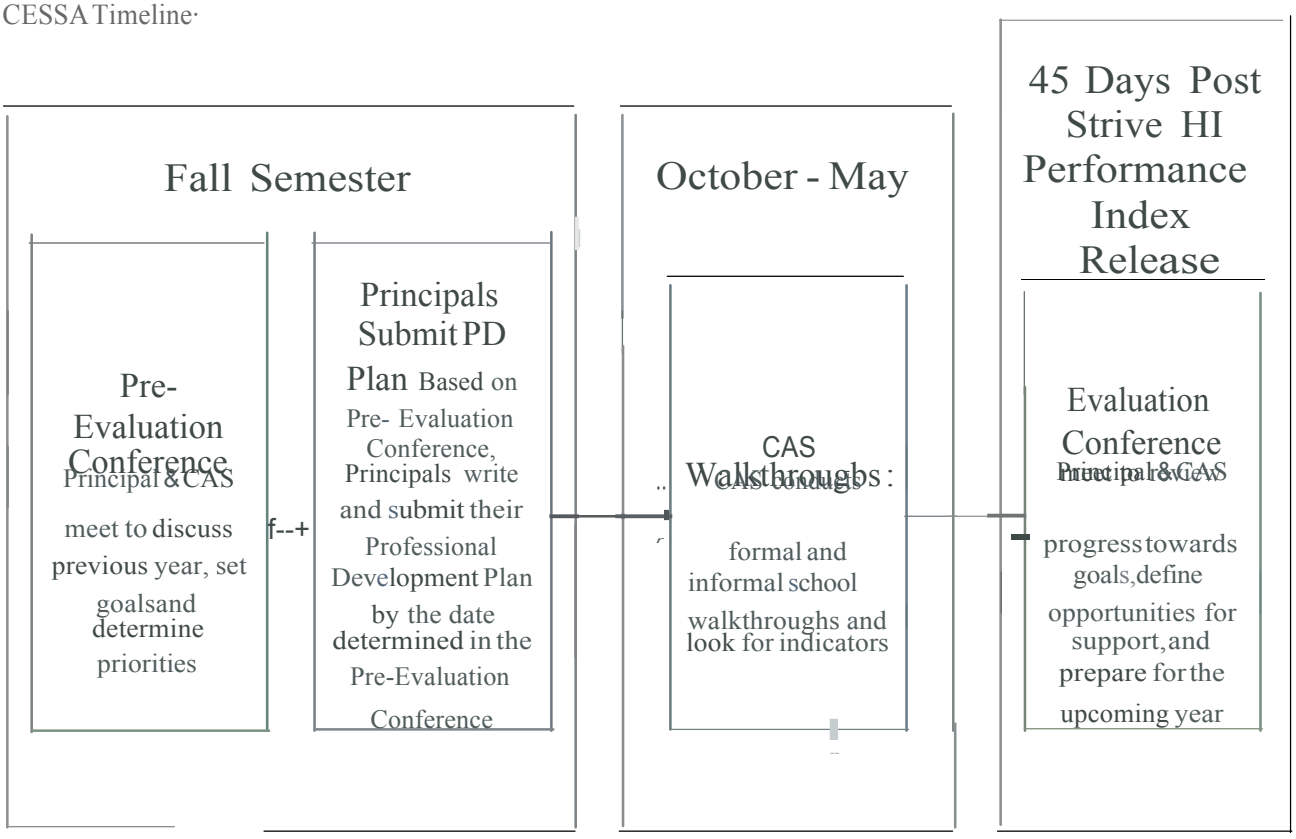
## CESSA Framework Design

The six CESSA Domains are rooted in the Interstate School Leaders Licensure Consortium (ISLLC) standards. The following visual illustrates the organization of CESSA components and domains:



## CESSA Timeline

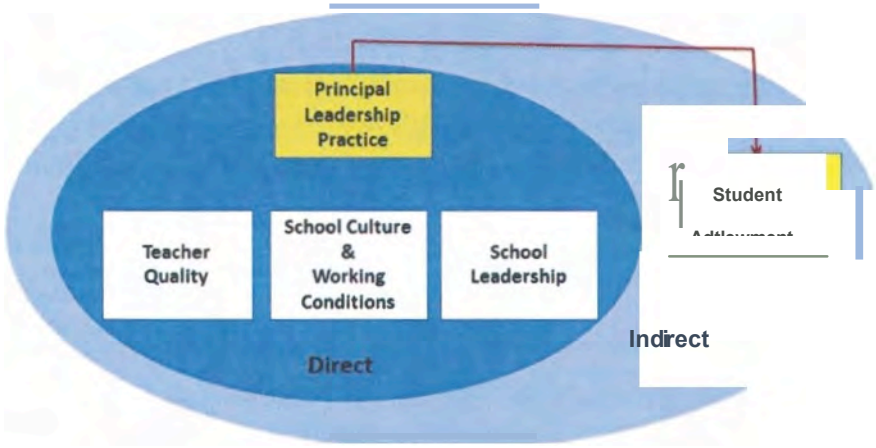
All Pre-Evaluation Conferences must be completed by the fall of the following school year (to include receipt of domain 1growth and achievement data from the previous school year). The CAS and Principal should decide the due date for the Professional Development Plan during the Pre-Evaluation Conference. End-of-Year Formative and Summative Evaluation Conferences must be held within 45 days of the Strive HI Performance Index data release. The following visual illustrates the CESSA Timeline·



# Student Educational Outcomes, Domain 1

## Overview

The foundational purpose of any school is to increase student performance and achievement. Understanding that Principals have a strong and immediate influence on teacher quality, and directly influence school culture and teacher working conditions, the following pictures depict the theory of action behind Domain 1. Furthermore, it is important to note that Principals are the second most important school-level factor influencing student achievement. This idea is illustrated in the following visual[12]




## Measures

[12] Clifford, M., Behrstock-Sherratt, E., and Fetters, J., *The Ripple Effect: A Synthesis of Research on Principal Influence to Inform Performance Evaluation Design,* American Institutes for Research (AIR), Washington, D.C. 2012.

School Year 2015-2016 and Beyond

Based on the academic plan, the principal and CAS set targets during the Pre-Evaluation Conference. Two of the targets are based on math and reading proficiency from the statewide test. The remaining three targets are set based on the list of achievement indicators on the following page.

During the Evaluation Conference, the principal and CAS discuss the results of all five targets and apply a met or not met rating. For the reading and math indicators, the met or not met rating is based upon either their math and reading achievement or their math and reading median growth percentile (MGP) band (below), whichever is more favorable.

Growth Indicators

The Department assigns one of three performance levels for both Math and Reading school MGP. These performance levels are assigned within given ranges and identified in the table below. An unsatisfactory rating results in a not met with a basic and highly effective as met

| Unsatisfactory | Basic | Highly Effective |
|---|---|---|
| Reading MGP ≤ 35<br>Math MGP ≤ 30 | Reading MGP 36-65<br>Math MGP 31-60 | Reading MGP > 66<br>Math MGP > 61 |

Achievement Indicators (see Appendix E for a glossary of these terms)

Performance on Achievement Indicators is measured against the targets set in the Pre-Evaluation Conference. Targeting setting is a collaborative process between the Principal and CAS and should support the Academic Plan and align to the Strategic Plan. Targets should be set using the previous year's Strive Hi results, which are populated on the CESSA Evaluation Form. Further, selecting Additional Indicators should be decided upon with consideration to a school's community context,
needs, historical challenges, and priorities. The Additional Indicators that can be chosen are:

- ACT Suite (8th through 11th grade)
- AP Scores
- Chronic Absenteeism
- College-Going Rates
- Discipline
- Gap Rate
- Graduation
- HSA Science Proficiency
- Other

## Principal Leadership and Practice, Domains 2-6

The five remaining domains were aligned with the "Profile of an Effective School Leader" published by the Interstate School Leaders Licensure Consortium (ISLLC) under the Council of Chief of State School Officers and the NAESP/NASSP's *Rethinking Principal Evaluation.* Principal Leadership and Practice will be measured with the CESSA Leadership rubric, which was

developed by HGEA and Unit 6 Principals. The domains focus on Principals' leadership within schools and recognize the role Principals play in fostering human relationships, school and staff capacity-building, and ultimately holding responsibility for overall school success.

Each of the five domains described on pages 10-12 are followed by the descriptors and examples of evidence that can be used to denote progress. Descriptors are the mindsets and actions that contribute to the qualitative characteristics evocative of each domain; because the remaining domains are qualitative measures of leadership, descriptors are necessary as proxies for each domain. The examples of evidence are what can be used to prove progress within each indicator and, subsequently; each domain.

## Cycle & Conferences

There is a cycle of conferences and actions necessary of both CAS and Principal in accordance with the CESSA Timeline on page 20. This includes the Pre-Evaluation Conference; the Professional Development Plan; CAS Walkthroughs and Evidence Collection; Annual Interim Evaluation and Performance Evaluation Conference.

The following visual outlines each step of the CESSA process and the roles and responsibilities therein.


- CAS & Principal review previous year's data to assess needs and opportunities
- Based on previous year's data, CAS and Principal set targets for Domain 1using CESSA Evaluation Form
- CAS & Principal discuss targets for Domains 2-6
- CAS sets date by which the Principal Professional Development Plan is due
- CESSA Form pp. 1-3


- Using the Professional Development Plan template (Appendix C), Principals should outline their goals for the following year
- Tenured principalsshould complete a 5-year PD plan
- Professional Development Plan should be aligned to goals and conversations from Pre-Evaluation Conference
- Turn in by date determined during Pre-Evaluation Conference


- CAS will conduct formal and informal observations throughout the school year; should provide formative feedback
- Principals should collect evidence aligned with PD Plan and in support of the CESSA performance standards


- Applies only to tenured principals
- Conducted each year to assess principals' progress toward goals laid out in PD Plan
- CAS and Principals should focus conversation on at least one area within each domain, to be determined during Pre-Evaluation Conference
- CAS should, in conversation with principal, complete CESSA Annual Review form


- Conducted each year for probationary and tenured/transfer principals; conducted at the end of 5-year cycle for tenured principals
- CAS should, in conversation with principal, complete the CESSA Annual Review form and determine the principal's Annual Overall Rating of Professional Leadership Performance
- From conference, identify best practices and support needed for further improvement
- CESSA Form pp. 3-11

## Evaluating and Assigning Ratings

The assignment of performance levels per domain is a process that requires careful thought and attention to evidence the CAS collects throughout the year. When assigning ratings it is important to identify the length of leadership at the school. For example, if a Principal began second semester, Domain 1, Student Educational Outcomes does not apply - only Domain 2-6.

Additionally, Principals that are being evaluated on the summative schedule have different performance level descriptors than Principals on the all other schedule. This is reflected in the CESSA rubrics and scoring tables and illustrated below:

| RATINGS FOR SUMMATIVE EVALUATIONS | RATINGS FOR YR 1-4 INTERIM EVALUATIONS |
|---|---|
| Unsatisfactory | Unacceptable Progress |
| Marginal | Minimal Progress |
| Basic | Expected Progress |
| Effective | Exceeds Expected Progress |
| Highly Effective | Exceptional Progress |

## Domain 1: Student Educational Outcomes

The school MGP and Proficiency scores from the Strive Hi Performance Index are needed to assign levels of performance for Domain 1. The CAS will identify whether the Principal has met the targets set during the Pre-Conference. The CAS will then assign a rating for Domain 1 as follows:

| Domain 1 Student Growth and Achievement | | | | |
|---|---|---|---|---|
| **Unsatisfactory** | **Marginal** | **Basic** | **Effective** | **Highly Effective** |
| Less than 2 targets met | 2 of 5 targets met | 3 of 5 targets met | 4 of 5 targets met | 5 of 5 targets met |

## Domains 2-6: Principal Leadership and Practice

Together, the CAS and Principal review the evidence collected throughout the year for Domains 2-6 and provide a performance rating using the rubric. A performance rating is required per Domain and assigned in the CESSA Form on pages 4-9 by using the dropdown menus in each domain section.

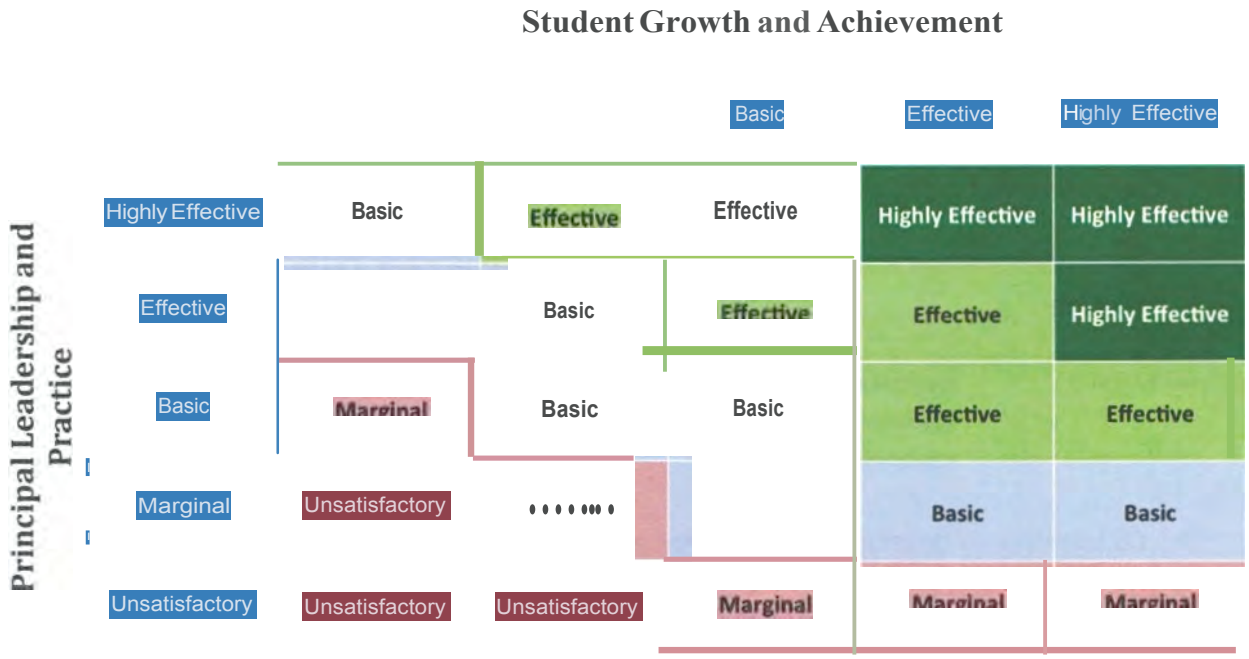
After identifyi ng the performance levels for each domain, the CAS will use the selection criteria in the Domai n 2-6 scoring rubric below to identify the overall performance for Principal Leadership and Practice.

| Domain 2-6: Principal Leadership and Practice | | | | |
|---|---|---|---|---|
| **Unsatisfactory** | **Marginal** | **Basic** | **Effective** | **Highly Effective** |
| **Unacceptable Progress** | **Minimal Progress** | **Expected Progress** | **Exceeds Expected Progress** | **Exceptional Progress** |
| U nsatisfactory or Unacceptable Progress on at least 3 Domains | Marginal or Minimal Progress on at least 2 Domains AND No more than 1 U nsatisfactory Rating | Basic or Expected Progress on at least 3 Domains AND No Rating below Marginal or Minimal Progress on any Domain | Effective or Exceeds Expected Progress on at least 3 Domains AN D No Rating Below Basic or Expected Progress on any Domain | Highly Effective or Exceptional Progress on at least 2 Domains AND No Rating Below Effective or Exceeds Expected Progress on any Domain |

Once the overall Principal Leadership and Practice rating is identified using the Domain 2-6 scoring rubric above, the CAS will select the appropriate rating from the dropdown menu on the CESSA Form page 9. The rating previously selected in Domain 1Student Educational Outcomes will automatically combine with the rating selected for Domains 2-6 Leadership and Practice to provide the final performance rating.

## Overall Performance Matrix

Once principals have performance ratings for Principal Leadership and Practice and Student Growth and Achievement categories, the overall effectiveness rating will then be determined by using the performance matrix below. The performance rating that the principal achieved according to the Domain 1Rubric (Student Growth and Achievement) will be identified in the vertical columns and will then be matched to the performance rating the principal achieved according to the Domains 2-6 Rubric (Principal Leadership and Practice) identified in the horizontal rows. The summative rating for the principal will be the performance level in the cell that is at the nexus between the two categories of CESSA.



# Appendices

**Appendix A: PROFILE OF AN EFFECTIVE SCHOOL LEADER (Updated)[13]**

The effective school leader is committed, responsible, competent, caring, and unwavering in the effort to have students reach high standards. A sense of both moral and professional commitment enables the effective school leader to promote a shared vision of service to students and to focus on the success of every learner as the desired result.

Human relationships and capacity-building within students, teachers and the wider school community are at the heart of the school leader's work. School leaders promote a school culture focused on professionalism, where school staff is committed to systematically improve their practices and student learning.

The effective school leader holds school professionals accountable for data-driven school and instructional improvement to attain the state performance standards.

The effective school leader is responsible for the following professional expectations and responsibilities:

**STANDARD 1** **Facilitating the development, articulation, implementation, and stewardship of a vision of learning that is shared and supported by all stakeholders**

- Collaboratively develop and implement a shared vision and mission.
- Collect and use data to identify goals, assess organizational effectiveness, and promote organizational learning.
- Create and implement plans to achieve goals.
- Promote continuous and sustainable improvements.
- Monitor and evaluate progress and revise plans.

[13] Based on the Educational Leadership Policy Standards: ISLLC 2008, CCSSO. The Council of Chief State School Officers

STANDARD 2 Advocating, nurturing, and sustaining a school culture and instructional program that is conducive to student learning and staff professional growth

) Nurture and sustain a culture of collaboration, trust, learning, and high expectations.

> Create a comprehensive, rigorous, and coherent curricular program.

> Create a personalized and motivating learning environment for students.

> Supervise instruction.

)- Develop assessment and accountability systems to monitor student progress.

> Develop the instructional and leadership capacity of staff.

> Maximize time spent on quality instruction.

> Promote the use of the most effective and appropriate technologies to support teaching and learning.

> Monitor and evaluate the impact of the instructional program.

STANDARD 3 Ensuring management of the organization, operation, and resources for a safe, efficient, and effective learning environment

> Monitor and evaluate the management and operational systems.

> Obtain, allocate, align, and efficiently utilize human, fiscal, and technological resources.

> Promote and protect the welfare and safety of students and staff.

> Develop the capacity for distributed leadership.

> Ensure teacher and organizational time is focused to support quality instruction and student learning.

STANDARD 4 Collaborating with faculty and community members; responding to diverse community interests and needs; and, mobilizing community resources

- Collect and analyze data and information pertinent to the educational environment
- Promote understanding. appreciation. and use of the community's diverse cultural, social and intellectual resources.
- Build and sustain positive relationships with families and caregivers.
- Build and sustain productive relationships with community partners.

STANDARD 5 Acting with integrity, fairness, and in an ethical manner

- Ensure a system of accountability for every student's academic and social success.
- Model principles of self-awareness, reflective practice, transparency, and ethical behavior.
- Safeguard the values of democracy, equity, and diversity.
- Consider and evaluate the potential moral and legal consequences of decision-making.

Promote social justice and ensure that individual student needs inform all aspects of schooling.

STANDARD 6 Understanding, responding to, and influencing the political, social, economic, legal and cultural context

- Advocate for children, families, and caregivers.
- Act to influence local, district, state, and national decisions affecting student learning.
- Assess, analyze, and anticipate emerging trends and initiatives in order to adapt leadership strategies.

## Appendix B: Philosophy of Education Hawaii's Public Schools Policy 2000

**The Premise.** The Board of Education believes that a democratic society is dependent upon the free, full growth of individuals who will participate in the creation and development of the institutions in that society. The institution of government in this society is founded on a secular base, which allows and encourages the development of a pluralistic society that contains many cultures within that society.

**The Need for Education.** Individuals must develop their personal potentials to participate fully in a democratic, multi-cultural society. Education is the process which allows individuals to become citizens who have positive attitudes toward learning and inquiry, who communicate effectively, who are guided in making choices based on critically determined and commonly shared values, who are successful in the workplace, and who practice civic responsibility. The preservation, promotion, and improvement of a democratic, multi-cultural society require the formal schooling of its children, youth and adults.

**Scope.** The State of Hawaii shall provide a public school system with a scope of curricular, instructional and assessment programs from pre-school to high school for children, youth and adults. These programs shall include traditional programs as well as programs offere through the Department's online and distance learning alternatives, summer school and other non-instructional time programs that support students' learning needs. Such programs shall be simultaneously intellectual, aesthetic, and practical, with instructional practices which insure that learners acquire the knowledge relevant to living in the present as well as the arts and skills required for living in the future. All programs shall derive from a standards-based curriculum and research-based best practices which must include the areas of knowledge of language arts, science, mathematics, social studies, fine arts, health, physical education, world languages, and career and life skills, and *all* other comprehensive support services necessary for implementation.

These programs and services shall enable all public school graduates to realize their goals and aspirations; possess the attitudes, knowledge, and skills to contribute positively to and compete in global society; exercise their rights and responsibilities of citizenship; and pursue post-secondary and/or careers without the need for remediation.

**Equal Educational Opportunity.** Students shall have an equal education opportunity to enroll in programs regardless of race, color, religion, sex, sexual orientation, disabilities, or national origin.

Former Code No. 6121
Former Policy Approved: 09/52
Reviewed: 07/60
Amended: 01/68; 09/70; 03/88; 10/94; 01/99: 06/23/05; 01/24/08

## Appendix C: Professional Development Plan

All Principals must develop a Professional Development (PD) Plan and submit to the Complex Area Superintendent after the initial Pre-Evaluation Conference. The PD plan should be a basis for open dialogue throughout to identify and discuss best practices and supports. The PD plan may be used to measure (evaluate) progress on specific goals for Domain 2-6.

DURATION—

1. List one or more Professional Development Goal(s): Target Date(s)

II. List one or more Strategies/Activities that you will implement to achieve goal(s):

| | Target Date(s) |
|---|---|
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |
| 6. | |

Ill. Reflection: Write two or more paragraphs sharing insights about your learning and leadership experiences.

Examples: Summarize impressions, recall supporting information, analyze learning, construct new learning(s).

How does this compare to what you already knew about school improvement?
What made the difference in the outcomes?
What are your thoughts about your next steps?

How will you sustain the change/improvement?

## Professional Development Plan Sample

All Principals must develop a Professional Development (PD) Plan and submit to the Complex Area Superintendent after the initial Pre-Evaluation Conference. The PD Plan should be a basis for open dialogue throughout the process to identify and discuss best practices and support. The PD plan may be used to measure (evaluate) progress on specific goals for Domain 2-6.

DURATION July 2013-June 2018

| I. List one or more Professional Development Goal(s): | Target Date(s) |
|---|---|
| *Goal 1. To increase knowledge, understanding, skills and experiences in school improvement planning and processes.* | Sy2013-2018 |

II. List one or more Strategies/Activities that you will implement to achieve goal(s):

| | Target Date(s) |
|---|---|
| 1. *Study and read research on school improvement and change.* | Sy2013-2014 |
| 2. *Attend professional development training and conferences relevant to school improvement and the change process.* | Sy2013-2014 |
| 3. *Review and reflect on school improvement plan and processes at my school.*<br>4. *How are they tied in to the school's Academic and Financial plan?* | Summer 2014 |
| 5. *Implement and lead analyses of school improvement planning-systems, structures and processes with teacher leaders at my school.* | Sy2014-2015 |
| 6. *Develop a plan for improving school improvement planning structures and processes with teacher leaders,faculty, students and School Community Council (to include professional development for teacher leaders).* | Sy2014-2015<br>Sy2015-2016 |
| 7. *Implement plans and processes.* | Sy2015-2016 (Phase I)<br>Sy2016-2017 (Phase 11)<br>SY2017-2018 (Phase Ill) |
| 8. *Review, monitor and analyze effectiveness of components of systems,structures and processes.* | Sy2015-2016 (Phase I)<br>Sy2016-2017 (Phase 1Q<br>SY2017-2018 (Phase Ill) |

III. **Reflection : Write two or more paragraphs sharing insights about your learning and leadership experiences.**

Examples. Summarize impressions, recall supporting information, analyze learning, construct new learning(s).
How does this compare to what you already knew about school improvement?
What made the difference in the outcomes?
What are you r thoughts about your next steps?
How will you sustain the change?

School Administrator's Signature _____ Date _____

CAS Signature _____ Date _____

## Appendix D: Domains 2-6 Rubrics

(Beginning on the following page)

## DOMAIN 2- PROFESSIONAL GROWTH AND LEARNING

| Descriptors | 1<br>UNSATISFACTORY | 2<br>MARGINAL | 3<br>BASIC | 4<br>EFFECTIVE | 5<br>HIGHLY EFFECTIVE |
|---|---|---|---|---|---|
| | | | | *All of Basic and...* | *All of Effective and...* |
| 2.1 Initiates professional development to improve leadership practice. | Unwilling participant in professional development or rarely initiates professional development for self. | Participates in professional development, but does not incorporate learning in own practices. | Engages in professional development to develop, expand or refine knowledge, skills and abilities.<br>Makes connections and examines relevance and applications to his/her practices and from different perspectives and | Applies knowledge, experiences and learning in new situations and changing contexts.<br>Draws upon internal and external resources to support learning and improvement | Generates professional development opportunities for self and others to build leadership capacity and to affect change in practices.<br>Leads and supports others by coaching, collaborating, presenting consulting and evaluating effectively. |
| 2.2 Reflects on leadership practices. | Does not reflect on his/her leadership practices. | Considers and reviews decisions but does not consider the 2nd and 3rd level effects of his/her decisions on others. | Analyzes and evaluates the effectiveness of his/her thinking, behaviors and decisions.<br>Considers his/her effect on others and impact on the school community. | Seeks and engages in collegial dialogue and professional learning communities | Reflects on next steps and identifies actions for continuous improvement |
| 2.3 Identifies strengths and areas for improvement. | Does not recognize areas for improvement and the need for change. | Recognizes some strengths and areas for improvement, but does not act to bring about needed change. | Clarifies, defines and increases awareness of his/her own thinking and behaviors to identify strengths and areas for improvement. | Plans for self-improvement; identifies the-- what, why , how, when and the support that is needed.<br>Acts on plan. | Continues to self-monitor progress and growth.<br>Pursues ongoing learning. |

## DOMAIN 2- PROFESSIONAL GROWTH AND LEARNING

| Descriptors | 1<br>UNSATISFACTORY | 2<br>MARGINAL | 3<br>BASIC | 4<br>EFFECTIVE | 5<br>HIGHLY EFFECTIVE |
|---|---|---|---|---|---|
| | | | | *All of Basic and...* | *All of Effective and..* |
| **2.4 Considers feedback from faculty, staff, parents, students and community/ university partners in identifying strengths iJlb neeus.** | Immediately rejects or disregards feedback from school and community. | Listens and considers feedback, but usually rejects other perspectives. | Recognizes and understands the value of multiple perspectives<br>Views feedback as an opportunity to improve performance and to learn from others. | Proactively seeks feedback and makes adjustments to Leadership Practice.<br>Uses feedback to support improvement and learning in a variety of contexts. | Proactively seeks feedback about the school's administrators, faculty, staff and the school. |
| 2.5 **Demonstrates commitment to continuous learning.** | Practices reflect satisfaction with the status quo rather than a commitment to learning and continuous improvement | Verbally expresses a commitment to continuous learning, but this is not evidenced by administrator's decisions and practices. | Demonstrates openness to continuous learning by participating in professional learning communities at the school and complex levels.<br>Allocates school resources to support continuous learning and improvement for faculty, staff and students. | Creates the conditions necessary to support a school culture that believes in and advocates continuous learning for all--nurtures collaboration, inquiry, intellectual safety; respect; and, resiliency. | Creates sustainable systems, programs and structures to support continuous learning. |

## DOMAIN 2- PROFESSIONAL GROWTH AND LEARNING

| Descriptors | 1<br>UNSATISFACTORY | 2<br>MARGINAL | 3<br>BASIC | EFFECTIVE | HIGHLY EFFECTIVE |
|---|---|---|---|---|---|
| | | | | *All of Basic and..* | *All of Effective and...* |
| 2.6 Promotes partnerships and alliances to strengthen leadership skills and practices. | Does not participate in professional activities or opportunities to enhance learning or leadership. | Limited interaction with other professional groups, all of which is not self-initiated. | Communicates an interest in establishing partnerships and alliances with professional organizations and/or affiliate organizations.<br><br>Participates in partnership events or activities to develop leadership skills and practices. | Seeks and engages in collaborative opportunities with partners and affiliates on a regular basis to deepen his/her understanding and to refine practices. | Assumes an active leadership role in professional organizations, partnerships and/or affiliate organizations. |

## DOMAIN 3- SCHOOL PLANNING AND PROGRESS

| Descriptors | 1<br>UNSATISFA CTORY | 2<br>MARGINAL | 3<br>BASIC | 4<br>EFFECTIVE | 5<br>HIGHLY EFFECTIVE |
|---|---|---|---|---|---|
| | | | | *All of Basic and…* | *All of Effective and…* |
| 3.1Develops an effective school improvement plan that is based on:<br>• A well-crafted needsassessment;<br>• Aclearly defined and inclusive process for creating the plan;<br>• A defined implementation process;and,<br>• An identified monitoring and evaluation system. | Academic/Financial plan is written in isolation without collaboration.<br><br>AFP is not aligned with the school's needs assessment<br><br>AFP goals do not show measurable outcomes.<br><br>School's initiatives and outcomes are not aligned with the AFP.<br><br>School has no monitoring system to ensure fidelity of implementation. | AFP is crafted by one individual or a small group within the school community.<br><br>AFP goals demonstrate limited growth and some measurable outcomes.<br><br>School's initiatives and outcomes are somewhat aligned to the AFP.<br><br>AFP is monitored inconsistently without utilizing a systematic process. | AFP is crafted utilizing a collaborative process that includes family, staff and the school community council.<br>AFP goals demonstrate measurable outcomes based on student growth and learning.<br><br>AFP is implemented fully with fidelity.<br><br>Administration monitors AFP progress at least quarterly with faculty, staff, and sec.<br><br>School administration makes sound data based adjustments as necessary to ensure school improvement and academic achievement | Progress on the AFP and student performance is shared with students, school faculty and staff, parents and community.<br><br>Input from student leaders,school faculty and staff, parents and community is utilized to establish priorities, goals and a vision for school improvement | Successful programs, instructional approaches and strategies are shared with feeder schools to support and build a continuum oflearning for students.<br><br>School Renewal is an expected outcome of the assessment, planning, implementation, monitoring and evaluation process. |

## DOMAIN 3- SCHOOL PLANNING AND PROGRESS

| Descriptors | 1<br>UNSATISFACTORY | 2<br>MARGINAL | 3<br>BASIC | 4<br>EFFECTIVE | 5<br>HIGHLY EFFECTIVE |
|---|---|---|---|---|---|
| | | | | *All of Basic and...* | *All of Effective and...* |
| 3.2 Identifies a networking system to actively engage all audiences of the school community and stakeholders in the school improvement process. | No identified network of shareholders outside of the immediate school community. | Somewhat identified network of shareholders that sporadically participates in the school improvement process. | Functional networking system that consistently focuses on school improvement efforts. | Broad representation of the school community and stakeholders is present and serves as a system of support. | Members of the networking system contribute their leadership, knowledge and skills to the school improvement process. |

## DOMAIN 4- SCHOOL CULTURE

| Descriptors | 1<br>UNSATISFACTORY | 2<br>MARGINAL | 3<br>BASIC | 4<br>EFFECTIVE | 5<br>HIGHLY EFFECTIVE |
|---|---|---|---|---|---|
| | | | | *All of Basic and...* | *All of Effective and...* |
| 4.1 Develops and maintains a positive school culture. | Unwillingness to acknowledge results of climate surveys and does not recognize areas of need for maintaining a positive school culture. | Gives little or no attention to needs that are identified in climate surveys (Tripod Student Survey, SQS). | Develops a positive school culture and safe learning environments. Supports curriculum, activities and programs that promote safety in multi-cultural diverse classrooms throughout the school. | Builds and sustains structures, systems and programs that promote a positive school culture. Utilizes CSSS and other data sources to conduct periodic reviews of progress and to identify areas needing adjustments. | Collaborates with all role groups to continuously improve school culture that is multi-dimensional and extends into the K-12 construct |

## DOMAIN 4- SCHOOL CULTURE

| Descriptors | 1<br>UNSATISFACTORY | 2<br>MARGINAL | 3<br>BASIC | EFFECTIVE | HIGHLY EFFECTIVE |
|---|---|---|---|---|---|
| **4.2 Sets high expectations for all the school community.** | Unwillingness to create or support high academic and behavior expectations as exhibited by frequently accepting poor academic performance and/or student behavior and fails to set high expectations or sets unrealistic goals. | Gives little or no attention to school-wide expectations for student achievement and behavior as evidenced by occasionally failing to hold students to these expectations and/or sets expectations without teacher and student input. | Sets clear expectations for student achievement and behavior with some teacher and student input | ***All of Basic and...*** Empowers teachers, staff and students to set high expectations for learning and behavior in school community and ensures the use of practices that have been proven to promote student success. | ***All of Effective and...*** Integrates school community role and partner groups into establishing and sustaining high academic and behavioral expectations for all learners. |
| **4.3 Enables teachers and students to work collaboratively and cooperatively.** | Permits a learning environment that relies on teacher-controlled classroom activities, rote learning, student compliance and learning opportunities that are disconnected from students' experiences, needs or cultures. | Tolerates a learning environment in which students are passive recipients in learning opportunities that are only peripherally connected to their experiences and cultures. | Supports a learning environment that enables teachers and students to work together collaboratively and cooperatively with some consideration to students' experiences and cultures. | Creates a personalized and motivating learning environment where teachers and students collaboratively design meaningful and relevant learning opportunities that students recognize as connected to their experiences, needs and cultures. | Nurtures and sustains a teacher-student centered culture where collaboration, trust, and high expectations create an environment whereby students engage in meaningful, relevant learning that is clearly connected to their experiences, culture and futures. |

## DOMAIN 4- SCHOOL CULTURE

| Descriptors | 1<br>UNSATISFACTORY | 2<br>MARGINAL | 3<br>BASIC | 4<br>EFFECTIVE | 5<br>HIGHLY EFFECTIVE |
|---|---|---|---|---|---|
| | | | | *All of Basic and...* | *All of Effective and...* |
| 4.4 Positively influences teachers and staff working conditions. | Little or no attention is given to developing systems, structures and processes that promote teachers and staff working conditions. | Attempts to ensure that well-defined routines and procedures are in place that address positive working conditions for teachers and staff, but does not complete the task or does so partially. | Develops and promotes well-defined routines and procedures that lead to positive working conditions. | Applies and sustains well-defined routines and procedures that promote positive working conditions AND monitors the extent to which teachers/staff perception of a positive work environment is on a regular basis. | Innovative in creating systems with all role groups that continuously improve teachers/ staff working conditions. |
| 4.5 Sets a tone that supports continuous professional learning. | Displays little or no evidence of new learning or sharing of learning with faculty and/or colleagues. | Applies and shares when required, professional learning practices within school. | Occasionally shares professional learning experiences with staff and/or colleagues but tends to rely on others to take the lead in facilitating professional development. | Personally leads professional development sessions *at various times* throughout the school year with staff and/or colleagues. | Establishes self as an active professional development presenter with staff and colleagues across the system, demonstrating with a commitment of time and intellect, the belief that continuous p_rgJ §ion!J"!<!mIQg. begins with the leader. |
| | | | | | |

## DOMAIN 5- PROFESSIONAL QUALITITES AND INSTRUCTIONAL LEADERSHIP

| Descriptors | 1<br>UNSATISFACTORY | 2<br>MARGINAL | 3<br>BASIC | 4<br>EFFECTIVE | 5<br>HIGHLY EFFECTIVE |
|---|---|---|---|---|---|
| | | | | *All of* Basic and... | *All of* Effective and... |
| 5.1Demonstrates a shared responsibility and shared vision and mission | Has a Vision and or Mission statements that may not necessarily align to the department's Strategic Plan or the school's Academic and Financial Plan. | Writes and updates the Vision and Mission statements but does not involve individuals from a variety of role groups.<br><br>Statements are generally stated and do not necessarily reflect the needs of the school or current school initiatives. | Uses a collaborative strategy to review the Vision and Mission at least annually with only a select group of individuals who may not represent a variety of role groups.<br><br>Aligns the Vision and Mission statements to the Department's and School's plans and initiatives. | Provides opportunities for rich dialogue among all school role groups to periodically and systematically review and update the Vision and Mission.<br><br>Collects and uses data to identify needs that are add ressed by the Vision and Mission statements. | Posts the Vision and Mission in the buildings and on planning documents and reports.<br><br>Uses the Vision and Mission statements as the basis for all decision making. As there is a sense of "ownership" for the Vision and Mission statements, various role group members can also articulate the Vision and Mission. |

## DOMAIN 5- PROFESSIONAL QUALITITES AND INSTRUCTIONAL LEADERSHIP

| Descriptors | 1<br>UNSATISFACTORY | 2<br>MARGINAL | 3<br>BASIC | 4<br>EFFECTIVE | 5<br>HIGHLY EFFECTIVE |
|---|---|---|---|---|---|
| | | | | *All of Basic and ...* | *All of Effective and ...* |
| S.2 Monitors and continuously improves teaching and learning. | Allows for individual teacher practice and there is no systematic curriculum or instructional practices that meet the unique needs of students.<br>Is unaware of whatis happening in the classroom and in teacher data team meetings.<br>There is no supervision of instruction. | Writesschoolcurriculum without teacher input or regard to available student performance data.<br>Visits classrooms and teacher data team meetings occasionally. Does not promote or expect best practices in all classrooms and teacher data teams. | Provides opportunities for teachers to write curriculum maps but does not systematically update them based on student data.<br>Often visits classes and participates in conferences with teachers.<br>Allows for instructional improvement opportunities as requested by individual teachers. | Assures that curriculum maps and related documen ts are current and reflect instruction in the classroom.<br>Often visits classes and participates in conferences with teachers to improve instructional practices.<br>Develops assessment and accountability system to monitor student progress and program effectiveness.<br>Develops the instructional and leadership of teachers and staff. | Models continuous improvement as a learner and shares current research as appropriate.<br>Promotes opportunities for teachers and staff to participate in action research and learning to promote best practices that meet the unique needs of students.<br>Seeks and utilizes most effective and appropriate technologies to support teaching and learning. |
| S.3 Manages the organization and systems effectively and provides resources for a safe and high performing learning | Is unaware of the allocated resources and there is no budget or plan to utilize human, fiscal and technological resources.<br>There is no planned use of resources to provide a safe and high performing learni ng environment | Isaware of the allocated resources and although there is no plan for the use of resources, the school is generally safe and high perform ing learning environment. | Utilizes and is limited to using only allocated resources to manage and operate the daily activities of the school.<br>The school is a safe and high performing learning environment | Involves teachers and staff members in systematically developing, monitoring and evaluating the management and operational systems.<br>Obtains, allocates, aligns and efficiently utilizes human, fiscal and technological resources in a planned manner. | Promotes and protects the welfare and safety of students and staff by constant progress monitoring and first hand experiences. environment<br>Develops the capacity for distributed leadership in teachers and staff.<br>Ensures teacher and organizational time is focused to support quality instruction and student learning. |

## DOMAIN 5- PROFESSIONAL QUALITITES AND INSTRUCTIONAL LEADERSHIP

| Descriptors | 1<br>UNSATISFACTORY | 2<br>MARGINAL | 3<br>BASIC | 4<br>EFFECTIVE | 5<br>HIGHLY EFFECTIVE |
|---|---|---|---|---|---|
| | | | | *All of Basic and…* | *All of Effective and…* |
| 5.4 Models integrity, fairness and high ethical standards on a consistent basis. | Prefers to use position to reward some people and to withhold favor from those who are not in agreement<br>There is no due process in decision making and people in general do as they wish until reminded otherwise.<br>Takes advantage of ones position to obtain favor from others and gives the attitude of being above the rules. | Does not always have a consistent basis for decision making.<br>Handles issues on a case by case basis which may sometimes be in conflict with stated laws, policies, rules and regulations of the department, school and classroom discipline plans. | Is aware of and complies with laws, policies, rules and regulations and occasionally refers to them to support decision making. Occasionally will make exceptions based on emotions. However, does expect others to comply with school and classroom rules with some exceptions. | Consistently applies the laws, policies, rules and regulations and appropriately balances with understanding and attention to the unique needs of others.<br>Follows the laws, policies, rules and regulations so others expect and accept decisions that are based on fairness and equity. | Ensures a system of accountability for every student's academic success.<br>Models principles of self-awareness, reflective practice, transparency, and ethical behavior.<br>Safe guards the values of democracy, equity and diversity.<br>Considers and evaluates the potential moral and legal consequences of decisions. Promotes social justice and ensures that individual student needs inform all aspects of schooling. |

## DOMAIN 5- PROFESSIONAL QUALITITES AND INSTRUCTIONAL LEADERSHIP

| Descriptors | 1<br>UNSATISFACTORY | 2<br>MARGINAL | 3<br>BASIC | 4<br>EFFECTIVE | 5<br>HIGHLY EFFECTIVE |
|---|---|---|---|---|---|
| | | | | *All of Basic and ...* | *All of Effective and...* |
| 5.5 Advocates for teachers and students. | Chooses not to "interfere" with the work of others and is unaware of what is happening in the school and the classrooms. People generally do not seek administrative support as they know they are "on their own." | Relies on teachers and students to resolve their own issues. Will be involved only if requested or required by others.<br><br>Accepts that mediocre teaching and occasional behavior issues will occur. | Establishes program and systems that promote and protect the welfare and safety of students and staff. | Ensures that teacher and organizational time is focused to support teacher success with quality instruction and student learning.<br>Establishes and monitors a behavior management system for the school and the classrooms.<br>There is a feeling of security that teachers and students are supported. | Utilizes data to continually set high expectations for teacher and student success.<br><br>Recognizes highly effective teachers, staff and students. |
| 5.6 Promotes civic responsibility. | Believes that some people are different and should be treated differently and does not use a standard for decision making.<br><br>Does not hold people responsible for their decisions or behaviors, whether right or wrong.<br><br>Keeps the school disconnected from the community and its needs. | Relies on teachers to manage their students as they see fit.<br><br>Is not involved or does not participate in activities which promote responsibility for the school or classroom or to celebrate the diversity in the school. | Has written school rules to support student responsibility to self and others.<br><br>Utilizes these rules as a basis for decisions regarding students.<br><br>Expect teachers and students to model and demonstrate responsibility to self and others. | Safeguards the values of democracy, equity and diversity by ensuring that individual student needs inform all aspects of schooling.<br><br>Openly advocates for children, families and caregivers. | Acts to influence local, district, state and national decisions affecting student learning.<br><br>Supports teachers and student involvement in civic activities. |

## DOMAIN 6- STAKEHOLDER SUPPORT AND ENGAGEMENT

| Descriptors | 1<br>UNSATISFACTORY | 2<br>MARGINAL | 3<br>BASIC | 4<br>EFFECTIVE<br>*All of Basic and…* | 5<br>HIGHLY EFFECTIVE<br>*All of Effective and…* |
|---|---|---|---|---|---|
| 6.1 Initiates and facilitates parent and community participation in school wide activities and initiatives. | Principal demonstrates a pattern of missed opportunities for engagement with parents and community. | Principal and school participate in required school community partnerships but do not seek out additional or optional opportunities. | Principal and school participate in school community partnerships provided by the community, state, and/or district | Principal arranges for and facilitates school community partnerships that support student achievement and school priorities. | Principal initiates and arranges for school-community partnerships that demonstrate highly effective support for student achievement and school, district, and state & federal priorities. |
| 6.2 Engages openly in shared problem-solving and decision making, maintaining a school culture of transparency and trust within the school community. | Principal makes most decisions in isolation. There is no evidence that there is consultation with community or staff. | Principal, faculty leadership team make most decisions, but do not include community. There may be some communication concerning decisions with school community. | Principal, faculty leadership team make most decisions and seeks advice of sec. There is established, regular communication with school community. | Students and community members are actively consulted in decisions. | Key partner organizations, and representative key community members actively participate in decision-making activities. |

## DOMAIN 6- STAKEHOLDER SUPPORT AND ENGAGEMENT

| Descriptors | UNSATISFACTORY | MARGINAL | BASIC | EFFECTIVE<br>*All of Basic and ...* | HIGHLY EFFECTIVE<br>*All of Effective and ...* |
|---|---|---|---|---|---|
| 6.3 Promotes open, effective and collaborative modes of communication with staff, families and the surrounding community. | Principal does not understand the importance or engage in open communication with staff, families and community. | Principal understands the importance of open communication with staff, families and community. There is evidence of infrequent communication. | Principal works with others to establish a system of open communication that provides regular, timely information for the school community.<br><br>Principal and staff implement communication systems that fosters dialogue and collaboration between the school faculty/ staff and individual students, parents and community members. | Communication systems support networking, collaboration and engagement of stakeholders in making important decisions.<br><br>Faculty, staff, students, families and other community members are informed about the communication systems; understand how to access information; and, believe their participation in networking, collaboration and stakeholder gatherings are important and beneficial to the school as well as to themselves. | Information is provided in different formats in multiple ways through different media to engage all members of the school community. |
| 6.4 Builds positive relationships that are culturally responsive to diverse stakeholders. | Principal considers the community and school as separate entities. | Principal acknowledges that school and community are inextricably linked. However, there is limited engagement with a few components of the school community. | Principal acknowledges that school and community are inextricably linked. There are efforts to engage all components of the school community. | Principal promotes understanding and use of the community's diverse cultural and social resources through planned activities and events that nurtures effective teaching and student learning and success for all students. | Plans and implements activities that increase positive connections with people to create an environment that supports and are valued by all components of the community. |

## Appendix E: Glossary of Terms

**Attendance Rate**
The attendance rate is the percent of students who are physically present and accounted for on regular school days in a given year.

**Chronic Absenteeism**
The chronic absenteeism rate is the percentage of students that are absent for 15 or more school days a year (excluding medical emergencies). On the Strive HI Performance System, chronic absenteeism rates fall into one of five quintiles -very low absenteeism, low absenteeism, average absenteeism, high absenteeism, very absenteeism -each of which has been assigned its own respective point value.

**College-Going Rate**
Consistent with Strive Hi, college-going rate is defined as the "total percentage of students who enrolled in any institution of higher education within 16 months of earning a regular high school diploma." The college enrollment is calculated using data provided by the National Student Clearinghouse and analyzed by Hawaii P-20. These data include records on more than 98 percent of all students in public and private U.S. institutions, including the UH system, Chaminade and Hawaii Pacific University.

**Gap Rate (Current Year)**
The current year gap rate is a comparison between proficiency rates of students in the "High-Needs" (HN) or "Non-High Needs" (NHN) student groups. The current-year gap rate is calculated by dividing the difference between the NHN and HN proficiency rates by the NHN proficiency rate ((NHN - HN)/NHN)).

**Graduation Rate**
The graduation rate measures the rate of student 9-12 completion within a four-year cohort. All states, including Hawaii, are required to calculate graduation rates using a four-year adjusted cohort rate as defined in federal 2008 regulations.

The four-year adjusted cohort graduation rate is federally defined as the number of students who graduate in four years with a regular high school diploma divided by the number of students who form the adjusted cohort for the graduating class. From the beginning of 9th grade (or the earliest high school grade), students who are entering that grade for the first time form a cohort that is "adjusted" by adding any students who subsequently transfer into the cohort and subtracting any students who subsequently transfer out, emigrate to another country, or die.

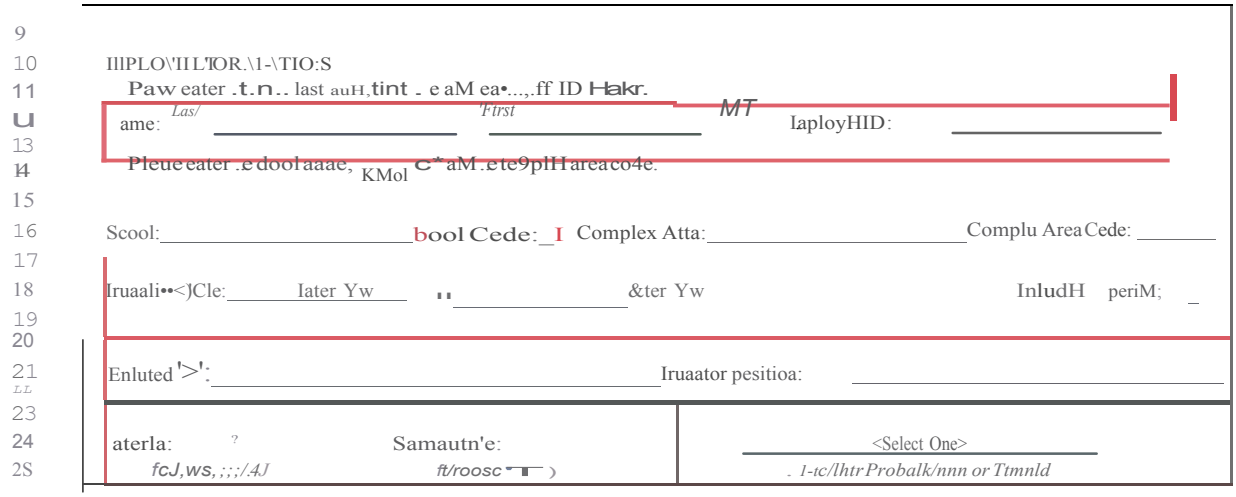
**Median Student Growth Percentile**
Growth is a measure of progress in academic achievement. The Hawaii Growth Model compares the progress of individual students on the State Assessment relative to others with a similar achievement history, known as their academic peers. This comparison is quantified as a Student Growth Percentile or SGP. The Median Student Growth Percentile is calculated by taking the individual SGPs of all the students in the school being analyzed, ordering them from lowest to highest, and identifying the middle score (the median). The Median SGP tells indicates how much growth a school's students are making as a whole.

# Appendix F: How to Use the CESSA Form

In general, either the Principal or the CAS should complete all fields labeled in blue. There are data validation rules in those fields that require digits. This will be further explained below.

## Employee Information (lines 9-25)

The Employee Information is completed by the Principal.



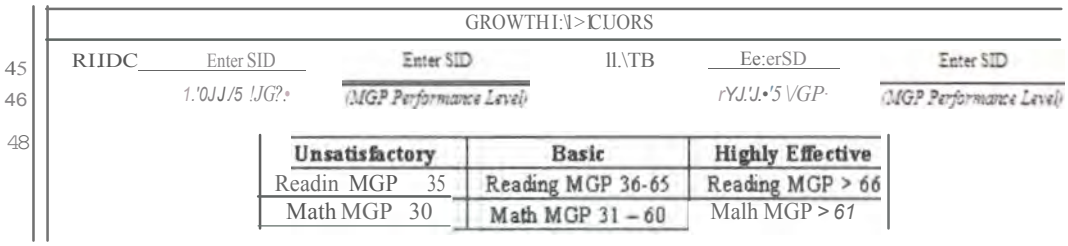

1. Enter Principal's last and first name (middle initial optional).
2. Enter Principal's Employee ID, which is an eight digit number higher than 10000000.
3. The School Code is entered by either selecting it from the dropdown menu or keyed in. The School Code will be a 3-digit number starting at 100.
   a. In the cases in which a school code is not present (examples: new schools or location changes), the CAS should request a Blank CESSA Form from OSR.
4. The Evaluation Cycle years will be identified using the drop down menu. The Evaluation Period will be entered in the mm/dd/year format
5. The Interim year number will be identified as well as whether it is a Summative evaluation.
6. Identify whether the Principal being evaluated is Probationary or Tenured.

## Pre-Evaluation Domain 1: Student Educational Outcomes (lines 37-79)

It is important to note that only Principals who have been at their campus for the majority of the academic year will be evaluated using all CESSA domains. Those who have not been at their campuses for the majority of the year will not have Domain 1 included in their evaluation.

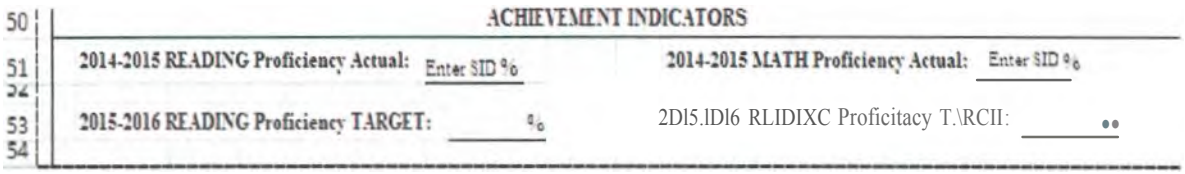
1. The date of the Pre-Evaluation Conference will be recorded under "Pre-Evaluation Conference" on line 39 by either the CAS or Principal.

2. The Growth I ndicators should be entered on line 44 using the 2014-2015 Strive HI results which should be used as a benchmark for informing current school year goal setting.



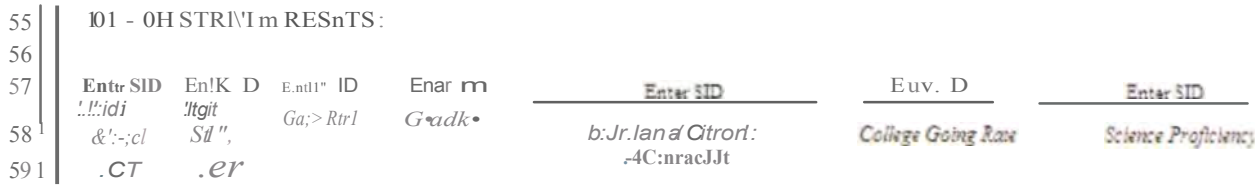

Note: The scores should pre-populate if "Enter SID" is in the cell, but if the cell is shaded blue then data will need to be entered manually.

3. The Achievement Indicators require the previous year's proficiency percentages for Reaching and Math on line 50.



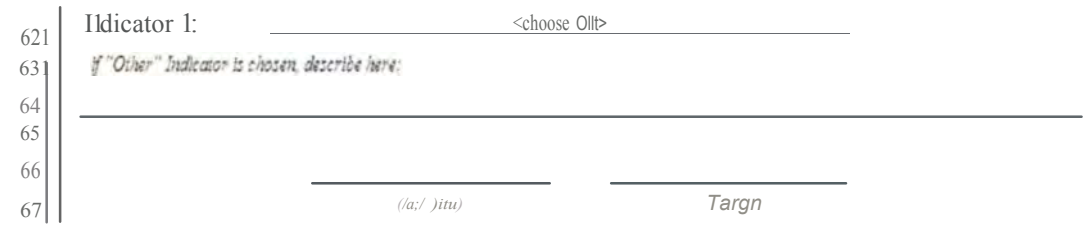

Note: The scores should pre-populate if "Enter SID" is in the cell, but if the cell is shaded blue then data will need to be entered manually.

4. The applicable 2014-2015 Strive H I Results will be entered on line 56. These scores are from the previous year and can be used in the lines below for setting targets for I ndicators 1-3.




Note: The scores should pre-populate if "Enter SID" is in the cell, but if the cell is shaded blue then data will need to be entered manually.

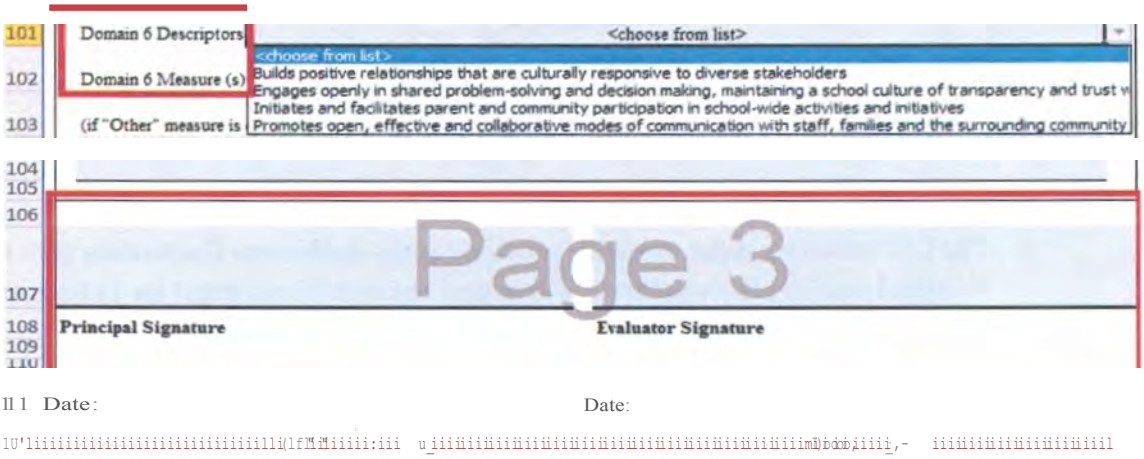
5. The Principal and CAS will collaborate to select Descriptors and Targets for Indicators 1-3. Below, in line 62, the Principal (in collaboration with the CAS) will identify the I ndicator from the dropdown menu, enter the progress from the previous year ("last year") and enter the Target for the current cycle. If "Other" is chosen from the dropdown menu, the selected indicator should be described in line 64.




## Domains 2-6: Principal Leadership Practice (lines 79-111)

The Principal will select a descriptor for each domain as well as the measures for identifying progress per descriptor from the dropdown menus. If the Principal wants to identify other measures not listed in the dropdown menus, this can be done in the space labeled "if Other measure is chosen, describe here."

The Principal and CAS will sign and this can be done electronically by typing signatures into the open cells on line 108. Principal and CAS will identify the date underneath the signature line using the mm/dd/year format.




## Evaluation Conference (lines 114-428)

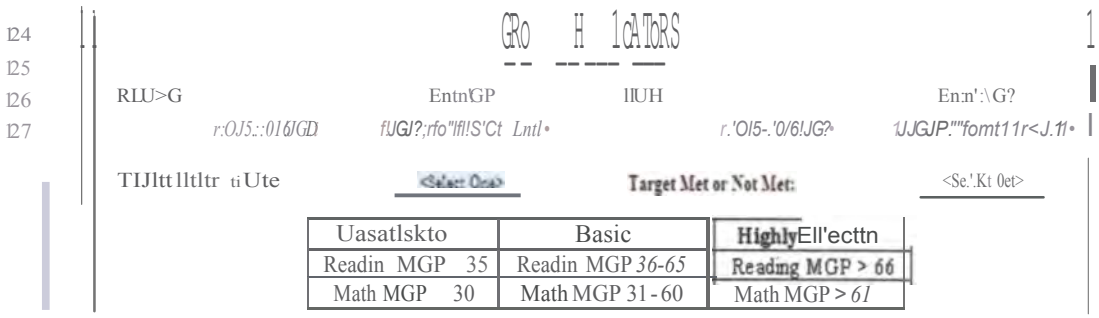
The purpose of the evaluation conference is for the CAS and Principal to meet and collaboratively analyze the evidence collected throughout the year per Domain and agree upon the corresponding performance ratings according to the CESSA Rubrics. Both CAS and Principal should bring additional evidence to conference for the purpose of enhancing and/or supporting the rubric-based conversation. If the CAS and Principal do not agree on performance ratings for certain domains, the CAS will make the final decision.

## Domain 1: Student Educational Outcomes (Lines 114-217)

1. Principal or CAS will enter the date for the Post-Evaluation Conference in the open fields on line 117. The "Interim" and "Summative" fields on line 119 will populate from the "Employee Information" section.

2. It is the responsibility of the Principal to enter the 2015-2016 school Growth Indicators on line 125.

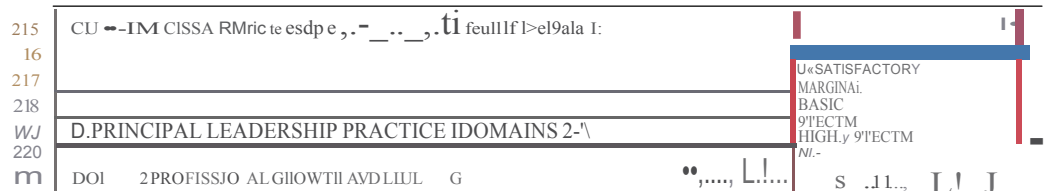
3. The CAS will identify whether the 2015-2016 Growth Indicators meet or do not meet the scoring band targets using the dropdown menu for "Met" or "Not Met" on line 129.




| Uasatlskto | Basic | HighlyEll'ecttn |
|---|---|---|
| Readin MGP 35 | Readin MGP 36-65 | Reading MGP > 66 |
| Math MGP 30 | Math MGP 31 - 60 | Math MGP > 61 |

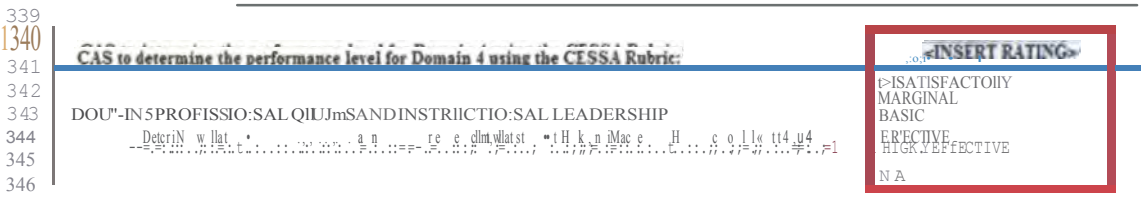
4. The CAS will discuss the evidence provided at the Evaluation Conference with the Principal and identify whether the Principal has met the target(s) for Indicators 1-3 based on the goals set during the Pre-Conference.


5. The CAS will then complete Commendations and Recommendations on lines 191-213 and assign a rating using the dropdown according to the Domain 1 rubric dropdown menu, lines 215-217:

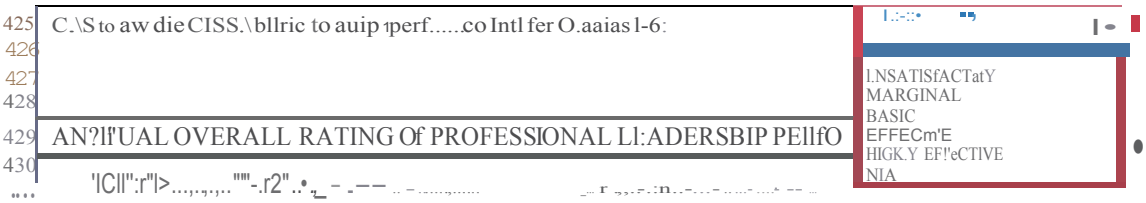



## Domains 2-6:Principal Leadership and Practice (lines 219-427)

1. The CAS will discuss the evidence provided at the Evaluation Conference with the Principal and rate the evidence for Domains 2-6 using the rubric (included in Appendix D). To do this, the CAS will select the performance rating from the dropdown menus per Domain (Domain 2: line 255; Domain 3:line 294; Domain 4: line 340; Domain 5: line 386; Domain 6: line 423).




2. After collaborating with the Principal to determine the performance level selections for each Domain (2-6), the CAS will use the ratings in combination with the Domain 2-6: Principal Leadership and Practice Rubric to make the determination of the overall performance level and make this selection in lines 425-437 using the dropdown menu.




## Annual Overall Rating of Professional Leadership Performance

The Overall Rating for CESSA (lines 429-435) will populate according to the CESSA Performance Matrix once the CAS has selected the performance levels for Domain 1:Student Educational Outcomes (lines 215-217) and Domains 2-6: Principal Leadership and Practice (lines 425-427).

429 **ANNUAL OVERALL RATING Of PR.OD:SSIONAL LL\DERSlllP PlllfOR\UN'CE:**

430

| 431 L STUDDJ.IDUC:\TIQ\L<br>432 OUTCOltIS (J)omala 1): | IL PRJXC1P1.U.U>ERSBIP<br>PRACTICE (I)etubul-6): | 0\llt.\LL R:\IDG: |
|---|---|---|
| SERT RAG> | <INSERT RATING> | INSERT RATINGS ABOVE |

435

1. The CAS should provide overall comments, commendations and recommendations to the Principal in lines 447-520.
2. The Principal should provide comments in lines 524-565.

3. Both the Principal and CAS will sign at the bottom of the form on lines 570 and 574. This can be done electronically by typing the information into the open cells. Principal and CAS will identify the date underneath the signature line using the mm/dd/year format.