STATE OF SOUTH CAROLINA

DEPARTMENT OF EDUCATION

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Grade Six Assessment Specifications for Assessment of the South Carolina College- and Career-Ready Science Standards 2021 for 2025-2026

Contents

Purpose and Use

- Provides guidelines for item writers for the state assessment
- Provides supporting key content vocabulary used in the state assessment
- Provides focused DCI/SEP/CCC targets for the state assessment
- Identifies specific state assessment limits on foundational knowledge
- Defines universal design considerations
- Provides examples of state assessment contexts for items/clusters/tasks (not exhaustible)
- Provides information on overlap with 2014 standards

Note to Teachers:

This document is intended as a guide for item developers working in and with the Office of Assessment and Standards and not as a curriculum or instructional guide. The information found within the *Grade 6 Item Specifications and Content Limits for the South Carolina College and Career-Ready Science Standards 2021* reflects the relevant terminology and content limits used to develop the items found on the state assessment.

Each item is developed using the three dimensions as set forth by the *South Carolina College- and Career–Ready Science Standards* and will assess science and engineering practices (SEPs) and crosscutting concepts (CCCs) and the Disciplinary Core Ideas (DCIs) found in
A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas."

Required field-test item characteristics:

- CCC, DCI, and SEP within one item (3D).
- DCI and CCC **or** a DCI and SEP within one item (2D).
- 2D items may not assess a CCC and SEP within a single item.
- Items may not assess any single dimension.
- Stimulus sets will be 3D, meaning that within the body of items associated with that stimulus, all three dimensions will be assessed.

"**Can**", "**could,**" "**e.g.,**" and "**may**" are terms that infer information that is **not exhaustive.**

Acknowledgement:

Office of Assessment and Standards science team greatly appreciates the input received from the committee members of the June SCPASS Grades Four and Six Biology Alignment Study and the Summer 2022 Content Review Committees, and the Grade 6 Item Specification and Performance Target Review Committee.

Specification Updates for 2025-2026 (All revisions are highlighted)

General note:
Terminology that could be used in this document may apply to more than one PE. If it is a listed term, students are expected to be able to use and apply the term in any context.

6-PS4-2 (pp. 8-9)
Added terminology:

- behavior
- opaque (G4)
- property
- seismic waves
- translucent (G4)

Students are expected to know that refraction occurs when the speed of a light wave changes as it passes through different media.

Seismic waves may be used as a context, but student are not expected to identify/ compare primary waves, secondary waves, and surface waves or describe/explain how these waves travel through Earth.

6-LS1-3 (p. 12)
Added terminology:

- organelle

6-LS1-8 (p. 14)
Added terminology

- innate
- learned

6-ESS2-1 (pp. 17-18)
Added terminology:

- cooling

Added "cooling" to the pathway for igneous rock so it reads, "cooling and crystallization."

6-ESS2-5 (pp. 23-24)
Added terminology:

- barometric pressure
- millibar (mb)

Atmospheric/barometric pressure is expressed qualitatively (e.g., high, low, etc.) or quantitatively (mb) if it is included in a table or in a context where quantification is necessary.
Note: This has been removed from the "may not require" section of this PE.

6-ESS2-6 (p. 26)
The Coriolis effect, thermohaline circulation, and density of water can be used within a broader context of a stimulus, but items do not require students to provide answers related to the dynamics of these phenomena. When needed, an explanation of these is provided within the stimulus.

Matter and Its Interactions

6-PS1-4

Develop and use 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.
State Assessment Boundary: The use of mathematical formulas is not required.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 6 Science that directly measure 6-PS1-4 and **not** to any other Performance Expectation.

DCI: 6-PS1.A.1-3 / 2°6-PS3.A.1-4 **SEP:** 6-II.a **CCC:** 6.CE.1

Phenomenon-Related Terminology That Could Be Used in Items or Item Clusters Specific to This Performance Expectation

- atom
- boil
- condense
- evaporate
- freeze
- gas
- inert
- kinetic energy
- liquid
- matter
- melt
- molecule
- particle
- particle motion
- phase
- phase change
- pressure
- pure substance
- solid
- system
- temperature
- thermal energy
- vapor

6-PS1-4 On the state assessment, items may not require students to:

- demonstrate knowledge of plasma as one of the states of matter,
- demonstrate knowledge of deposition or sublimation,
- demonstrate knowledge of the terms "closed systems" or "open systems,"
- factor in mass as it relates to thermal energy (in scenarios comparing two different substances, assume equal mass),
- use mathematical formulae, or
- use model components at sub-atomic scales.

6-PS1-4 For state assessment purposes:

- Kinetic energy will be expressed in quantitative terms (e.g., greater, less, etc.).
- The terms atoms, molecules, or particles could be used, but a term will be used consistently within an item, a cluster, or a stimulus set.
- Thermal energy will be expressed in quantitative terms (e.g., greater, more, less, etc.).
- Item may require students to explain how molecular collisions affect pressure in a system

Energy

6-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 polystyrene foam cup.

State Assessment Boundary: Assessment does not include calculating the total amount of thermal energy transferred.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 6 Science that directly measure 6-PS3-3 and **not** to any other Performance Expectation.

DCI: 6-PS3.A.5 / 6-PS3.B.1,2 / 6.ETS.A.1,2 / 6.ETS1.B.1,2 **SEP:** 6-VI.a **CCC:** 6.EM.1

Phenomenon-Related Terminology That Could Be Used in Items or Item Clusters Specific to 6-PS3-3

- absorption
- conduction
- conductor/conductivity
- constraint
- convection
- criterion/criteria
- fluid
- heat
- heat transfer
- infrared light
- insulate/insulator
- kinetic energy
- radiation
- reflect/reflectivity
- retain/retention
- solar energy
- visible light
- temperature
- thermal energy
- thermometer

6-PS3-3 On the state assessment, items may not require students to:

- calculate kinetic energy,
- calculate the total amount of thermal energy transferred,
- convert units (i.e., within metric system, time units, temperature scales),
- demonstrate knowledge of "joule" and "joule/second,"
- demonstrate knowledge of the term "vacuum," and/or
- identify angle of reflection.

6-PS3-3 For State Assessment Purposes

- Constraints in the design process are limited to cost, materials, safety, and time.
- Designs/devices/solutions are limited to the maximization or minimization of the transfer of heat energy.
- Heat transfer will be expressed in quantitative terms (e.g., more, less, faster, slower, etc.).
- Kinetic energy will be expressed in quantitative terms (e.g., greater, less, etc.).
- Temperature will be (e.g., cooler, warmer, etc.) expressed in quantitative terms or quantitatively in units (°C).
- Thermal energy will be expressed in quantitative terms (e.g., more, less, etc.).

6-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.
State Assessment Boundary: Assessment does not include calculating the total amount of thermal energy transferred.*

*The State Assessment Boundary applies only to items developed for SC READY Grade 6 Science that directly measure 6-PS3-4 and **not** to any other Performance Expectation.

DCI: 6-PS3.A.6,7 / 6-PS3.B.1 **SEP:** 6-III.a **CCC:** 6.SPQ.1

Phenomenon-Related Terminology That Could Be Used in Items or Item Clusters Specific to This Performance Expectation

- conduction
- controlled variable
- dependent variable
- heat
- independent variable
- initial
- kinetic energy
- matter
- mass
- newton (N)
- particle
- proportional
- rate
- ratio
- temperature
- thermal energy
- time
- variable
- volume

Note: At this grade level, mass and weight are distinguished.

6-PS3-4 On the state assessment, items may not require students to:

- calculate thermal energy transfer
- calculate the kinetic energy of particles of matter;
- demonstrate knowledge of the mathematical application of rate, ratio, or proportion;
- convert between temperature scales;
- demonstrate knowledge of the term "sublimate," or
- refer to the term joule (J) unless defined in the context of the item.

6-PS3-4 For state assessment purposes:

- Items could include the use of graduated cylinders, thermometers, and balances.
- less, more Mass will be expressed in quantitative terms (e.g.,) or quantitatively in units (i.e., g, kg).
- Students are required to know the difference between a variable and a unit.
- Temperature will be expressed in quantitative terms (e.g., higher, lower) or quantitively in units (°C).
- Thermal energy will be described qualitatively (e.g., less, more, greater).
- Time will be described quantitatively (e.g., longer, shorter) or quantitively (i.e., s, m, h).
- Volume will be described qualitatively (e.g., more, less) or quantitatively (i.e., mL, L).

Waves and Their Applications in Technologies for Information Transfer

6-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.

State Assessment Boundary: Assessment is limited to qualitative applications pertaining to light and mechanical waves. *

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 6 Science that directly measure 6-PS4-2 and **not** to any other Performance Expectation.

DCI: 6-PS4.A.1 / 6-PS4.B.1-4 **SEP:** 6-II.b **CCC:** 6.SF.1

Phenomenon-Related Terminology That Could Be Used in Items or Item Clusters Specific to This Performance Expectation

- absorption
- amplitude
- barrier
- bend
- behavior
- brightness
- color
- color filter
- echo
- electromagnetic wave
- frequency
- lens
- light wave
- mechanical wave
- medium/media
- mirror
- opaque
- path
- prism
- propagate
- property
- ray
- ray diagram
- reflection
- refraction
- seismic waves
- sound wave
- transmit
- translucent
- transparent
- vibration
- visible light spectrum
- wave
- wavelength

Note: The term "matter wave" is incorrectly used in the last foundation statement under "PS4.B." This term should be "mechanical wave" and should replace any occurrence of "matter wave," specifically in DCI foundation statement PS4.) and on page 138 in the K-12 Framework.

6-PS4-2 On the state assessment, items may not require students:

- calculate or identify wave speed,
- demonstrate knowledge of diffraction,
- demonstrate knowledge of interference,
- differentiate concave and convex lenses,
- identify angles of incidence or reflection, and/or
- quantify amplitude, frequency, or wavelength.

(Continued on next page.)

6-PS4-2 For State Assessment Purposes

- Amplitude will be expressed in quantitative terms (e.g., higher, lower, etc.).
- Frequency will be expressed in quantitative terms (e.g., greater, less, etc.).
- Wavelength will be expressed in quantitative terms (e.g., longer, shorter, etc.).
- Lenses, prisms, mirrors could be used in items and item clusters.
- Refraction will be referred to as "bending" of light waves.
- Ray diagrams will be used to model light behavior.
- Students are expected to know that refraction occurs when the speed of a light wave changes as it passes through different media.
- Sound waves, water waves, and seismic waves are the only type of mechanical waves that will be used.
    - Note: Seismic waves may be used as a context, but student are not expected to identify/ compare primary waves, secondary waves, and surface waves or describe/explain how these waves travel through Earth.
- Wave properties are limited to amplitude, frequency, and wavelength.

From Molecules to Organisms: Structure and Function

6-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 up of at least one cell, distinguishing between living and non-living things, and understanding that living things may be made up of one cell or many and varied cells.

State Assessment Boundary: Assessment does not include identification of specific cell types
and should emphasize the use of evidence from investigations.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 6 Science that directly measure 6-LS1-1 and **not** to any other Performance Expectation.

DCI: 6-LS1.A.1,2 **/** 6-ETS2.A.1 **SEP:** 6-III.b **CCC:** 6.SPQ.2

Phenomenon-Related Terminology That Could Be Used in Items or Item Clusters Specific to This Performance Expectation

- cell
- growth
- hand lens
- magnification
- microscope
- organism
- reproduce
- unicellular
- waste

6-LS1-1 On the state assessment, items may not require students to:

- demonstrate knowledge of meiosis or mitosis;
- demonstrate knowledge of slide preparation (histological) techniques;
- demonstrate knowledge of protein synthesis or the functions of proteins;
- identify specific cell types (i.e., eukaryote versus prokaryote, cells of specialized tissues
  or organs);
- identify cellular mechanisms/processes necessary for homeostasis;
- identify the structure or function of DNA;

6-LS1-1 For state assessment purposes:

- A variety of organisms—unicellular, multicellular—could be used in any item or stimulus.
- A variety of variables (e.g., presence of cells, production of waste, growth, reproduction, etc.) could be used as a context in an item or stimulus.

6-LS1-2
Develop and use a model to describe the function of a cell as a whole and ways the parts of the cell 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.
State 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.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 6 Science that directly measure 6-LS1-2 and **not** to any other Performance Expectation.

DCI: 6-LS1.A.3 **SEP:** 6-II.b **CCC:** 6.SF.2

Phenomenon-Related Terminology That Could Be Used in Items and Item Clusters Specific to This Performance Expectation

- active transport
- animal cell
- carbon dioxide
- cell
- cell membrane
- cell wall
- cellular respiration
- chloroplast
- diffusion
- energy
- eukaryote
- homeostasis
- mitochondrion
- nucleus
- osmosis
- oxygen
- organelle
- photosynthesis
- plant cell
- sugar

6-LS1-2 On the state assessment, items may not require students to do any of the following:

- demonstrate knowledge of
    - active and passive transport
    - the role the cell wall plays in diffusion/osmosis
    - meiosis or mitosis
    - the phospholipid bilayer,
    - prokaryotes,
- demonstrate knowledge of protein synthesis,
- demonstrate knowledge of the term "glucose,"
- demonstrate knowledge of carbohydrates, lipids, nucleic acids, or carbohydrates;
- differentiate the types of diffusion, or
- identify the structure or function of DNA.

6-LS1-2 For state assessment purposes:

- Molecules that can move across the cell membrane are limited to carbon dioxide, sugar, oxygen, and water.
- Use "sugar" when referring to glucose.

6-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.
State Assessment Boundary: Assessment does not include the mechanism of one body system independent of others or individual organs and structures. Assessment is limited to the circulatory, excretory, digestive, respiratory, muscular, skeletal, and nervous systems and is limited to the interdependence of the body systems.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 6 Science that directly measure 6-LS1-3 and **not** to any other Performance Expectation.

DCI: 6-LS1.A.4 **SEP:** 6-VII.a **CCC:** 6.SSM.1

Phenomenon-Related Terminology That Could Be Used in Items and Item Sets Specific to This Performance Expectation

- anatomy
- cell
- hierarchal organization
- organelle
- organ
- organ system
- subsystem
- tissue

6-LS1-3 On the state assessment, items may not require students to:
- demonstrate knowledge of body systems beyond those listed in the state assessment boundary,
- demonstrate knowledge of individual organs or the functions of individual organs in isolation, or
- demonstrate knowledge of one body system independent of another.

6-LS1-3 For state assessment purposes:
- assessable organ systems and interactions are found in the table titled *Assessable Organ Systems and Interactions*.
- only multicellular organisms will be used in items, clusters, and tasks.

(Continued on next page.)

Assessable Organ Systems, Components, Functions, and Interactions

Organ System	Interactions
circulatory	• works with the muscular system to pump blood • works with the respiratory system to oxygenate blood and remove carbon dioxide • works with the digestive system to provide water and nutrients to the body • works with the excretory system to remove excess water and waste
digestive	• works with the muscular system to breakdown and push food through the digestive tract • works with the circulatory system to breakdown food for uptake into the bloodstream and absorption into the cells
excretory	• works with the circulatory system to remove excess water and cellular waste material • uses components of the digestive and respiratory systems to expel waste from the body
muscular	• works with the circulatory system to pump blood • works with the digestive system to move food through the digestive tract • works with the excretory system to move waste out of the body • works with the respiratory system to pull and push air into and out of the body • works with the skeletal system for support and movement
nervous	• works with all the organ systems to control functions necessary for live and allows the organism to perceive their environment
respiratory	• works with the muscular system to bring air into the body and to expel air from the body • works with the circulatory system to bring oxygen into the body and release carbon dioxide from the body
skeletal	• works with the nervous system to promote movement • works with the circulatory system by manufacturing blood cells • works with the digestive system by storing important minerals needed for normal body function

6-LS1-8

Performance Expectation: Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

Clarification Statement: Examples of stimulus and sensory receptor pairings include electromagnetic stimuli (light intensity and color) are received by the eye; mechanical stimuli (sound waves) are received by the hair cells of the inner ear; mechanical stimuli (pressure) are received by the skin; and chemical stimuli (food) are received by the various taste buds.

State Assessment Boundary: Assessment does not include identifying specific structures of the brain or mechanisms for the transmission of this information.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 6 Science that directly measure 6-LS1-8 and **not** to any other Performance Expectation.

DCI: 6-LS1.D.1,2 **SEP:** 6-VIII.a **CCC:** 6.CE.1

Phenomenon-Related Terminology That Could Be Used in Items and Item Clusters Specific to This Performance Expectation

- auditory receptors
- behavior
- brain
- chemical stimulus
- ear
- electromagnetic stimulus
- environment
- eye
- fell
- hear
- heat
- innate
- learned
- light
- mechanical stimulus
- memory
- nerve cells
- nose
- odor
- reflexes
- sense
- sensory receptor
- sensory input
- sight/vision
- spinal cord
- skin
- sound
- stimulus/stimuli
- system
- taste
- temperature
- tongue
- touch
- visible

6-LS1-8 On the state assessment, items may not require students to:

- identify any sensory structures other than those listed above,
- identify the mechanisms for the transmission of sensory information,
- identify responses to environmental stimuli by plants, or
- identify the structures of the brain.

6-LS1-8 For state assessment purposes:

- Human and other animal responses could be used in items and stimulus sets.

Place in the Universe

6-ESS1-4

Performance Expectation: 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 analysis of rock formations and the fossils they contained to establish relative ages of major events in Earth's history. Scientific explanations
can include models to study the geologic time scale.

State Assessment Boundary: Assessment does not include recalling the names of specific periods or epochs and events within them.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 6 Science that directly measure 6-ESS1-4 and **not** to any other Performance Expectation.

DCI: 6-ESS1.C.1,2 **SEP:** 6-VI.b **CCC:** 6.SPQ.3

Phenomenon-Related Terminology That Could Be Used in Items and Clusters Specific to This Performance Expectation

- asteroid/meteorite impact
- cross-cutting relationships
- extinction
- fault
- fossil
- fossil record
- geologic time scale
- impact crater
- lava flow
- mountain range
- ocean basin
- relative dating
- rock strata
- sediment
- sedimentary rock
- stratigraphic column
- superposition
- volcano
- volcanic eruption
- weathering

6-ESS1-4 On the state assessment, items may not require students to:

- identify/recall:
  - events, names, or date ranges of specific periods or epochs on the geologic time scale;
  - the different types of fossils and processes by which fossils form; or
  - the names of geologic formations (e.g., Rocky Mountains, Chicxulub).

(Continued on next page.)

6-ESS1-4 For State Assessment Purposes

- Names of major geologic events and formations may be used in context.
- Names of periods in the geologic time scale may be used in context, and always within the eras in which these appear.
- Students are expected to understand how to apply the principles of geology (i.e., cross-cutting relations, superposition) and demonstrate an understanding of how these principles help explain relative ages of fossils and rock strata.
- Students can be required to identify the eras (i.e., Paleozoic, Mesozoic, Cenozoic) in which specific geologic events occur.

Earth's Systems

6-ESS2-1

Performance Expectation: 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 process of melting, crystallization, weathering, deformation, and sedimentation, which act together to form minerals and rocks through the cycling of Earth's materials.

State Assessment Boundary: Assessment does not include the identification and naming of minerals.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 6 Science that directly measure 6-ESS2-1 and **not** to any other Performance Expectation.

DCI: 6-ESS2.A.1,2 **SEP:** 6-II.b **CCC:** 6.EM.2

Phenomenon-Related Terminology That Could Be Used in Items and Clusters Specific to This Performance Expectation

- basalt
- cementation
- cooling
- compaction
- conduction
- convection
- crystallization
- deformation
- deposition
- erosion
- granite
- igneous rock
- limestone
- mantle
- marble
- melting
- metamorphic rock
- metamorphism
- mineral
- pathway
- quartzite
- sandstone
- radiation
- rock
- rock cycle
- sediment
- sedimentary rock
- shale
- slate
- solar energy
- thermal energy
- weathering
- uplift

6-ESS2-1 On the state assessment, items may not require students to:

- classify or name minerals;
- describe the process of convection;
- differentiate extrusive and intrusive igneous rock; or
- identify mineral composition of rocks.

(Continued on next page.)

6-ESS2-1 For State Assessment Purposes

- Energy inputs are limited to the radiation of solar energy and heat from Earth's interior driving mantle convection.
- Knowledge of types of rocks are within the classifications is limited to basalt, granite, shale, sandstone, limestone, marble, quartzite, and slate.
- Items may require students to explain the roles of gravity and solar energy on the rock cycle.
- The pathways (steps) of the rock cycle are identified as cooling and crystallization, melting, metamorphism (heat and pressure), and weathering-erosion-deposition-compaction and cementation.

6-ESS2-2
Performance Expectation: 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.
State Assessment Boundary: Assessment does not include identification or naming of specific events.

♦The State Assessment Boundary applies **only** to items developed for SC READY Grade 6 Science that directly measure 6-ESS2-2 and **not** to any other Performance Expectation.

DCI: 6-ESS2.A.3 / 6-ESS2.C.1 **SEP:** 6-VI.b **CCC:** 6.SPQ.3

Phenomenon-Related Terminology That Could Be Used in Items and Clusters Specific to This Performance Expectation

- asteroid/meteorite impact*
- cave
- compression
- converge
- deposition
- diverge
- earthquake
- erosion
- folding
- ice
- impact crater♦
- landslide
- lava
- mountain range
- plate boundary
- plate tectonics
- subduction
- tension
- uplift
- volcano
- weathering

♦*Note: In the Clarification Statement, the term "meteor impacts" is incorrect. Meteors do not impact a surface. This use of "meteor" also occurs in the in the K-12 Framework (pp. 177,190). Replace occurrences of "meteor" when referred to as an object hitting Earth's surface with "asteroid" or "meteorite." The landform created by this event is called an "impact crater".*

6-ESS2-2 On the state assessment, items may not require students to:

- demonstrate knowledge of the term "geochemical reaction;"
- demonstrate knowledge of the term "spatial scale;" or
- identify/recall any specific geologic event.

(Continued on next page.)

6-ESS2-2 For State Assessment Purposes

- "Spatial scale" will be referred to as "global" or "local."
- The term "specific event" is defined as any named geologic occurrence (e.g., units of geologic time, geologic catastrophes, extinctions, etc.).
- To describe a feature caused by the impact of a space object, use the term "impact crater."

6-ESS2-3
Performance Expectation: Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and sea floor 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), the locations of ocean structures (such as ridges, fracture zones, and trenches), and the prevalence of earthquake and volcanoes along plate boundaries.
Assessment Boundary: Paleomagnetic anomalies in oceanic and continental crust are not assessed.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 6 Science that directly measure 6-ESS2-3 and **not** to any other Performance Expectation.

DCI: 6-ESS2.B.1-3 / 6-ETS2.A.2 **SEP:** 6-IV.a **CCC:** 6.P.1

Phenomenon-Related Terminology That Could Be Used in Items and Clusters Specific to This Performance Expectation

- continent
- continental crust
- continental shelf
- converge
- deep-sea trench
- diverge
- earthquake
- fossil
- fracture zone
- hotspot
- igneous rock
- metamorphic rock
- mid-ocean ridge
- oceanic crust
- plate boundary
- plate tectonics
- seafloor spreading
- seafloor structure
- sedimentary rock
- subduction (zone)
- uplift
- volcanic island arc
- volcanic rock
- volcano

6-ESS2-3 On the state assessment, items may not require students to:
- analyze and interpret data/information related to paleomagnetism;
- distinguish between "causation" and "correlation," (these specific terms-above grade level);
- distinguish the characteristic types of volcanoes at plate boundaries; or
- identify abyssal plains, guyots and seamounts.

6-ESS2-3 For State Assessment Purposes
- Graphs, images, maps, and tables are used to provide information.
- Volcanic island arcs are islands along deep-sea trenches.

(Continued on next page.)

6-ESS2-4
Performance Expectation: Develop a model to describe this cycling of water through Earth's systems driven by energy from the Sun and 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: Assessment does not include a quantitative understanding of the latent heats of vaporization and fusion.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 6 Science that directly measure 6-ESS2-4 and **not** to any other Performance Expectation.

DCI: 6-ESS2.C.2,3 **SEP:** 6-II.c **CCC:** 6.EM.2

Phenomenon-Related Terminology That Could Be Used in Items Specific to 6-ESS2-4

- atmosphere
- cloud
- condensation
- crystallization
- evaporation
- fog
- frost
- glacier
- gravity
- groundwater
- ice
- ice sheet
- landform
- pathway
- precipitation
- solar energy
- snow
- temperature
- transpiration
- water
- water cycle
- water vapor

6-ESS2-4 On the state assessment, items may not require students to:

- demonstrate a quantitative understanding of the latent heats of vaporization and fusion.

6-ESS2-4 For state assessment purposes

- none identified

6-ESS2-5
Performance Expectation: Analyze and interpret data to provide evidence for how the motions and complex interactions of air masses result 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 overtime, 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).
State Assessment Boundary: Assessment does not include recalling the names of cloud types or weather symbols used on maps or the reported diagrams from weather stations.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 6 Science that directly measure 6-ESS2-5 and **not** to any other Performance Expectation.

DCI: 6-ESS2.C.4 / 6-ESS2.D.1 **SEP:** 6-IV.a **CCC:** 6.CE.1

Phenomenon-Related Terminology That Could Be Used in Items and Clusters Specific to This Performance Expectation

- air mass
- air pressure
- altitude
- anemometer
- atmosphere
- atmospheric pressure
- barometer
- barometric pressure
- cold front
- condensation
- density
- evaporation
- gravity
- hail
- humidity
- hygrometer
- millibar (mb)
- jet stream
- precipitation
- probability
- sling psychrometer
- temperature
- thunderstorm
- tornado
- warm front
- weather/wind vane
- wind
- wind direction
- wind speed

6-ESS2-5 On the state assessment, items may not require students to:

- express density quantitively,
- express temperature as it relates to weather solely in the Fahrenheit scale,
- express wind speed in metric units,
- include the use of isobars or isotherms on weather maps,
- require students to calculate absolute or relative humidity,
- require students to identify cloud types,
- recall weather symbols,
- use the term occluded front or stationary front, or
- use surface/weather station reports or the related symbols.

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6-ESS2-5 For state assessment purposes:

- Students should understand that air pressure, atmospheric pressure, and barometric pressure are the same thing.
- Air pressure, atmospheric pressure, and barometric pressure will be used consistently throughout an item or stimulus set.
- Air/atmospheric/barometric pressure is expressed in quantitative terms (e.g., high, low, etc.) or quantitively in units (mb).
- Assessment is limited to the weather occurring at the interfaces of air masses.
- Density is expressed in quantitative terms (e.g., more, less, etc.).
- Dewpoint is referred to as "the temperature at which water condenses."
- Humidity is expressed in quantitative terms or (e.g., higher, lower, etc.) or quantitatively in units (%),
- Probability is expressed in quantitative terms (e.g., likely, unlikely, etc.).
- Students should understand the tools of weather measurement (i.e., anemometer, barometer, hygrometer, sling psychrometer, thermometer, and weather/wind vane).
- Temperature is expressed qualitatively (e.g., cool, warm, etc.) or qualitatively (°C).
- Wind speed is expressed in quantitative terms (e.g., high, low, etc.) or quantitatively in units (m/s).

6-ESS2-6
Performance Expectation: Develop and use models 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 patterns of global and regional climate that vary due to atmospheric circulation, oceanic circulation, and geographic land features.
State Assessment Boundary: Assessment does not include the dynamics of the Coriolis Effect, thermohaline circulation, or the role of density.*

The State Assessment Boundary applies **only** to items developed for SC READY Grade 6 Science that directly measure 6-ESS2-6 and **not** to any other Performance Expectation.

DCI: 6-ESS2.C.5 / 6-ESS2.D.2-4 **SEP:** 6-II.a **CCC:** 6.SSM.2

Phenomenon-Related Terminology That Could Be Used in Items and Clusters Specific to This Performance Expectation

- air current
- altitude
- atmosphere
- atmospheric circulation
- atmospheric pressure
- climate
- coastal region
- condensation
- continent
- continental climate
- convection
- current
- equator
- evaporation
- fluid
- freshwater
- humidity
- ice
- landform
- latitude
- marine climate
- oceanic circulation
- ocean current
- prevailing wind
- polar zone
- precipitation
- rotation
- salinity
- solar energy
- temperate zone
- temperature
- thermal energy
- tropical zone
- water cycle
- wind

6-ESS2-6 For the state assessment, items may not require students to:

- calculate absolute or relative humidity,
- explain the dynamics of atmospheric or ocean currents with reference to density,
- explain the dynamics of oceanic currents with reference to thermohaline factors,
- explain the global movement of atmospheric or ocean currents based on the Coriolis effect,
- express atmospheric pressure quantitatively,
- identify cloud types
- identify or recall the names of the global winds,
- identify or recall the Tropics of Cancer and Capricorn,
- reference density, or
- use the term "air pressure or barometric pressure" when referring to atmospheric pressure.

6-ESS2-6 For state assessment purposes:

- Any ocean current could be referenced in an item.
- Atmospheric/barometric pressure is expressed in quantitative terms (e.g., low, high, etc.) or quantitatively in units (mb).
- Humidity will be expressed in quantitative terms (e.g., higher, lower, etc.) or quantitatively in units (%).
- Temperature is expressed qualitatively (e.g., cool, warm, etc.) or qualitatively (°C).
- Wind speed will be expressed quantitative terms (e.g., high, low, etc.) or qualitatively in units (m/s).
- The Coriolis effect, thermohaline circulation, and density of water can be used within a broader context of a stimulus, but items do not require students to provide answers related to the dynamics of these phenomena. When needed, an explanation of these is provided within the stimulus.

Earth and Human Activity

6-ESS3-2

Performance Expectation: Analyze and interpret data on natural hazards to identify patterns, which help forecast future catastrophic events and inform the development of technologies to mitigate their effects.

Clarification Statement: 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).

State Assessment Boundary: None

DCI: 6-ESS3.B.1,2 / 6-ETS2.B.1 **SEP:** 6-IV.b **CCC:** 6.P.2

Phenomenon-Related Terminology That Could Be Used in Items and Clusters Specific to This Performance Expectation

- ashfall
- atmospheric pressure
- catchment
- drought
- earthquake
- earthquake magnitude
- flood
- frequency
- humidity
- hurricane
- lahar (volcanic mudslide)
- lava flow
- levee
- liquefaction
- mass wasting
- natural hazard
- prediction
- pyroclastic flow
- reservoir
- satellite
- seismograph
- severe weather
- storm surge
- thunderstorm
- tropical storm
- tsunami
- volcanic eruption
- wildfire

6-ESS3-2 On the state assessment, items may not require students to:

- distinguish between "causation" and "correlation;"
- identify the different types of earthquake magnitude;
- identify named hurricane events (e.g., Hugo, Katrina); or
- identify specific types or names of volcanoes (e.g., shield volcano, stratovolcano, Mount St. Helens, Vesuvius).

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6-ESS3-2 For state assessment purposes:

- Assessable natural hazards include drought, earthquake, flood, hurricane, thunderstorm, tornados, tsunami, volcanic eruption, and wildfire, but the focus on natural hazards is on those that have occurred or are most likely to occur in South Carolina (i.e., earthquake, flood, hurricane, thunderstorms, tornado, and wildfire).

Grade 6 Condensed Disciplinary Core Idea Statements

The information below contains the specific Disciplinary Core Idea foundation statements for Grade 6 as found in the *South Carolina College- and Career-Ready Science Standards 2021*.

6-PS1: Matter and Its Interactions

6-PS1.A—Structure and Properties of Matter

1. Gases and liquids are made of molecules or inert atoms that are moving about relative to each other. (6-PS1-4)
2. In a liquid, particles molecules are constantly in contact with others; in a gas, particles they are widely spaced except when they collide. In a solid, particles (atoms, molecules) are closely spaced and may vibrate in position but do not change relative positions. (6-PS1-4)
3. The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (6-PS1-4)
4. 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. (6-LS1-3)

6-PS3: Energy

6-PS3.A—Definitions of Energy

1. The term "heat" as used in everyday language refers to thermal motion (the motion of atoms or molecules within a substance) and radiation (particularly infrared and visible light). In science, heat is used only for this second meaning, it refers to the energy transferred due to the temperature difference between two objects. (2° 6-PS1-4)
2. The temperature of a system is proportional to the average internal kinetic energy and potential energy per atom or molecule (whichever is appropriate particle for this system's material). Details of that relationship depend on the type of atom or molecule and the interactions among the atoms in the material. (2° 6-PS1-4)
3. Temperature is not a direct measure of a system's total thermal energy. (2° 6-PS1-4)
4. The total thermal energy (sometimes called the total internal energy) of a system depends jointly on the temperature, the total number of atoms in the system, and the state of matter. (2° 6-PS1-4)
5. The term "heat" as used in everyday language refers to both thermal energy (the motion of atoms or molecules within a substance) and energy transfers by convection, conduction, and radiation (particularly infrared and light). (6-PS3-3)
6. Temperature is a measure of the average kinetic energy of particles of matter. (6-PS3-4)
7. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present. (6-PS3-4)

6-PS3.B—Conservation of Energy and Energy Transfer

1. The amount of energy transfer needed to change the temperature sample of matter by a given amount depends on the nature of the matter, the size of the sample, and the environment. (6-PS3-3, 6-PS3-4)
2. Energy is spontaneously transferred from hotter objects/regions into colder ones by the process of conduction, convection, and radiation. (6-PS3-3)

6-PS4: Waves and Their Applications in Technologies for Information Transfer

6-PS4.A—Wave Properties

1. A sound wave needs a medium through which it is transmitted. (6-PS4-2)

6-PS4.B—Electromagnetic Radiation

1. 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. (6-PS4-2)
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. (6-PS4-2)
3. A wave model of light is useful for explaining brightness, color, and the frequency-dependent refracting of light at a surface between media. (6-PS4-2)
4. Because light can travel through a space, it cannot be a matter wave [sic] like sound or water waves. *See Note of Caution on this PE*. (6-PS4-2)

LS1: From Molecules to Organisms

6-LS1.A—Structures and Function

1. All living things are made up of cells, which is the smallest unit that can be said to be alive. (6-LS1-1)
2. An organism may consist of one cell (unicellular) or many different numbers and types of cells (multicellular). (6-LS1-1)
3. Within cells, special structures are responsible for functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (6-LS1-2)
4. In multicellular organisms, the body is a system of multiple interacting systems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for body functions. (6-LS1-3)

6-LS1.D—Information Processing

1. 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. (6-LS1-8)
2. Changes in the structure and functioning of many millions of interconnected nerve cells allow combined inputs to be stored as memories for long periods of time. (6-LS1-8)

ESS1: Earth's Place in the Universe

6-ESS1.C—The History of Planet Earth

1. The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analysis of rock strata and the fossil record provide only relative dates, not an absolute scale. (6-ESS1.4)
2. Major historical events include the formation of mountain chains and ocean basins, the adaptation and extinction of living organisms, volcanic eruptions, periods of massive glaciation, and the development of watersheds and rivers through glaciation and water erosion. (6-ESS1.4)

ESS2.A: Earth's Systems

6-ESS2.A—Earth Materials and Systems

1. All Earth processes are the result of energy flowing and matter cycling with and among the planet's systems. This energy is derived from the Sun and the Earth's hot interior. (6-ESS2-1)
2. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. (6-ESS2-1)
3. 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. (6-ESS2-2)

6-ESS2.B—Plate Tectonics and Large-Scale System Interactions

1. Plate tectonics is the unifying theory that explains the past and current movements of the rocks at Earth's surface and provides a framework for understanding its geologic history. (6-ESS2-3)
2. Plate movements are responsible for most continental and ocean floor features and the distribution of most rocks and minerals within Earth's crust. (6-ESS2-3)
3. 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. (6-ESS2-3)

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6-ESS2.C—The Roles of Water in Earth's Surface Processes

1. Waters movements —both on the land and underground—cause weathering and erosion, which changed the land's surface features and create underground formations. (6-ESS2-2)
2. Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. (6-ESS2-4)
3. Global movements of water and its changes in form are propelled by sunlight and gravity. (6-ESS2-4)
4. The complex patterns of 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. (6-ESS2-5)
5. Variations in density—due to differences in temperature and salinity—drive a global pattern of interconnected ocean currents. (6-ESS2-6)

6-ESS2.D—Weather and Climate

1. Because these patterns are so complex, weather can only be predicted probabilistically. (6-ESS2-5)
2. The tilt of Earth's rotational axis causes a pattern of uneven heating and cooling that changes seasonally and establishes global patterns of climate and weather. (6-ESS2-6)
3. 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. (6-ESS2-6)
4. The ocean exerts a major influence on weather and climate by absorbing energy from the Sun, releasing it overtime, and globally re distributing it through ocean currents. (6-ESS2-6)

ESS3: Earth and Human Activity

6-ESS3.B—Natural Hazards

1. Some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occurs suddenly and with no notice, and thus are not yet predictable. (6-ESS3-2)
2. 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. (6-ESS3-2)

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ETS1 Engineering, Technology, and the Application of Science

6-ETS1.A—Defining and Delimiting Engineering Problems

1. The more precisely the criteria and constraints of a design task can be defined, the more likely the design solution will be successful. (6-PS3-3)
2. Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to limit possible solutions. (6-PS3-3)

6-ETS1.B—Developing Possible Solutions

1. A solution needs to be tested, and then modified based on the test to improve it. (6-PS3-3)
2. There are systematic processes for evaluating solutions with respect to how well they meet criteria and constraints of a problem. (6-PS3-3)

Connections to Engineering, Technology and Applications of Science

6-ETS2.A—Interdependence of Science, Engineering, and Technology

1. Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led through the development of entire industries and engineered systems. (6-LS1-1)
2. Technologies extend the measurement, exploration, modeling, and computational capacity of scientific investigations. (6-ESS2-3)

6-ETS2.B—Influence of Engineering, Technology, & Science on Society & the Natural World

1. 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. (6-ESS3-2)

Grade 6 Condensed Science and Engineering Practices

The information below contains the specific Science and Engineering foundation statements for Grade 6 as found in the *South Carolina College- and Career-Ready Science Standards 2021*.

6-I. Asking Questions and Defining Problems
(not used on any PE at this grade level)

6-II. Developing and Using Models
Modeling at 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.

- **a.** Develop a model to predict and/or describe phenomena. (6-PS1-4)
- **b.** Develop and use a model to describe phenomena. (6-PS4-2, 6-LS1-2; 6-ESS2-1; (6-ESS2-6)
- **c.** Develop a model to describe unobservable mechanisms. (6-ESS2-4; 6-ESS3-4)

6-III. 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 in progresses to includes investigations that use multiple variables and provide evidence to support explanations or design solutions.

- **a.** 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. (6-PS3-4)
- **b.** Conduct an investigation to produce data to serve as the basis for evidence that meets the goals of the investigation. (6-LS1-1)

6-IV. Analyzing and Interpreting Data
Analyzing data in 68 builds on K5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic to statistical techniques of data and error analysis.

- **a.** Analyze and interpret data to provide evidence for phenomena. (6-ESS2-3; 6-ESS2-5)
- **b.** Analyze and interpret data to determine similarities and differences in findings. (6-ESS3-2)

6-V. Using Mathematics and Computational Thinking
(not used on any PE at this grade level)

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6-VI. 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.

- **a.** Apply scientific ideas, principles, to design, construct, and test a design of an object, tool, process, or system. (6-PS3-3)
- **b.** 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. (6-ESS1-4; 6-ESS2-2)

6-VII. 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.

- **a.** Use oral and written argument supported by empirical evidence that supports or refutes claims for either explanations or solutions about the natural or designed world(s). (6-LS1-3)

6-VIII. 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.

- **a.** Gather, read, synthesize information from multiple appropriate sources, and assess the credibility, accuracy, a possible bias of each publication and method used, and describe how they are supported or not supported by evidence. (6-LS1-8)

Grade 6 Condensed Crosscutting Concept Statements

The information below contains the specific Crosscutting Concept foundation statements for Grade 6 as found in the *South Carolina College- and Career-Ready Science Standards 2021*.

6.P. Patterns

1. Patterns in rates of change and other numerical relationships can provide information about natural and human design systems. (6-ESS2-3)
2. Graphs, images, and tables can be used to identify patterns and data. (6-ESS3-2)

6.CE. Cause and Effect: Mechanism and Prediction

1. Cause-and-effect relationships may be used to predict phenomena in natural or designed systems. (6-PS4-1, 6-LS1-8; 6-ESS2-5)

6.SPQ. Scale, Proportion, and Quantity

1. 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. (6-PS3-4)
2. Phenomena that can be observed at one scale may not be observable at another scale. (6-LS1-1)
3. Time, space, and energy phenomena can be observed at various scales using model to study systems that are too large or too small. (6-ESS1-4; 6-ESS2-2)

6.SSM. Systems and System Models

1. Systems may interact with other systems; they may have subsystems and be part of larger complex systems. (6-LS1-3)
2. Models can be used to represent systems and their interactions—such as inputs, outputs, and processes —and energy, matter, and information flow within systems. (6-ESS2-6)

6.EM. Energy and Matter: Flows, Cycles, and Conservation

1. The transfer of energy can be tracked as energy flows through a designed or natural system. (6-PS3-3)
2. Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter. (6-ESS2-1, 6-ESS2-4)

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6.SF. Structure and Function

1. Structures can be designed to serve functions by considering properties of different materials, and how materials can be shaped and used. (6-PS4-2)
2. 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 and design structures/systems can be analyzed to determine how they function. (6-LS1-2)

6.SC. Stability and Change

(not included on any PE at this grade level)

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