STATE OF SOUTH CAROLINA
DEPARTMENT OF EDUCATION

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Grade Four Assessment Specifications for State 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
- Identifies specific state assessment limits on foundational knowledge

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 4 Assessment Specifications 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 2022 SCPASS Grades Four and Six Biology Alignment Study, the Summer 2022 Grade Four Content Review Committees, and the SC READY Grade 4 Science Item Specifications 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.

Students are expected to interact with simple line plots. They are not expected to construct the graphs.

4-PS3-1 (p. 5)

- Students are expected to understand that friction can slow an object down.

4-PS3-2 (p. 7)

- Students are expected to understand that when the surfaces of two objects move against each other, heat is produced. This is called friction.

4-PS4-2 (p. 14)

- Students are expected to use and apply opaque, translucent, and transparent.

4-LS1-1 (p. 18)
Wings (external)

- Appendage used for flying
- Bats are the only mammal with wings.
- Most birds have wings used for flying.
- Some insects have wings used for flying.

Whiskers (external)

- Help animals sense their environment.
    - Air currents
    - Vibrations
    - Avoid running into objects
    - Detect prey

4-ESS2-2 (p. 27)
Mountain range (occurs where plate movement causes Earth's surface to uplift or break)

- Can form where plates are moving toward each other or where plates are moving apart

4-ESS3-1 (p. 30)
Under "Environmental effects . . ." add:

- Wind turbines can harm wildlife and create noise pollution
- Solar energy requires large amounts of land for the solar panels, create hazardous materials during the manufacture of the solar panels, and prevent the migration and nesting of animals.

4-ESS3-2 (p. 32)
Early warning system

- Warns people in communities of approaching hazards such as:
    - Fire: smoke detectors
    - Severe weather: emergency weather warnings by notification on phone, radio, television, sirens
    - Tsunami: notifications after an earthquake, sirens
    - Floods: notifications on radio and television

Energy
4-PS3-1
Performance Expectation: Use evidence to construct an explanation relating the speed of an object to the energy of that object.
Clarification Statement: None
State 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.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 4 Science that directly measure 4-PS3-1 and **not** to any other Performance Expectation.

DCI: 4-PS3.A.1 **SEP:** 4-VI.a **CCC:** 4.EM.1

Phenomenon-Related Terminology That Could Be Used in Items Specific to 4-PS3-1

- collide/collision
- control
- distance
- energy
- force
- friction
- heat
- impact
- minute
- motion
- problem
- sound
- speed
- temperature
- thermometer
- time
- transfer
- variable

4-PS3-1 On the state assessment, items will not require students to:

- apply/identify/use the terms “independent and dependent variables,”
- calculate or quantify energy, force, net force, or speed,
- construct a data table or graph from scratch,
- convert units (i.e., within metric system, time units, temperature scales),
- demonstrate knowledge of Newton’s laws,
- identify kinetic and potential energy, or
- interpret force diagrams.

(Continued on next page.)

4-PS3-1 For State Assessment Purposes

- Data may be communicated by tabled information, simple line plots or bar graphs.
- Distance will be expressed quantitatively using units (i.e., cm, m) or in quantitative terms (e.g., farther, closer, etc.).
- Energy, force, and speed will be expressed in quantitative terms (e.g., more, less, etc.).
- Students are expected to identify which variable is purposely changed, and which variable is being measured because of that change.
- Temperature will be expressed qualitatively (e.g., hot, cold, etc.), in quantitative terms (e.g., higher, lower), or in degrees Celsius.
- The "bones" of data tables and graphs will be provided when students are required to complete a graph or table. ("Bones" refers to the grid of data tables and to the x-/y-axes of graphs.)
- Time will be expressed quantitative using units (i.e., sec, min, hr) or in quantitative terms (e.g., longer, shorter, etc.).
- Students are expected to understand that friction can slow an object down.

4-PS3-2
Performance Expectation: Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
Clarification Statement: None
State Assessment Boundary: Assessment does not include quantitative measurements of energy or the difference between transferring and transforming energy.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 4 Science that directly measure 4-PS3-2 and **not** to any other Performance Expectation.

DCI: 4-PS3.A.2 / 4-PS3.B.1.a-c,2,3.a. **SEP:** 4-III.a **CCC:** 4.EM.1

Phenomenon-Related Terminology That Could Be Used in Items Specific to 4-PS3-2

- circuit
- control
- collide/collision
- distance
- electrical current
- energy
- force
- friction
- heat
- light
- motion
- problem
- sound
- speed
- temperature
- thermometer
- time
- transfer
- variable
- vibrate

4-PS3-2 On the state assessment, items may not require students to:
- construct a data table or graph (bar or line plot),
- convert units (i.e., within metric system, time units, temperature scales),
- demonstrate knowledge of or calculate net forces, speed, or energy,
- demonstrate knowledge of kinetic and potential energy, or
- demonstrate knowledge of the law of conservation of energy.

4-PS3-2 For State assessment Purposes
- Data may be communicated by tabled information and/or simple line plots/bar graphs.
- Distance will be expressed quantitatively using units (i.e., cm, m) or in quantitative terms (e.g., farther, closer, etc.).
- Energy, force, and speed will be expressed in qualitative terms (e.g., more, less, greater, etc.)
- Heat will be expressed qualitatively (e.g., hotter, cooler, etc.).
- Light will be expressed qualitatively (e.g., brighter, dimmer, etc.).
- Sound will be expressed qualitatively (e.g., greater, lesser, etc.).
- Temperature will be expressed qualitatively (e.g., hot, cold, cool, warm) or quantitatively (i.e., °C).
- The “bones” of data tables and graphs will be provided when students are required to complete a graph or table. (“Bones” refers to the grid of data tables and to the x-/y-axes of graphs.)

- Time will be expressed quantitatively (i.e., sec, min, hr) or qualitatively (e.g., longer, shorter, etc.).
- Where qualitative data are presented on a graph, an arrow will replace the scale.
- Students are expected to understand that when the surfaces of two objects move against each other, heat is produced. This is called friction.

4-PS3-3
Performance Expectation: 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.
State Assessment Boundary: Assessment does not include quantitative measures of changes
in the speed of an object (acceleration) or quantitative measurements of energy.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 4 Science that directly measure 4-PS3-3 and **not** to any other Performance Expectation.

DCI: 4-PS3.A.2 / 4-PS3.B.1.a-c / 4-PS3.C.1 **SEP:** 4-I.a **CCC:** 4.EM.1

Phenomenon-Related Terminology That Could Be Used in Items Specific to 4-PS3-3

- collide/collision
- constant
- direction
- distance
- energy
- force
- heat
- light
- motion
- problem
- sound
- speed
- variable

Note: Items written to this PE may only use qualitative information to describe relationships.

4-PS3-3 For the state assessment, items may not require students to:

- calculate energy, net force, or speed,
- complete data tables or graphs,
- construct a data table or graph (bar or plot),
- convert units (i.e., within metric system, time units, temperature scales),
- demonstrate knowledge of the concept of acceleration, kinetic energy, and potential energy,
- determine or identify forces acting on the objects,
- quantify energy or speed, or
- use any type of quantitative information.

(Continued on next page.)

4-PS3-3 For State Assessment Purposes

- Data (qualitative only) may be communicated by tabled information, simple line plots or bar graphs.
- Distance will be expressed using quantitative terms (e.g., farther, shorter, etc.).
- Energy will be expressed using quantitative terms (e.g., more, less, etc.).
- Sound will be expressed using quantitative terms (e.g., greater, lesser, etc.).
- Speed will be expressed using quantitative terms (e.g., faster, slower).
- Students are expected use and apply directional terminology (e.g., left, right, forward, backward, etc.).
- The "bones" of data tables and graphs will be provided when students are required to complete a graph or table. ("Bones" refers to the grid of data tables and to the x-/y-axes of graphs.)
- Time will be expressed qualitatively (e.g., longer, shorter, etc.).

4-PS3-4
Performance Expectation: Apply scientific ideas to design, test, and refine a device that coverts 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, and time to design the device.
State Assessment Boundary: Devices should be limited to those that convert motion energy to electric energy or use stored energy (batteries) to cause motion or produce light or sound.*

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

DCI: 4-PS3.B.3 / 4-PS3.D.1 / 4-ETS1.A.1,2 / 4-ETS1.B.1 / (2°) 4-ETS2.B.1 **SEP:** 4-V1.b
CCC: 4.EM.1

Phenomenon-Related Terminology That Could Be Used in Items to 4-PS3-4

- circuit
- constant
- constraint
- convert
- criteria/criterion
- electrical current
- energy
- generator
- heat energy
- initial
- light energy
- mechanical energy
- motion
- solar cell
- sound energy
- temperature
- thermometer
- transfer
- variable

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

- analyze or interpret data with magnitudes of electrical currents (ampere), brightness (lumen),
- calculate energy,
- construct a data table or graph (bar or line plot),
- convert units (i.e., within metric system, time units, temperature scales),
- identify the independent and dependent variables,
- sound (decibel) in units unless the units are defined; and/or
- require students to demonstrate knowledge of kinetic and potential energy.

(Continued on next page.)

4-PS3-4 For State Assessment Purposes

- Data may be communicated by tabled information, simple line plots or bar graphs.
- Devices/solutions are limited to the conversion of motion into electrical currents and the use of batteries, a solar cell, or a hand crank to produce light, motion, or sound.
- Distance will be expressed quantitatively to the nearest whole unit (i.e., cm, m).
- Electrical current will be expressed qualitatively (e.g., less, more).
- Energy will be expressed qualitatively (e.g., less, more).
- Heat will be expressed quantitatively to the nearest whole degree (i.e., °C).
- Light will be expressed qualitatively (e.g., brighter, dimmer).
- Sound will be expressed qualitatively (e.g., louder, softer).
- The "bones" of data tables and graphs will be provided when students are required to complete
  a graph or table. ("Bones" refers to the grid of data tables and to the x-/y-axes of graphs.)
- Temperature will be described qualitatively (e.g., hot, cold, cool, warm)
  or quantitatively (i.e., °C).
- Time will be expressed quantitatively to the nearest whole unit (i.e., sec, min, hr) or qualitatively (e.g., longer, shorter, etc.).
- Types of energy are limited to electrical, motion, and stored energy (i.e., batteries).

Waves and Their Applications for Technologies for Information Transfer
4-PS4-1
Performance Expectation:
Develop a model of waves to describe patterns of amplitude and wavelength and that waves can cause objects to move.
Clarification Statement: Examples of models include diagrams, analogies, or physical models using
(but not limited to) stringed beads, rubber bands, wire, or yarn to illustrate amplitude of waves and wavelength.
State Assessment Boundary: Assessment does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.♦

♦The State Assessment Boundary applies **only** to items developed for SC READY Grade 4 Science that directly measure 4-PS4-1 and **not** to any other Performance Expectation.

DCI: 4-PS4.A.1.a,b;2 **SEP:** 4-II.a **CCC:** 4.P.1

Phenomenon-Related Terminology That Could Be Used in Items Specific to 4-PS4-1

- amplitude
- baseline
- *crest
- distance
- disturbance
- energy
- force
- matter
- motion
- propagate
- trough
- wave
- wave property
- wavelength

*Note: The highest point on wave is more correctly known as a crest, not as a peak.

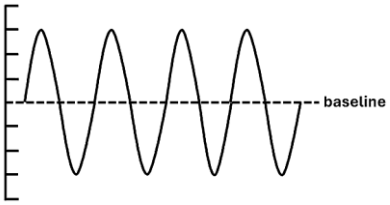
4-PS4-1 On the state assessment, items may not require students to:

- calculate frequency or wave speed,
- define/identify the rest position of a wave
- demonstrate knowledge of different wave types (i.e., electromagnetic, longitudinal, mechanical, or transverse),
- demonstrate knowledge of interference,
- demonstrate knowledge of the properties of frequency or wave speed,
- refer to matter as a “medium” or “media”, or
- quantify amplitude or wavelength.

(Continued on next page.)

4-PS4-1 For State Assessment Purposes

- Amplitude will be described qualitatively (e.g., higher, lower, etc.).
- Diagrams of waves include only transverse waves with the baseline labeled and represented by a dashed line.
    - Example: Model of a Wave



- Energy will be expressed qualitatively (e.g., more, less, etc.).
- Experiment/investigation contexts are limited to using rope, spring toy, or water to model waves.
- Students are expected to compare models of waves that require analysis or comparison of waves based on amplitude and wavelength.
- Students are expected to understand that waves have properties
    - amplitude- the distance above or below the baseline that a wave moves
    - crest- the highest point on a wave
    - trough- the lowest point on a wave
    - wavelength- the distance between two corresponding parts of a wave (i.e., from crest to crest or from trough to trough)
- Students should understand that waves with greater amplitudes carry more energy.
- *The highest point on a wave will be defined as a crest.
- Wavelength will be described qualitatively (e.g., longer, etc.).

4-PS4-2
Performance Expectation: Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
Clarification Statement: None
State Assessment Boundary: Assessment does not include knowledge of specific color reflected
and seen, the cellular mechanisms of vision, or how the retina works.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 4 Science that directly measure 4-PS4-2and **not** to any other Performance Expectation.

DCI: 4-PS4.B.1 **SEP:** 4-II.b **CCC:** 4.CE.1

Phenomenon-Related Terminology That Could Be Used in Items Specific to 4-PS4-2

- barrier
- eye
- illuminate
- light
- light source
- luminous
- opaque
- mirror
- reflect/reflection
- translucent
- transparent
- visible/visibility♦

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

- classify barriers as opaque, transparent, and translucent (unless defined in the scenario/stimulus),
- demonstrate knowledge of the angle of reflection,
- describe the effect of color filters,
- reference the visible light spectrum,
- demonstrate knowledge of cellular mechanisms of vision,
- demonstrate knowledge of the cornea, pupil, and retina or of its function,
- identify the reflection of a specific color,
- demonstrate knowledge of absolute brightness or apparent brightness,
- use the terms “see and seen♦”, and/or
- use units of illuminance or intensity.

4-PS4-2 For State Assessment Purposes

- When possible, the terms “see” and “seen” will be replaced by “view/viewed”, “visible” and “visibility.”
- Students are expected to use and apply opaque, translucent, and transparent.

4-PS4-3

Performance Expectation: Generate and compare multiple solutions that use patterns to transmit information.

Clarification Statement: Examples of solutions include drums sending coded information through sound waves, using a grid of 0s and 1s representing black and white to send information about a picture, QR codes, barcodes, and using Morse code to send text. The coding method does not need to be electronic or digital, and the code should only be two possible values such as on/off, 0/1, black/white.

State Assessment Boundary: None

DCI: 4-PS4.C.1,2 / 4-ETS1.C.1 / 4-ETS2.A.1 **SEP:** 4-VI.c **CCC:** 4.P.1

Phenomenon-Related Terminology That Could Be Used in Items Specific to 4-PS4-3

- barcode
- binary
- code
- decode
- encode/encrypt
- digitized information
- Morse code
- pattern
- QR code
- transmit

4-PS4-3 On the state assessment, items may not require students to:

- reference or use blinking lights as a form of coded communication.

4-PS4-3 For State Assessment Purposes

- Criterion is limited to accuracy of the message communicated.
- Methods for sending coded messages will be limited to binary codes (i.e., 0/1, black/white, Morse code (dot-dash patterns representing long/short beeps or vibrations) or on/off, for example binary images (i.e., use of zeros and ones to create a black and white image.)
- Use of devices that convert digitized information into sound waves (radio, cell phone) or pictures (television),

From Molecules to Organisms: Structure and Processes
4-LS1-1
Performance Expectation: Construct an argument that plants and animals have internal and external structures that function together in a system to support survival, growth, behavior, and reproduction.
Clarification Statement: Examples of structures could include thorns, roots, heart, lungs, or skin.
State Assessment Boundary: Assessment does not include microscopic structures within plant and animal systems.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 4 Science that directly measure 4-LS1-1 and **not** to any other Performance Expectation.

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

Phenomenon-Related Terminology That Could Be Used in Items Specific to 4-LS1-1

- behavior
- camouflage
- external structure
- grow
- internal structure
- organism
- reproduction
- survive/survival
- system

4-LS1-1 On the state assessment, items may not require students to:
- demonstrate knowledge of body systems (e.g., circulatory, respiratory, etc.),
- reference, or require students to demonstrate knowledge of, microscopic structures in animals and plants;
- classify organisms into flowering and nonflowering groups and/or invertebrate and vertebrate groups,
- demonstrate knowledge of external and internal structures beyond those found in the table titled *External and Internal Structures of Animals and Plants Used for State Assessment*;
- demonstrate knowledge of the term "organ." When necessary, use "internal structure." (The compositional hierarchy of organs is not taught until 6-LS1-3.)

4-LS1-1 For State Assessment Purposes
- Applicable animal and plant structures are limited to those listed in the table titled *External and Internal Structures of Animals and Plants Used for State Assessment*.
- "Organs" will be referred to as "internal structures."
- The term "spines" should be used instead of "quills" when referencing these external animal structures.
- The eye is considered an external structure (does not include the internal anatomy).

(Continued on next page.)

External and Internal Structures of Animals and Plants Used for State Assessment

Animals Structures

Beak (External)
- The hard extension of a bird's or turtle's jaw
- Allows animals to eat hard seeds and other types of food
- Helps animal protect itself

Brain (Internal)
- Controls all the functions of the body

Claw (External)
- Sharp, pointed extension of an animal's toe
- Used to grasp branches, grab prey, defense

Ears (External/Internal- the discrete anatomy of the ear is beyond scope)
- Help animal sense danger
- Can help regulate body temperature

Exoskeleton (External)
- Hard outer covering on some insects and animals
- Provides protection of internal structures and from predators

Eye (For the purposes of assessment, only the gross, external structure is referenced)
- Functions to provide vision
- Helps animals find food and avoid predators

Feathers (External)
- External structures
- The covering of a bird's body
- Functions to camouflage and regulate body temperature

Fins (External)
- Flat appendages found on fish
- Used for locomotion (movement)

Flippers (External)
- Flat, modified legs in sea birds, mammals, and reptiles
- Used for locomotion (movement)

Fur/hair (External)
- Outer covering on most mammals
- Functions to regulate body temperature
- Serves to camouflage

Gills (For the purposes of assessment, only the gross, external structure is referenced)
- Respiratory structure on fish and other aquatic organisms that absorb oxygen from water

Heart (Internal)
- Functions to pump oxygen and nutrients to cells of the body

(Continued on next page.)

Legs (External)

- Appendages that provide locomotion (movement)
- Also function to help animals to hunt and avoid predators

Lungs (Internal)

- Respiratory structure in animals that absorb oxygen from air taken in from outside the body

Shells (External)

- Hard, outside covering on some animals
- Function to provide camouflage
- Protects internal structures from the outside environment

Skin (External)

- Outer covering on animals
- Functions to protect internal structure of body and regulate body temperature
- In some animals, has colors and structures that provides camouflage

Spines (External)

- Hard, sharp modified hairs that project to provide protection from predators (See bullet under "For State Assessment Purposes.")

Stomach (Internal)

- Helps breakdown food eaten by animals

Talon (external)

- Long, sharp pointed claws on the ends of a raptor's feet (e.g., eagle, falcon, hawk)
- Used to capture prey, to grab branches, for defense

Wings (external)

- Appendage used for flying
- Bats are the only mammal with wings.
- Most birds have wings used for flying.
- Some insects have wings used for flying.

Whiskers (external)

- Help animals sense their environment.
    - Air currents
    - Vibrations
    - Avoid running into objects
    - Detect prey

(Continued on next page.)

Plant Structures

Bark (External)

- The tough outer covering on a woody plant
- Provides protection from the environment

Flower (External)

- Color and scent attract animals that help in reproduction
- When pollenated, produce seeds

Fruit (External)

- Grow from pollenated flowers
- Contain seeds
- Attract animals that eat the fruit and spread seeds

Leaves (External)

- Contain the internal structures that use sunlight, water from the roots, and carbon dioxide from the atmosphere to produce food (simple sugars)
- The food (simple sugar) is carried throughout the plant by internal structures

Roots (External)

- Functions to take in water and nutrients from the soil
- Provides support by anchoring plant to ground

Seed (External or internal)

- Produced by plants
- Often have hard, protective coverings and other structures that provide protection and help in dispersal

Spines (External)

- Hard, sharp modified leaves that project to provide protection from predators

Thorn (External)

Hard, sharp modified stems that project to provide protection from predators

4-LS1-2
Performance Expectation: 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.
State 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 State Assessment Boundary applies **only** to items developed for SC READY Grade 4 Science that directly measure 4-LS1-2 and **not** to any other Performance Expectation.

DCI: 4-LSD.1,2 **SEP:** 4-II.c **CCC:** 4.SSM.1

Phenomenon-Related Terminology That Could Be Used in Items Specific to 4-LS1-2

- brain
- ear
- environment
- eye
- feel
- hear
- heat
- instinct/instinctive
- light
- memory
- nose
- odor
- perceive/perception
- sense
- sense receptor
- sensory input
- sight/vision
- skin
- sound
- stimulus/stimuli
- system
- taste
- temperature
- tongue
- touch
- visible/visibility

4-LS1-2 On the state assessment, items may not require students to:
- identify or describe the function or mechanisms of the specific sensory receptors found in the ear, eye, nose, skin, and tongue, or
- identify the parts of the brain responsible for processing environmental stimuli, storing memories or controlling the different parts of the body.

4-LS1-2 For State Assessment Purposes
- Evidence will include data from graphs and tables, informational text, models, and/or observations.
- Limits on senses, sensory receptors, and behaviors/responses to sensory input that can be used in items and item sets on the state assessment are found in the table titled *Animal Senses* on the following page.
- Use only familiar animals and plants unless a description is included.

(Continued on next page.)

Animal Senses for State Assessment Purposes

Hearing:

- Signals detected: receives vibrations, detects sound
- Examples of sensory receptors in humans and other animals:
    - humans have ears
    - other animals' hearing organs may differ in type, number, and location on the body
    - some animals' ears can receive sounds beyond the perception of humans
- Examples of behaviors in humans and other animals related to hearing:
    - locate food, sense danger, communication

Sight:

- Signals detected: colors, shapes, sizes, space/distance, light, movement
- Examples of sensory receptors in humans and other animals:
    - humans have eyes
    - other animals' eyes may differ in type, number, and location on the body
    - some animals' eyes receive different wavelengths of light (i.e., visible light, ultraviolet light)
- Examples of behaviors in humans and other animals related to sight:
    - locate food, shelter, sense predators, and other organisms

Smell:

- Signals detected: odors, scents
- Examples of sensory receptors in humans and other animals:
    - humans have a nose
    - other animals' smelling organs different in type and location on body
    - some animals can smell things that humans cannot sense
- Examples of behaviors of humans and other animals related to the sense of smell:
    - avoid danger by sensing predators, finding food, recognizing the smells of other organisms

Taste:

- Signals detected: flavors, humans detect bitter, salty, sour, and sweet tastes
- Examples of sensory receptors in humans and other animals:
    - humans have taste buds on tongues,
    - other animals' taste organs are different types and in different locations on body
- Examples of behaviors of humans and other animals
    - judge which foods are safe to eat

Touch:

- Signals detected: pain, pressure, shapes, sizes, temperature, texture, vibrations
- Examples of sensory receptors in humans and other animals:
    - humans have skin with touch receptors
    - other animals' touch organs are different and located on different parts of the body
- Examples of behaviors in humans and other animals:
    - identify food, react to danger, care for each other, communication

Earth's Place in the Universe
4-ESS1-1
Performance Expectation: 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.
State 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 State Assessment Boundary applies **only** to items developed for SC READY Grade 4 Science that directly measure 4-ESS1-1 and **not** to any other Performance Expectation.

DCI: 4-ESSC.1 **SEP:** 4-VI.d **CCC:** 4.P.2

Phenomenon-Related Terminology That Could Be Used in Items to 4-ESS1-1

- canyon
- climate
- deposition/deposit
- earthquake
- environment
- erosion
- fault
- folding
- fossil
- geology/geologic
- geologic column
- landscape
- marine
- rock
- sediment
- sedimentary rock
- topography
- weathering

4-ESS1-1 On the state assessment, items may not require students to:
- demonstrate knowledge of absolute dating,
- demonstrate knowledge of events in geologic time,
- demonstrate knowledge of the terms "superposition, terrestrial, and unconformity"
- demonstrate knowledge of units of geologic time,
- describe the rock cycle,
- explain how the rock forms,
- identify names of specific types of rocks or fossils,
- identify specific rock formations, or
- reference the process of fossilization.

(Continued on next page.)

4-ESS1-1 For State Assessment Purposes

- Fossils of organisms that once lived in water will be referred to as “marine.”
- Fossils of terrestrial organisms will be referred to as “land __.”
- Students are expected to understand that sedimentary rocks form when clay, mud, or sand turn into rocks and the most common rock in which fossils are found.
- Students are expected to use evidence from simple stratigraphic (geologic) columns.
- Students should understand that environments have changed many times during Earth’s history, for example: Environments can change from dry to marine and from marine to dry many times over the hundreds of millions of years of Earth’s history.

Earth's Systems
4-ESS2-1
Performance Expectation: 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.
State Assessment Boundary: Assessment is limited to a single form of weathering or erosion.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 4 Science that directly measure 4-ESS2-1 and **not** to any other Performance Expectation.

DCI: 4-ESS2A.1,2 / 4-ESS2.E.1 **SEP:** 4-III.a **CCC:** 4.CE.1

Phenomenon-Related Terminology That Could Be Used in Items to 4-ESS2-1

- angle of slope
- balance
- deposition
- erosion
- freeze-thaw cycle
- graduated cylinder
- glacier
- gravity
- heat-cool cycle
- protractor
- rate of flow
- sediment
- stream table
- temperature
- vegetation
- volume
- weathering
- weight
- wind speed

4-ESS2-1 On the state assessment, items may not require students:
- apply more than agent of weathering or erosion within an item,
- calculate rate of flow,
- differentiate or identify constructive and destructive processes
- reference "biological, chemical, mechanical, or physical weathering,"
- student knowledge of mass (at this grade level students only need know weight), or
- use cubic units.

4-ESS2-1 For State Assessment Purposes
- Angle of slope will be expressed quantitatively (°) or qualitatively (e.g., steep, greater, lesser, no slope, etc.).
- Distance/length will be expressed quantitatively using units (i.e., cm, m) or quantitative terms (e.g., shorter, longer, etc.).
- Temperature will be expressed quantitatively using units (°C) or using quantitative terms (e.g., hotter, cooler, etc.).
- Wind speed and speed of water will be expressed in qualitative terms (e.g., fast, slow, etc.).
- Volume will be expressed quantitatively (i.e., mL, L) or qualitatively (e.g., more, less, etc.).

4-ESS2-2
Performance Expectation: Analyze and interpret data from maps to describe 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.
State Assessment Boundary: None

DCI: 4-ESS2.B.1,2 **SEP:** 4-IV.a **CCC:** 4.P.2

Phenomenon-Related Terminology That Could Be Used in Items to 4-ESS2-2

- compass rose
- continent
- contour interval
- contour line
- earthquake
- elevation
- epicenter
- hot spot
- landform
- lava
- magma
- ocean
- *plate boundary
- relief map
- sea level
- topographic
- topography
- volcano

*Note: The term "continental boundary" is replaced with more correct term "plate boundary."

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

- apply or identify map scales, topographic map symbols beyond those found on *Topographic Symbols That Could Be Used on the State Assessment*,
- demonstrate knowledge of latitude/longitude and negative elevation values,
- demonstrate knowledge of the terms "plate tectonics" or "tectonic plates,"
- identify the different types of plate boundaries, or
- identify examples of landforms that are beyond those named in *Descriptions of Landforms Used on the State Assessment* (p.20) and *Topographic Symbols Used on the State Assessment* (p. 21).

(Continued on next page.)

4-ESS2-2 For State Assessment Purposes

- Elevation will be expressed using quantitative terms (e.g., high, low, etc.) or quantitively in units (i.e., meters above or below sea level).
- *Continental boundaries will be referred to by the more correct term as plate boundaries.
- Movement of plates will be designated by arrows representing convergence or divergence.
- Features/landforms included in items, clusters, and tasks are limited to those found in *Descriptions of Landforms That Could Be Used on the State Assessment* on page 20.
- Locations below sea level will be described as "below sea level" (ex. 100 m below sea level).
- Students are expected to know the continents of Australia, Eurasia (Europe and Asia together), North America, and South America.
- Students are expected to compare elevations of different locations using quantitative elevation (in meters) to identify whether the locations or higher or lower as compared to each other.
- The allowable symbols on topographic maps are found in *Topographic Symbols That Could Be Used on the State Assessment* on page 21.

Descriptions of Features/Landforms That Could Be Used on the State Assessment
(See also *Topographic Symbols That Could Be Used on the State Assessment* for other features/landforms.)

Deep-ocean trench (occurs on ocean floor where plates are moving towards each other)

- A deep, steep depression on the ocean floor
- Are the deepest places on Earth's surface
    - Example: Challenger Deep in the Mariana Trench in the Pacific Ocean
- Associated activity:
    - Earthquakes occur along trench
    - Volcanoes along the trench on the ocean floor can form islands
        - Example: Japan, Aleutian Islands of Alaska
    - Forms volcanic mountain ranges at the edges of continents
        - Example: Andes Mountains along the western side of South America and the Cascade Range in the northwestern United States.

Hotspot

- Places where unusually hot magma rises through the Earth's surface
- Can occur far from plate boundaries
    - Example: The Hawai'ian Islands, Yellowstone National Park

Mid-ocean ridge (occurs on ocean floor where plates are moving apart)

- An underwater mountain range that forms on the ocean floor
    - Example: The Mid-Atlantic Ridge (found in the middle of the Atlantic Ocean) is part of the longest system of mountains in the world. Most of it is underwater and runs around Earth "like a base-ball seam."
- Earthquakes and volcanic activity occur along the ridges

Mountain

- A tall, elevated landform with steep sides

Mountain range

- Raised landforms made up of connecting mountains
    - Examples: Appalachian Mountain range in the eastern US, Rocky Mountains in the western US
        - Caused when plates moved together pushing Earth's crust upward

Rift valley (occurs on land where plates are moving apart)

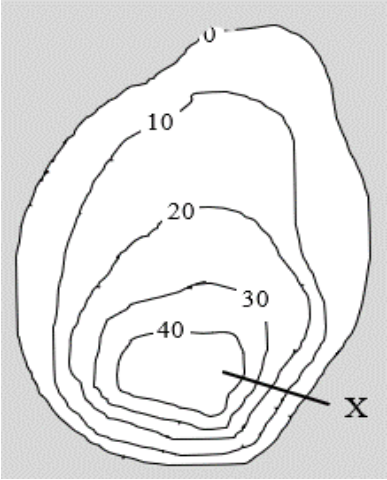
- A long valley caused where Earth's surface is pulled apart
    - Example: The Great Rift Valley in eastern Africa
- Earthquakes and volcanoes occur along the valley

Volcano

- An opening in Earth's surface out of which lava, hot gases, and ash erupt

Topographic Symbols That Could Be Used on the State Assessment

Contour Lines

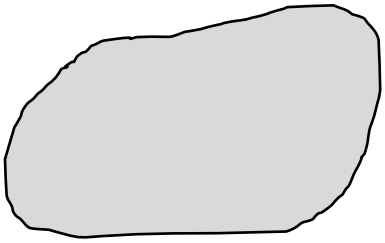


Contour interval- 10 meters

Contour lines connect areas of the same elevation.

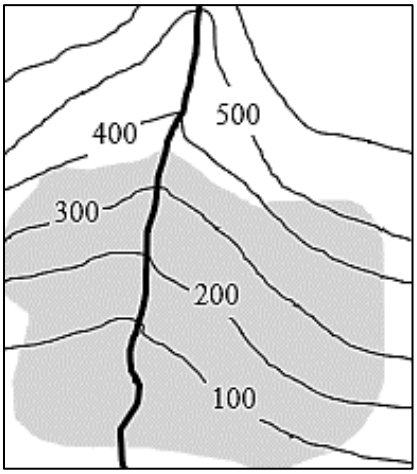
- Students **will not be asked** to give specific elevations but are expected to understand that the closer the lines are together, the steeper the surface of Earth.
- Students are expected to compare elevations based on the elevation written along the contour line (e.g., higher vs lower, etc.)
- Students are expected to understand that a contour line represents a change in elevation called a contour interval. This information will be provided on a map.
- A contour line that is a closed circle (X) represents the top of a hill or mountain. Students should recognize that a closed circle represents the top of a hill or mountain but **will not be asked** to identify a labeled circle as a mountain top or to identify or provide the elevation.

Bodies of Water



For state assessment items, bodies of water (e.g., lake, river, ocean, etc.) are represented by a grayscale area enclosed or bordered by a blackline. Students should recognize the symbol for what is represented but will not be asked the elevation or to label the symbol.

Rivers, Streams, and Wooded Areas



Rivers and streams are represented by black lines that are bolder than the contour lines. Students should recognize the symbol for what is represented but **will not be asked** specific elevations along the flow or to label the symbol. Contour lines will always be labeled
with the elevation, but students should know that the "v" shape along rivers and streams always points to higher elevation.

On state assessment items, forested/wooded areas will be represented in grayscale shading. Students should recognize the gray areas as land that is covered by forests/woods.

Earth and Human Activity
4-ESS3-1
Performance Expectation: Obtain and combine information to describe that energy and fuels are derived from natural resources and how their uses affect the environment.
Clarification Statement: Examples of renewable resources could include wind energy, water behind dams, and sunlight; non-renewable resources are fossil and nuclear fuels.
Assessment Boundary: None

DCI: 4-ESS3.A.1,2 **/** 4-ETS2.A.1 / 4-ETS2.B.2 **SEP:** 4-VIII.a **CCC:** 4.CE.1

Phenomenon-Related Terminology That Could Be Used in Items Specific 4-ESS3-1

- biomass
- dam
- fossil fuel
- habitat loss
- hydroelectric energy
- natural resources
- non-renewable energy
- nuclear energy/fuel
- oil
- petroleum
- pollution
- renewable energy
- solar energy
- solar panel
- turbine
- windmill
- wind energy

4-ESS3-1 On the state assessment, items may not:
- require students to demonstrate knowledge of energy resources or environmental effects beyond those mentioned in "*For State Assessment Purposes*"; or
- use the term "fissile" or "fission" when describing nuclear fuels.

4-ESS3-1 For State Assessment Purposes
- Environmental effects are limited to the following:
  - habitat destruction due to:
    - building of dams,
    - mining of coal and other resources, and
    - drilling for fossil fuels such as petroleum.
  - air pollution by the burning of fossil fuels; and
  - water pollution by the spilling or discharge of liquid fossil fuels.
  - Wind turbines can harm wildlife and create noise pollution.
  - Solar energy requires large amounts of land for the solar panels which creates hazardous materials during manufacturing, disruption of animal and plant habitats, and prevents animals from migrating and nesting.
- Examples of renewable energy are limited to wind energy, hydropower, and solar energy.
- Examples of non-renewable energy are limited to fossil fuels and nuclear energy.
- Students are expected to understand that natural resources are derived from the natural environment, e.g. wind, water, solar energy, fossil fuels, mined Earth materials.

4-ESS3-2
Performance Expectation: Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
Clarification Statement: Examples of solutions could include designing Earthquake or hurricane resistant buildings, improving monitoring of tornadic or volcanic activity, and constructing waterways for floodwater.
Assessment Boundary: Assessment is limited to earthquakes, floods, hurricanes, tornadoes,
and coastal erosion.*

*The State Assessment Boundary applies **only** to items developed for SC READY Grade 4 Science that directly measure 4-ESS3-2 and **not** to any other Performance Expectation.

DCI: 4-ESS3.B.1 / 4-ETS1.B.2 / 4-ETS2.B.1 **SEP:** 4-VI.c **CCC:** 4.CE.1

Phenomenon-Related Terminology That Could Be Used in Items Specific to 4-ESS3-2

- base isolation
- earthquake
- earthquake rod
- estuary
- evacuate
- flood
- floodplain
- hurricane
- levee
- natural disaster
- reinforce
- restore
- seawall
- shear wall
- storm surge
- stilts
- tornado

4-ESS3-2 On the state assessment, items may not:
- describe or name specific natural disasters; or
- use solutions and environmental impacts beyond those found in terms table found above and the *Solutions and Environmental Impacts That Could Be Used on the State Assessment*.

4-ESS3-2 For state assessment purposes:
- See table titled *Solutions and Environmental Impacts That Could Be Used on the State Assessment* on the following page for applicable solutions and techniques beyond the listed terminology.
- Constraints are limited to cost, materials, time, and relevant scientific information.

(Continued on next page.)

Solutions and Environmental Impacts That Could Be Used on the State Assessment

Beach replenishment

- Replacing sand removed by coastal erosion by pulling it from other locations
- Negative impacts:
    - Costly and temporary
    - Disrupts and harms native wildlife
- Positive impacts
    - Restores beaches used by tourists
    - Helps protect homes and businesses

Conservation and restoration of floodplains and wetlands

- Protect new buildings in floodplains and marsh areas
- Restoration removes buildings and other harmful factors to restore the natural condition
- Positive impacts
    - Reduces the loss of property and life
    - Control of building in frequently flooded areas
    - Restores habitats and environments

Early warning systems

- Warn people in communities of approaching hazards such as:
    - Fire: smoke detectors
    - Severe weather: emergency weather warnings by notification on phone, radio, television, sirens
    - Tsunami: notifications after an earthquake, sirens
    - Floods: notifications on radio and television

Earthquake resistant buildings

- Strengthening buildings to reduce damage in an earthquake
    - Shear walls (reinforced walls)
    - Base isolation
    - Earthquake rods
- Positive impacts
    - Reduces loss of property and life

Reducing property damage and death due to high winds (hurricanes and tornadoes)

- Building techniques that reduce damage in hurricanes and tornadoes
    - Wind resistant roofs and storm shutters
    - Storm shutters
- Positive impacts
    - Reduces loss of property and life

Reducing flood damage (including flooding due to hurricane storm surge)

- Methods to mitigate damage and loss of life in areas where high water is a hazard
    - Build structures on stilts in areas where there is frequent flooding
    - Digging ditches and catchments to collect runoff in heavy rains
    - Keep storm drains cleaned new lines build levees along rivers

- Positive impacts
    - Reduces loss of property and life
- Negative impacts
    - Levees can cause flooding in other areas up-river
    - Catchments, ditches, and levees can disrupt natural habitats
    - Catchments and ditches are breeding grounds for mosquitos that carry diseases

Seawalls

- Protects land and buildings from waves and high tides
- Positive impacts
    - Protects human communities
- Negative impacts
    - Loss of beach access to humans
    - Loss of natural habitats

Grade 4 Condensed Disciplinary Core Idea Foundation Statements

The information below contains the specific Disciplinary Core Idea foundation statements for Grade 4 as found in the *South Carolina College- and Career-Ready Science Standards 2021*.

PS3: Energy

4-PS3.A—Definitions of Energy

1. The faster we give an object is moving, the more energy it possesses. (4-PS3-1)
2. Energy can be moved [transferred] from place to place by moving objects or through sound, light, or electrical currents. (4-PS3-2, 4-PS3-3)

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

1. (a) Energy is present whenever there are moving objects , sound, light, or heat. (b) 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)
2. Light also transfers energy from place to place. (4-PS3-2)
3. (a) 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. (b) The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2, 4-PS3-4)

4-PS3.C—Relationship Between Energy and Forces

1. When objects collide, the contact forces transfer energy changing the motions of the objects. (4-PS3-3)

4-PS3.D—Chemical Processes and Everyday Life

1. The expression "produced energy" typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4)

PS4: Waves

4-PS4.A—Wave Properties

1. (a) Waves, which are regular patterns of motion, can be made in water by disturbing the surface. (b) When waves move across the surface of deep water, the water goes up and down in place; it does not move in the direction of the wave except when the water meets the beach. (4-PS4-1)
2. Waves at the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks[sic]). (4-PS4-1)

(Continued on next page.)

4-PS4.B—Electromagnetic Radiation

1. An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2)

4-PS4.C—Information Technologies and Instrumentation

1. (a) Digitized information is transmitted over long distances without significant degradation. (b) High-tech devices, such as computers or cell phones, can receive and decode information—converted from digitized form to voice—and vice versa. (4-PS4-3)
2. When in digitized form, information can be recorded, stored for future recovery, and transmitted over long distances without significant degradation of the wave. (4-PS4-3)

LS1: From Molecules to Organisms

4-LS1.A—Structures and Function

1. Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)

4-LS1.D—Information Processing

1. Different sense receptors are specialized for kinds of information, which may then be processed by the animal's brain. (4-LS1-2)
2. Animals can use their perceptions and memories to guide their actions. (4-LS1-2)

ESS1: Earth's Place in the Universe

4-ESS1.C—The History of Planet Earth

1. Local, regional climate and global patterns of rock formations revealed changes overtime 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)

ESS2: Earth's Systems

4-ESS2.A—Earth Materials and Systems

1. Rainfall helps to shape the land and affects the types of living things found in a region. (4-ESS2-1)
2. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1)

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

1. 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 ranges form inside continents or near their edges. (4-ESS2-2)
2. Maps can help locate the different land and water features of the Earth. (4-ESS2-2)

4-ESS2.E—Biogeology

1. Living things affect the physical characteristics of their regions. (4-ESS2-1)

ESS3: Earth and Human Activity

ESS3.A—Natural Resources

1. All materials, energy, and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. (4-ESS3-1)
2. Some resources are renewable overtime and others are not. (4-ESS3-1)
3. Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. (4-ESS3-1)

ESS3.B—Natural Hazards

1. A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (4-ESS3-2)

ETS1: Engineering, Technology, and the Application of Science

4-ETS1.A—Defining and Delimiting Engineering Problems

1. 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). (4-PS3-4)
2. Different proposals for solutions can be compared based on how well each one meets the specified criteria or how well each takes the constraints into account. (4-PS3-4)

4-ETS1.B—Developing Possible Solutions

1. 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. (4-ESS3-2)
2. Testing a solution involves investigating how well it performs under a range of likely conditions. (4-ESS3-2)
3. Communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (4-ESS3-2)

4-ETS1.C—Optimizing the Design Solution

1. Different solutions need to be tested in order to determine which of the best solves the problem, given the criteria and the constraints. (4-PS4-3)

ETS2: Connections to Engineering, Technology and Applications of Science

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

1. Knowledge of relevant scientific concepts and research findings is important in engineering. (4-PS4-3, 4-ESS3-1)

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

1. Engineers improve existing technologies or develop new ones to increase their benefits, reduce known risks, and meet societal demands. (4-PS3-4,4-ESS3-2)
2. Over time, human needs and wants change, as do the demands for new and improved technologies. (4-ESS3-1)

Grade 4 Condensed Science and Engineering Practice Foundation Statements

The information below contains the specific Crosscutting Concept foundation statements for Grade 4 as found in the *South Carolina College- and Career-Ready Science Standards 2021*.

4-I. Asking Questions and Defining Problems

Asking questions and defining problems in grades 3–5 bills on grades K–2 experiences and progresses to specifying qualitative relationships.

- **a.** Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause-and-effect relationships. (4-PS3-3)

4-II. Developing and Using Models

Modeling in 3–5 bills on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- **a.** Develop a model using an analogy, example, or abstract representation to describe a scientific principle. (4-PS4-1)
- **b.** Develop and/or use models to describe phenomena. (4-PS4-2)
- **c.** Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2)

4-III. 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.

- **a.** 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, 4-ESS2-1)

4-IV. 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.

- **a.** Analyze and interpret data to make sense of phenomena, using logical reasoning. (4-ESS2-2)

4-V. Using Mathematics and Computational Thinking

(not included on any PE at this grade level)

4-VI. Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions and 3–5 bills on K–2 experiences and progress is to the use of evidence and constructing explanations that specify variables that describe and predict phenomenon in designing multiple solutions to design problems.

- **a.** Use evidence (e. g., measurements, observations, patterns) to construct an explanation or design a solution to a problem.
- **b.** Apply scientific ideas to solve design problems. (4-PS3-4)
- **c.** Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-PS4-3,4-ESS3-2)
- **d.** Identify the evidence that supports particular points in an explanation. (4-ESS1-1)

4-VII. 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 design world(s).

- **a.** Construct and/ or support an argument with evidence, data, and/ or a model. (4-LS1-1)

4-VIII. Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progress is to evaluate the merit and accuracy of ideas and methods.

- **a.** Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (4-ESS3-1)

Grade 4 Condensed Crosscutting Concept Foundation Statements

The information below contains the specific Crosscutting Concept foundation statements for Grade 4 as found in the *South Carolina College- and Career-Ready Science Standards 2021*.

4.P. Patterns
Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.

1. Similarities and differences in patterns can be used to sort, classify, communicate, and analyze simple rates of change for natural phenomena and classify designed products. (4-PS4-1, 4-PS4-3)
2. Patterns can be used as evidence to support an explanation. (4-ESS1-1, 4-ESS2-2)

4.CE. Cause and Effect: Mechanism and Prediction
Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated is a major activity of science and engineering.

1. Cause-and-effect relationships are routinely identified, tested, and used to explain change. (4-PS4-2, 4-ESS2-1,4-ESS3-1, 4-ESS3-2)

4.SPQ. Scale, Proportion, and Quantity
In considering phenomena, it is critical to recognize what is relevant at different size, time, and energy scales, and to recognize proportional relationships between different quantities as scales change.

4.SSM. Systems and System Models
A system is an organized group of related objects or components, models can be used for understanding and predicting the behavior of systems.

1. A system can be described in terms of its components in their interactions. (4-LS1-1, 4-LS1-2)

4.EM. Energy and Matter: Flows, Cycles, and Conservation
Tracking energy and matter flows, into, out of, and within systems

1. Energy can be transferred in various ways and between objects. (4-PS3-1, 4-PS3-2, 4-PS3-3,4-PS3-4)

4.SF. Structure and Function (not included on any PEs at this grade level)

4.SC. Stability and Change (not included on any PEs at this grade level)

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