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## **SC READY Science Grade 6 2025 Data Review Report**

Office of Assessment and Standards

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*South Carolina Department of Education*

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## **Introduction**

Data Recognition Corporation and the South Carolina Department of Education (SCDE) Office of Assessment and Standards convened a committee of content experts to review item-level data from the Spring 2025 SC READY Grade 6 Operational Test. The committee analyzed and discussed the items and the data. The committee acknowledged the demanding work of South Carolina educators and offered these relevant and useful instructional strategies.

The Data Review committee was mindful that the [South Carolina College- and Career-Ready Science Standards 2021](#) were fully implemented for the first time in the 2023–2024 school year. These strategies reflect the higher rigor of the new standards.

### **Assessing the Practices and Crosscutting Concepts in Science:**

Science is unique among the content areas in that students are presented with a variety of graphics that communicate data and information about the natural world. This requires assessment items (test questions) to present a variety of graphics, for example, models, data tables, graphs, diagrams, etc. These types of graphics and the tools and features of the testing platform are presented for students to practice with on the [Online Tools Training \(OTT\)](#). Students need to have opportunities to interact with the OTT throughout the year to practice using these tools to support their performance on state science assessments.

We encourage teachers to use the resources posted on the SCDE website for guidance on instruction. Go to [Instructional Resources](#) to find the Vertical Articulations, Performance Targets, Bundling Guides, guidance on using the SEPs and CCCs and many more helpful resources.

## **Overarching Themes**

The following main themes consistently emerged as areas of emphasis during committee discussions.

### ***Claim-Evidence-Reasoning (CER)***

The practice of CER builds critical thinking and argumentation skills, helps students use data to justify conclusions, and reinforces scientific literacy. CER weaves throughout all instruction and should become part of regular practice for students. The committee recommends the following instructional strategies using CER to deepen students' understanding of scientific concepts.

- Provide students opportunities to make claims and use evidence from data to support their claims.
- Allow students to be challenged by their peers and engage in argument using evidence from models, text, and experimental data.
- Require students to use chains of reasoning, especially with more complex observations.
- Ask students to make text-based inferences and cite evidence from the text that support rationales and inferences.
- Require students to justify or provide reasoning for revisions of models, solutions, and designs.

### ***Models***

The development and use of models is consistently identified as an area for growth by data review committees. Models that explain or illustrate simple to complex systems and phenomena take many different forms and should be incorporated throughout instruction.

#### **General Recommendations:**

- Students should understand scale when constructing, evaluating, and interacting with models.
- Expose students to a variety of models and scaffold the development process of modeling. Students should be able to:
  - Identify the components of the model.
  - Explain the relationships among the components of the model.
  - Evaluate and revise models that better support the intent of the model.
  - Generate and peer-evaluate models.

### **Maps and Map Skills**

- Strengthen and reinforce students' skills in the use and interpretation of maps.
  - Use of the compass rose and keys on maps.
  - Maps that represent Earth in the past, for example:
    - Geological and fossil evidence supporting Pangaea
    - Location of glaciers and sea levels
  - World maps, for example:
    - Provide practice for students to recognize and analyze patterns.
      - Seafloor features indicating plate boundaries
      - Geological activity (volcanic and earthquake)
      - Movement of ocean currents
  - Weather maps, for example:
    - Expose students to real-time weather.
    - Students should be explaining observations in terms of direction, temperature, precipitation, humidity, and winds.

### **Modeling Cycles**

- Provide examples and require students to construct models representing more than one cycle and explain the relationship among the components. For example:
  - Models of the water cycle and phase change
  - Models of the rock cycle and the water cycle

### ***Collecting, Communicating, and Analyzing Data and Information***

Students must use data and other information to explain the natural world by identifying patterns, trends, and cause-and-effect relationships. Science provides the opportunity for students to incorporate the skills developed in ELA and mathematics to become critical consumers of information. Science requires empirical data to support arguments and claims, which reinforces students' ability to become critical consumers of information.

- Using graphs, table, and maps students should:
  - Identify trends,
  - Explain relationships among variables,
  - Summarize the data/information, and/or
  - Use the data/information as evidence to refute or support an argument/claim.
- Students should be constructing and interpreting multiple line graphs to communicate data.
- Provide practice in the collection, recording, and analysis of data/information using scientific conventions.
- Enrich the sense-making of phenomena by providing grade-level text related to the history behind the discoveries in the natural world. For example:
  - Schleiden, Schwann, and Virchow and the cell theory
  - Alfred Wegener and continental drift
  - Scientific Revolution (This connects to 6.3.CC, page 56 of the [South Carolina Social Studies College and Career-Ready Standards 2019.](#))

### ***Investigating the Natural World***

Students should become fluent in planning and conducting investigations (experiments). The general areas of note are summarized below.

- Provide opportunities for students to plan their own investigations.
  - State the claim/hypothesis/prediction.
  - Identify variables and constants.
  - Plan for at least three trials for each level of the independent variable.
  - Determine what evidence is needed to make a conclusion.
  - Explain how the dependent variable will be measured.
  - Make a conclusion whether the claim/hypothesis/prediction was supported or was not supported.
  - Discuss possible errors that could have caused the claim/hypothesis/prediction to not be supported.

### ***Building Connections and Identifying Relationships***

Students should make content connections among natural processes and the movement of energy and matter throughout the school year. The relationship between energy and matter is an overarching theme across the Performance Expectations (PE). This ability to make connections is foundational to science, moves beyond memorization, and helps students retain information and understand how to apply their knowledge to new contexts. [The SCDE Grade 6 Bundling Guide](#) provides examples of content connections you can use for instructional guidance.

#### **Connections Between Phenomena**

- Make connections among natural processes/systems and require students to explain the relationship between them:
  - The cycling of matter and energy.
    - The effects of temperature and the particles in matter.
    - Energy transfer through matter.
      - Thermal energy and the water cycle
    - Convection caused by Earth's internal heat and its effect on plate movement and the rock cycle
- Students should understand the connection between the water cycle, rock cycle, and the weather. For example:
  - Models that connect solar energy to the pathway that forms sedimentary rock (water and rock cycles)
  - Models that connect solar energy and its effect on air and ocean currents and how these affect climate and weather patterns

### **Scientific Terminology and Conventions**

- Connect scientific concepts/terminology to everyday life.
  - For example, instead of describing the weather as being “muggy,” use “humid” instead.
- Use metric units when discussing magnitude.
- Emphasize the Greek and Latin roots and affixes and their meanings in scientific terminology. This connects to ELA.6.AOR.9.1, page 97 of the [South Carolina College- and Career-Ready English Language Arts Standards 2023](#).

### **Classroom Assessments**

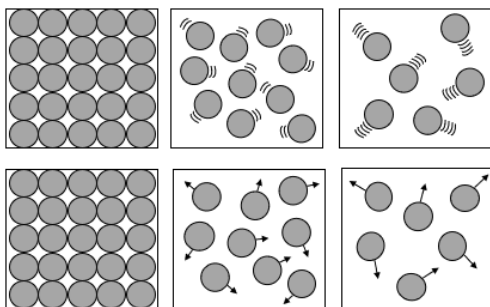
- Make sure the test banks provided by your instructional materials are tightly aligned to the standards.
- Provide opportunities for groups of students to work through multi-dimensional questions. Encourage discourse and argumentation.
- Use entrance/exit tickets to measure daily understanding.
- Review test-taking strategies with your students.
  - Focus on showing how the tools in the [Online Tools Training](#) module can help students.
    - Use the cross-off tool to omit the answer options that are wrong.
    - Use the highlighter to emphasize essential information.
    - Use the magnifier tool to see parts of models more clearly.
    - Use the notepad to record thoughts and information relevant to the correct answer.
    - Use the flag to mark items to go back to before exiting the test.
  - Explain the importance of reading the stimulus and ALL answer options before answering the question.

## Focused Strategies

The committee identified specific areas of focus during their discussions that align with several of the overarching themes. Only relevant PEs are listed.

### 6-PS1-4

- Students should investigate how phase change/particle motion effects:
  - The water cycle
  - Air pressure and the movement of air masses
- Provide opportunities for students to construct models that show particle density and particle motion as a substance undergoes phase change. For example:



### 6-PS3-3

- Require students to connect materials used in devices to energy transfer. For example:
  - Aluminum foil reflects light
  - Dark surfaces absorb light energy which is converted into heat energy.
  - Insulators resist the movement of heat energy.
  - Conductors promote the movement of heat energy.

### 6-LS1-1

- Students need to know that “living” things refer to organisms (alive or dead) and are biotic factors in an ecosystem. “Non-living” references abiotic factors in an ecosystem.
  - Onion skin is classified as a “living” thing. It was once alive.
  - Salt crystals are classified as “non-living.” It was never alive.

### 6-LS1-2

- Students are expected to understand that both photosynthesis and cellular respiration occur in plant cells. Thus, plant cells contain both chloroplasts and mitochondria while animal cells contain only mitochondria.
- Students must be able to identify and explain the relationship between chloroplasts and mitochondria.
- Reinforce the differences between photosynthesis and cellular respiration, including inputs and outputs.

### **6-LS1-3**

- Remind students the hierarchical organization of living things:
  - organelle→ cell→ tissue→ organ→ organ system→ organism
- Expose students to non-traditional hierarchical relationships. For example,
  - Blood is a tissue that is made up of different types of blood cells.
  - Skin is an organ composed of diverse types of tissues.
  - Compare how various organ systems function together to support an organism. For example:
    - the excretory and muscular systems, or
    - the circulatory and muscular system.

### **6-ESS1-4**

- Make sure students understand how to interpret geologic/stratigraphic columns
  - Reinforce the law of superposition by engaging students in hands-on activities that correlate older, deeper layers with more superficial, younger layers.
- Emphasize that information for the geologic time scale is arranged chronologically from the oldest at the bottom to the most recent at the top. On a number line, time is from oldest to youngest moving to the right.
  - Time unit abbreviations need to be reinforced.
    - Millions of years ago (mya).
    - Billions of years ago (bya).
- Geologic time is a good topic to reinforce scale when demonstrating how much time has passed since Earth formed (4.5 bya) and for how little of that time complex life has existed. For example, the Precambrian incorporates the earliest three eons (Hadean, Archean, and Proterozoic) which accounts for 88% of Earth's past.

### **6-ESS2-1**

- Relate the rock cycle to the water cycle and plate movement.
- Students need to understand that igneous rock is found both inside Earth and on Earth's surface.
- Students should understand that when molten material cools, it crystallizes.
  - Provide models showing the crystallization process as molten material cools.
  - This cooling of molten material connects to 6-PS3-3 in that molten material in an underground environment will lose thermal energy more slowly than molten material on or near Earth's surface.

### **6-ESS2-2**

- Provide information and images that represent how weathering and erosion affect the surface of Earth.
  - Expose students to examples (images or text) that explain types of weathering and erosion beyond the typical.
    - Landslides/ mass wasting
    - Glacial effects
    - Cave formation
  - Students should understand that some changes are gradual and some are catastrophic.

### **6-ESS2-3**

- Require students to interpret maps and diagrams and explain the differences between mid-ocean ridges and deep-sea trenches.

### **6-ESS2-4**

- Emphasize that solar energy and the force of gravity drive the water cycle.
  - Thermal energy is gained when evaporation and transpiration occur.
  - Thermal energy is lost when condensation occurs.
  - Gravity affects precipitation and runoff.

### **6-ESS2-5**

- Warmer air is less dense than cooler air; relate this to student knowledge about particle behavior and temperature [6-PS1-4].

## 6-ESS2-6

- When describing models showing the tilt of the Earth and the Sun, use the terms “tilted towards” and “tilted away.” Reinforce the fact that the tilt of the Earth and the resulting unequal heating of Earth’s surface generate the movement of air and water currents that are deflected by the rotation of the planet.
- Students should understand that solar distance is not a factor in this unequal heating, so avoid using “closer to” and “farther from” when discussing this.
  - This is an opportunity to promote student understanding of scale.
    - The models of a tilted Earth next to model of the Sun are not to scale.
  - The importance is how directly the Sun’s rays hit Earth’s surface.
    - Use a flashlight on a globe to demonstrate that the pattern of light from the flashlight is more circular near the equator and more oblate towards the poles. The more circular the pattern, the more concentrated the solar energy; the more oblate the pattern, the less concentrated the solar energy.