

Color-coded Georgia Standards of Excellence

Each standard in K-12 science courses begin with “Obtain, evaluate, and communicate...” The common language was intended by writers to provide consistency throughout courses, highlight the science practices, and incorporate scientific literacy. Simply put, it is what scientists do.

Science and engineering practices:

- Asking questions (science) and defining problems (engineering)
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics, information and computer technology, and computational thinking
- Constructing explanations (science) and designing solutions (engineering)
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

The color-coded standards are a visual of how the specific elements of science standards engage *students* in obtaining, evaluating, and communicating information.

	Obtain	• Obtain Information • Ask Questions/Define Problems • Plan & Carry Out Investigations • Use Models to Gather Data • Use Mathematics and Computational Thinking
	Evaluate	• Evaluate Information • Analyze Data • Use Mathematics and Computational Thinking • Construct Explanations/Solve Problems • Developing Arguments from Evidence • Use Models to Predict & Develop Evidence
	Communicate	• Communicate Information • Using Argue from Evidence (written/oral) • Use Models to Communicate

Various practices require students to obtain, evaluate, and communicate information simultaneously; see the following example of 7th grade life science:

S7L4c. Analyze and interpret data to provide evidence for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems.

The first part of the science practice involves *evaluating* information as students analyze and interpret data; in addition, since they are providing evidence, this practice also requires students to *communicate* their findings and analysis.

Earth and Space Science

S4E1. Obtain, evaluate, and communicate information to compare and contrast the physical attributes of stars and planets.

- Ask questions to compare and contrast technological advances that have changed the amount and type of information on distant objects in the sky.
- Construct an argument** on why some stars (including the Earth's sun) appear to be larger or brighter than others.
(*Clarification statement:* Differences are limited to distance and size, not age or stage of evolution.)
- Construct an explanation** of the differences between stars and planets.
- Evaluate strengths and limitations** of models of our solar system in describing relative size, order, appearance and composition of planets and the sun.
(*Clarification statement:* Composition of planets is limited to rocky vs. gaseous.)

S4E2. Obtain, evaluate, and communicate information to model the effects of the position and motion of the Earth and the moon in relation to the sun as observed from the Earth.

- Develop a model** to support an explanation of why the length of day and night change throughout the year.
- Develop a model based on observations to describe the repeating pattern of the phases of the moon (new, crescent, quarter, gibbous, and full).
- Construct an explanation** of how the Earth's orbit, with its consistent tilt, affects seasonal changes.

S4E3. Obtain, evaluate, and communicate information to demonstrate the water cycle.

- Plan and carry out investigations to observe the flow of energy in water as it changes states from solid (ice) to liquid (water) to gas (water vapor) and changes from gas to liquid to solid.
- Develop models** to illustrate multiple pathways water may take during the water cycle (evaporation, condensation, and precipitation).
(*Clarification statement:* Students should understand that the water cycle does not follow a single pathway.)

S4E4. Obtain, evaluate, and communicate information to predict weather events and infer weather patterns using weather charts/maps and collected weather data.

- Construct an explanation** of how weather instruments (thermometer, rain gauge, barometer, wind vane, and anemometer) are used in gathering weather data and making forecasts.
- Interpret data from weather maps, including fronts (warm, cold, and stationary), temperature, pressure, and precipitation to make an informed prediction about tomorrow's weather.
- Ask questions and use observations of cloud types (cirrus, stratus, and cumulus) and data of weather conditions to predict weather events.
- Construct an explanation based on research to communicate the difference between weather and climate.

Physical Science

S4P1. Obtain, evaluate, and communicate information about the nature of light and how light interacts with objects.

- Plan and carry out investigations** to observe and record how light interacts with various materials to classify them as opaque, transparent, or translucent.
- Plan and carry out investigations** to describe the path light travels from a light source to a mirror and how it is reflected by the mirror using different angles.
- Plan and carry out an investigation** utilizing everyday materials to explore examples of when light is refracted.

(Clarification statement: Everyday materials could include prisms, eyeglasses, and a glass of water.)

S4P2. Obtain, evaluate, and communicate information about how sound is produced and changed and how sound and/or light can be used to communicate.

- Plan and carry out an investigation** utilizing everyday objects to produce sound and predict the effects of changing the strength or speed of vibrations.
- Design and construct a device** to communicate across a distance using light and/or sound.

S4P3. Obtain, evaluate, and communicate information about the relationship between balanced and unbalanced forces.

- Plan and carry out an investigation** on the effects of balanced and unbalanced forces on an object and communicate the results.
- Construct an argument** to support the claim that gravitational force affects the motion of an object.
- Ask questions** to identify and explain the uses of simple machines (lever, pulley, wedge, inclined plane, wheel and axle, and screw) and how forces are changed when simple machines are used to complete tasks.

(Clarification statement: The use of mathematical formulas is not expected.)

Life Science

S4L1. Obtain, evaluate, and communicate information about the roles of organisms and the flow of energy within an ecosystem.

- Develop a model** to describe the roles of producers, consumers, and decomposers in a community.

(Clarification statement: Students are not expected to identify the different types of consumers – herbivores, carnivores, omnivores and scavengers.)

- Develop simple models** to illustrate the flow of energy through a food web/food chain beginning with sunlight and including producers, consumers, and decomposers.



- c. **Design a scenario** to demonstrate the effect of a change on an ecosystem.
(*Clarification statement:* Include living and non-living factors in the scenario.)
- d. **Use printed and digital data to develop a model** illustrating and describing changes to the flow of energy in an ecosystem when plants or animals become scarce, extinct or over-abundant.



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