

GRADE 1 OVERVIEW

In kindergarten through grade two, the standards and performance indicators for the science and engineering practices and core science content emphasize students making observations and explanations about phenomena they can directly explore and investigate. Student experiences should be structured as they begin to learn the features of a scientific investigation and engage in the practices of science and engineering. The seven core concepts (patterns; cause and effect; scale, proportion, and quantity; systems and system models; energy and matter; structure and function; and stability and change) are reinforced in the appropriate context of the core science content through hands-on instruction in the classroom.

These academic standards and performance indicators establish the practices and core content that South Carolina's students should know and be able to do by the end of grade one.

The four core areas of the grade one standards include:

- Exploring Light and Shadows
- Exploring the Sun and Moon
- Earth's Natural Resources
- Plants and Their Environments

The eight science and engineering practices describe how students should learn and demonstrate knowledge of the content outlined in the content standards. Engaging in these practices will help students become scientifically literate and astute consumers of scientific information.

Students should engage in scientific and engineering practices as a means to learn about the specific topics identified for their grade level. It is critical that educators understand the Science and Engineering Practices are *not* to be taught in isolation. There should *not* be a distinct "Inquiry" unit at the beginning of each school year. Rather, the practices need to be employed *within the content* for each grade level.

Teachers, schools, and districts should use these standards and indicators to provide a wide variety experiences, materials, and instructional strategies that accommodate a broad range of individual differences. These standards support active engagement in learning. Classrooms will need to be supplied with the materials and equipment necessary to complete scientific investigations.

The academic standards and performance indicators for grade one should be the basis for the development of classroom and grade-level assessments. Students must demonstrate knowledge of the science and engineering practices and core content ideas in preparation for future science learning.

GRADE ONE SCIENCE AND ENGINEERING PRACTICES

NOTE: Scientific investigations should always be done in the context of content knowledge expected at this grade level. The standard describes how students should learn and demonstrate knowledge of the content outlined in the other standards.

Standard 1.S.1: The student will use the science and engineering practices, including the processes and skills of scientific inquiry, to develop understandings of science content.

1.S.1A. Conceptual Understanding: The practices of science and engineering support the development of science concepts, develop the habits of mind that are necessary for scientific thinking, and allow students to engage in science in ways that are similar to those used by scientists and engineers.

Performance Indicators: Students who demonstrate this understanding can:

- 1.S.1A.1** Ask and answer questions about the natural world using explorations, observations, or structured investigations.
- 1.S.1A.2** Develop and use models to (1) understand or represent phenomena, processes, and relationships, (2) test devices or solutions, or (3) communicate ideas to others.
- 1.S.1A.3** With teacher guidance, conduct structured investigations to answer scientific questions, test predictions and develop explanations: (1) predict possible outcomes, (2) identify materials and follow procedures, (3) use appropriate tools or instruments to collect qualitative and quantitative data, and (4) record and represent data in an appropriate form. Use appropriate safety procedures.
- 1.S.1A.4** Analyze and interpret data from observations, measurements, or investigations to understand patterns and meanings.
- 1.S.1A.5** Use mathematical and computational thinking to (1) recognize and express quantitative observations, (2) collect and analyze data, or (3) understand patterns and relationships.
- 1.S.1A.6** Construct explanations of phenomena using (1) student-generated observations and measurements, (2) results of scientific investigations, or (3) data communicated in graphs, tables, or diagrams.
- 1.S.1A.7** Construct scientific arguments to support claims or explanations using evidence from observations or data collected.
- 1.S.1A.8** Obtain and evaluate informational texts, observations, data collected, or discussions to (1) generate and answer questions about the natural world, (2) understand phenomena, (3) develop models, or (4) support explanations. Communicate observations and explanations clearly through oral and written language.

GRADE ONE
SCIENCE AND ENGINEERING PRACTICES (*CONTINUED*)

1.S.1B. Conceptual Understanding: Technology is any modification to the natural world created to fulfill the wants and needs of humans. The engineering design process involves a series of iterative steps used to solve a problem and often leads to the development of a new or improved technology.

Performance Indicators: Students who demonstrate this understanding can:

1.S.1B.1 Construct devices or design solutions to solve specific problems or needs: (1) ask questions to identify problems or needs, (2) ask questions about the criteria and constraints of the devices or solutions, (3) generate and communicate ideas for possible devices or solutions, (4) build and test devices or solutions, (5) determine if the devices or solutions solved the problem, and (6) communicate the results.

GRADE ONE

PHYSICAL SCIENCE: EXPLORING LIGHT AND SHADOWS

Standard 1.P.2: The student will demonstrate an understanding of the properties of light and how shadows are formed.

1.P.2A. Conceptual Understanding: Objects can only be seen when light shines on them. Some materials allow light to pass through them; others allow only some light to pass through; and some do not allow any light to pass through and will create a shadow of the object. Technology such as mirrors can change the direction of a beam of light.

Performance Indicators: Students who demonstrate this understanding can:

- 1.P.2A.1** Obtain and communicate information to describe how light is required to make objects visible.
- 1.P.2A.2** Analyze and interpret data from observations to compare how light behaves when it shines on different materials.
- 1.P.2A.3** Conduct structured investigations to answer questions about how shadows change when the position of the light source changes.
- 1.P.2A.4** Develop and use models to describe what happens when light shines on mirrors based on observations and data collected.

GRADE ONE

EARTH SCIENCE: EXPLORING THE SUN AND MOON

Standard 1.E.3: The student will demonstrate an understanding of the patterns of the Sun and the Moon and the Sun's effect on Earth.

1.E.3A. Conceptual Understanding: Objects in the sky move in predictable patterns. Some objects are better seen in the day sky and some are better seen in the night sky. The Sun is a star that provides heat and light energy for Earth.

Performance Indicators: Students who demonstrate this understanding can:

- 1.E.3A.1** Use, analyze, and interpret data from observations to describe and predict seasonal patterns of sunrise and sunset.
- 1.E.3A.2** Use data from personal observations to describe, predict, and develop models to exemplify how the appearance of the moon changes over time in a predictable pattern.
- 1.E.3A.3** Obtain and communicate information to describe how technology has enabled the study of the Sun, the Moon, planets, and stars.
- 1.E.3A.4** Conduct structured investigations to answer questions about the effect of sunlight on Earth's surface.
- 1.E.3A.5** Define problems related to the warming effect of sunlight and design possible solutions to reduce its impact on a particular area.

GRADE ONE

EARTH SCIENCE: EARTH'S NATURAL RESOURCES

Standard 1.E.4: The student will demonstrate an understanding of the properties and uses of Earth's natural resources.

1.E.4A. Conceptual Understanding: Earth is made of different materials, including rocks, sand, soil, and water. An Earth material is a resource that comes from Earth. Earth materials can be classified by their observable properties.

Performance Indicators: Students who demonstrate this understanding can:

1.E.4A.1 Analyze and interpret data from observations and measurements to compare the properties of Earth materials (including rocks, soils, sand, and water).

1.E.4A.2 Develop and use models (such as drawings or maps) to describe patterns in the distribution of land and water on Earth and classify bodies of water (including oceans, rivers and streams, lakes, and ponds).

1.E.4A.3 Conduct structured investigations to answer questions about how the movement of water can change the shape of the land.

1.E.4B. Conceptual Understanding: Natural resources are things that people use that come from Earth (such as land, water, air, and trees). Natural resources can be conserved.

Performance Indicators: Students who demonstrate this understanding can:

1.E.4B.1 Obtain and communicate information to summarize how natural resources are used in different ways (such as soil and water to grow plants; rocks to make roads, walls, or buildings; or sand to make glass).

1.E.4B.2 Obtain and communicate information to explain ways natural resources can be conserved (such as reducing trash through reuse, recycling, or replanting trees).

GRADE ONE

LIFE SCIENCE: PLANTS AND THEIR ENVIRONMENTS

Standard 1.L.5: The student will demonstrate an understanding of how the structures of plants help them survive and grow in their environments.

1.L.5A. Conceptual Understanding: Plants have specific structures that help them survive, grow, and produce more plants. Plants have predictable characteristics at different stages of development.

Performance Indicators: Students who demonstrate this understanding can:

1.L.5A.1 Obtain and communicate information to construct explanations for how different plant structures (including roots, stems, leaves, flowers, fruits, and seeds) help plants survive, grow, and produce more plants.

1.L.5A.2 Construct explanations of the stages of development of a flowering plant as it grows from a seed using observations and measurements.

1.L.5B. Conceptual Understanding: Plants have basic needs that provide energy in order to grow and be healthy. Each plant has a specific environment where it can thrive. There are distinct environments in the world that support different types of plants. These environments can change slowly or quickly. Plants respond to these changes in different ways.

Performance Indicators: Students who demonstrate this understanding can:

1.L.5B.1 Conduct structured investigations to answer questions about what plants need to live and grow (including air, water, sunlight, minerals, and space).

1.L.5B.2 Develop and use models to compare how the different characteristics of plants help them survive in distinct environments (including deserts, forests, and grasslands).

1.L.5B.3 Analyze and interpret data from observations to describe how changes in the environment cause plants to respond in different ways (such as turning leaves toward the Sun, leaves changing color, leaves wilting, or trees shedding leaves).