

Fifth Grade Science Curriculum

The Georgia Performance Standards are designed to provide students with the knowledge and skills for proficiency in science at the fifth grade level. The Project 2061's *Benchmarks for Science Literacy* is used as the core of the curriculum to determine appropriate content and process skills for students. The GPS is also aligned to the National Research Council's *National Science Education Standards*. Technology is infused into the curriculum. The relationship between science, our environment, and our everyday world is crucial to each student's success and should be emphasized.

The performance standards should drive instruction. Hands-on, student-centered, and inquiry-based approaches should be the emphases of instruction. This curriculum is intended as a required curriculum that would show proficiency in science, and instruction should extend beyond the curriculum to meet student needs. Safety of the student should always be foremost in science instruction.

Science consists of a way of thinking and investigating, as well a growing body of knowledge about the natural world. To become literate in science, therefore, students need to acquire an understanding of both the **Characteristics of Science** and its **Content**. The Georgia Performance Standards for Science require that instruction be organized so that these are treated together. Therefore, **A CONTENT STANDARD IS NOT MET UNLESS APPLICABLE CHARACTERISTICS OF SCIENCE ARE ALSO ADDRESSED AT THE SAME TIME**. For this reason they are presented as co-requisites.

This Performance Standards include four major components. They are

The Standards for Georgia Science Courses. The Characteristics of Science co-requisite standards are listed first, followed by the Content co-requisite standards. Each Standard is followed by elements that indicate the specific learning goals associated with it.

Tasks that students should be able to perform during or by the end of the course. These are keyed to the relevant Standards. Some of these can serve as activities that will help students achieve the learning goals of the Standard. Some can be used to assess student learning, and many can serve both purposes.

Samples of student work. As a way of indicating what it takes to meet a Standard, examples of successful student work are provided. Many of these illustrate how student work can bridge the Content and Characteristics of Science Standards. The Georgia DOE Standards web site will continue to add samples as these domains are identified and teachers are encouraged to submit examples from their own classroom experiences.

Teacher Commentary. Teacher commentary is meant to open the pathways of communication between students and the classroom teacher. Showing students why they did or did not meet a standard enables them to take ownership of their own learning.

Georgia Performance Science Standards-- Explanation of Coding

Characteristics of Science Standards

SKCS1

Science Kindergarten Characteristics of Science Standard #1****

S8CS2

Science Grade **8 Characteristics of Science Standard #**2****

SCSh8

Science Characteristics of Science high school Standard #8****

Content Standards

S5P3

Science Grade **5 Physical Science Standard #**3****

S4E2

Science Grade **4 Earth Science Standard #**2****

S7L4

Science Grade **7 Life Science Standard #**4****

SC1

Science Chemistry Standard #1****

SB4

Science Biology Standard #4****

SPS6

Science Physical Science Standard #6****

SP3

Science Physics Standard #3****

Fifth grade students offer reasons for findings and consider reasons offered by others. They keep records of investigations and observations and understand why they should not alter records. They use numerical data to describe and compare objects. They will convert the fractions (halves, thirds, fourths, fifths, tenths, and hundredths) to decimals in scientific calculations. They identify the largest and smallest possible value of something. Fifth graders use cameras and tape recorders to gather and record information. They use reference books, back issues of magazines or newspapers, and computer databases to locate scientific information. They use the information found in these sources to support statements. Fifth graders realize that safety is a fundamental concern in all experimental science and follow safety guidelines. They wear goggles any time chemicals, glassware, or heat is used.

Evidence

Fifth grade students investigate scientific concepts. They understand that science is a process for gaining knowledge about the natural world. Students are active learners and use hands on activities to discover and explain phenomena. They are able to conduct experiments and report their findings in the form of written reports, charts, and various other presentations including multi-media projects. Their scientific explanations emphasize evidence and begin to use scientific principles, models, and theories.

Major Concepts/Skills:	Concepts/Skills to Maintain
Earth Science	Habits of Mind
Landforms of Georgia	Records observations
Effects of constructive forces	Offers and considers reasoning
Effects of destructive forces	Quantifies data
Role of technology in control	Measures and estimates
Physical Science	Uses scientific tools
Introduction to conservation of matter	Assembles, describes, takes apart, and reassembles
Physical Changes	Identifies parts and makes models
Chemical Changes	Describes changes
Electricity and magnetism	Compares physical attributes
Life Science	Draws and sketches
Classification of organisms	Questions and seeks to find answers
Inheritance of traits	Researches for scientific information
Learned behaviors	Replicates investigations
Cells and microorganisms	Works safely

Co-Requisite - Characteristics of Science

Habits of the Mind

S5CS1. Students will be aware of the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.

- a. Keep records of investigations and observations and do not alter the records later.
- b. Carefully distinguish observations from ideas and speculation about those observations.
- c. Offer reasons for findings and consider reasons suggested by others.
- d. Take responsibility for understanding the importance of being safety conscious.

S5CS2. Students will have the computation and estimation skills necessary for analyzing data and following scientific explanations.

- a. Add, subtract, multiply, and divide whole numbers mentally, on paper, and with a calculator.
- b. Use fractions and decimals, and translate between decimals and commonly encountered fractions – halves, thirds, fourths, fifths, tenths, and hundredths (but not sixths, sevenths, and so on) – in scientific calculations.
- c. Judge whether measurements and computations of quantities, such as length, area, volume, weight, or time, are reasonable answers to scientific problems by comparing them to typical values.

S5CS3. Students will use tools and instruments for observing, measuring, and manipulating objects in scientific activities.

- a. Choose appropriate common materials for making simple mechanical constructions and repairing things.
- b. Measure and mix dry and liquid materials in prescribed amounts, exercising reasonable safety.
- c. Use computers, cameras and recording devices for capturing information.
- d. Identify and practice accepted safety procedures in manipulating science materials and equipment.

S5CS4. Students will use ideas of system, model, change, and scale in exploring scientific and technological matters.

- a. Observe and describe how parts influence one another in things with many parts.
- b. Use geometric figures, number sequences, graphs, diagrams, sketches, number lines, maps, and stories to represent corresponding features of objects, events, and processes in the real world. Identify ways in which the representations do not match their original counterparts.
- c. Identify patterns of change in things—such as steady, repetitive, or irregular change—using records, tables, or graphs of measurements where appropriate.
- d. Identify the biggest and the smallest possible values of something.

S5CS5. Students will communicate scientific ideas and activities clearly.

- a. Write instructions that others can follow in carrying out a scientific procedure.
- b. Make sketches to aid in explaining scientific procedures or ideas.
- c. Use numerical data in describing and comparing objects and events.
- d. Locate scientific information in reference books, back issues of newspapers and magazines, CD-ROMs, and computer databases.

S5CS6. Students will question scientific claims and arguments effectively.

- a. Support statements with facts found in books, articles, and databases, and identify the sources used.
- b. Identify when comparisons might not be fair because some conditions are different.

The Nature of Science

S5CS7. Students will be familiar with the character of scientific knowledge and how it is achieved.

Students will recognize that:

- a. Similar scientific investigations seldom produce exactly the same results, which may differ due to unexpected differences in whatever is being investigated, unrecognized differences in the methods or circumstances of the investigation, or observational uncertainties.
- b. Some scientific knowledge is very old and yet is still applicable today.

S5CS8. Students will understand important features of the process of scientific inquiry.

Students will apply the following to inquiry learning practices:

- a. Scientific investigations may take many different forms, including observing what things are like or what is happening somewhere, collecting specimens for analysis, and doing experiments.
- b. Clear and active communication is an essential part of doing science. It enables scientists to inform others about their work, expose their ideas to criticism by other scientists, and stay informed about scientific discoveries around the world.
- c. Scientists use technology to increase their power to observe things and to measure and compare things accurately.
- d. Science involves many different kinds of work and engages men and women of all ages and backgrounds.

Co-Requisite - Content

Earth Science

S5E1. Students will identify surface features of the Earth caused by constructive and destructive processes.

- a. Identify surface features caused by constructive processes.
 - Deposition (Deltas, sand dunes, etc.)
 - Earthquakes
 - Volcanoes
 - Faults

- b. Identify and find examples of surface features caused by destructive processes.
 - Erosion (water—rivers and oceans, wind)
 - Weathering
 - Impact of organisms
 - Earthquake
 - Volcano
- c. Relate the role of technology and human intervention in the control of constructive and destructive processes.
Examples include, but are not limited to
 - Seismological studies,
 - Flood control, (dams, levees, storm drain management, etc.)
 - Beach reclamation (Georgia coastal islands)

Physical Science

S5P1. Students will verify that an object is the sum of its parts.

- a. Demonstrate that the mass of an object is equal to the sum of its parts by manipulating and measuring different objects made of various parts.
- b. Investigate how common items have parts that are too small to be seen without magnification.

S5P2. Students will explain the difference between a physical change and a chemical change.

- a. Investigate physical changes by separating mixtures and manipulating (cutting, tearing, folding) paper to demonstrate examples of physical change.
- b. Recognize that the changes in state of water (water vapor/steam, liquid, ice) are due to temperature differences and are examples of physical change.
- c. Investigate the properties of a substance before, during, and after a chemical reaction to find evidence of change.

S5P3. Students will investigate the electricity, magnetism, and their relationship.

- a. Investigate static electricity.
- b. Determine the necessary components for completing an electric circuit.
- c. Investigate common materials to determine if they are insulators or conductors of electricity.
- d. Compare a bar magnet to an electromagnet.

Life Science

S5L1. Students will classify organisms into groups and relate how they determined the groups with how and why scientists use classification.

- a. Demonstrate how animals are sorted into groups (vertebrate and invertebrate) and how vertebrates are sorted into groups (fish, amphibian, reptile, bird, and mammal).
- b. Demonstrate how plants are sorted into groups.

S5L2. Students will recognize that offspring can resemble parents in inherited traits and learned behaviors.

- a. Compare and contrast the characteristics of learned behaviors and of inherited traits.
- b. Discuss what a gene is and the role genes play in the transfer of traits.

Teacher note: Be sensitive to this topic since biological parents may be unavailable.

S5L3. Students will diagram and label parts of various cells (plant, animal, single-celled, multi-celled).

- a. Use magnifiers such as microscopes or hand lenses to observe cells and their structure.
- b. Identify parts of a plant cell (membrane, wall, cytoplasm, nucleus, chloroplasts) and of an animal cell (membrane, cytoplasm, and nucleus) and determine the function of the parts.
- c. Explain how cells in multi-celled organisms are similar and different in structure and function to single-celled organisms.

S5L4. Students will relate how microorganisms benefit or harm larger organisms.

- a. Identify beneficial microorganisms and explain why they are beneficial.
- b. Identify harmful microorganisms and explain why they are harmful.