

5th Grade Science

Key Instructional Activities

The Fifth Grade Georgia Standards of Excellence for science engage students in investigations of scientific concepts. Students are active learners and use hands-on activities to discover and explain phenomena. They understand that science is a process for gaining knowledge about the natural world and 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.

Fifth graders keep records of investigations and observations and understand why they should not alter records. They use numerical data to describe and compare objects, convert the fractions to decimals in scientific calculations, and identify the largest and smallest possible value of something. They use reference books, magazines or newspapers, and computer databases to locate scientific information.

Students at this grade level are able to identify the causes of some of Earth's surface features, explain the difference between a physical and a chemical change, investigate electricity and magnetism and the relationship between them, use scientific procedures to classify organisms, understand the difference between behaviors and traits, contrast the parts of animal and plant cells, and argue from evidence on how microorganisms can be beneficial or harmful to other organisms.



These science standards complement our English/Language Arts and mathematics standards, enabling classroom instruction to reflect a clearer picture of the real world, where solving problems often requires skills and knowledge from multiple disciplines. Further, these standards are designed to provide an equitable, high-quality science education to all of our students.



As the current science standards are implemented in schools, they will enable students to:

- *Develop a deeper understanding of science beyond memorizing facts, and*
- *Experience similar scientific and engineering practices as those used by professionals in the field.*

HOW WILL STUDENTS LEARN SCIENCE IN THE CLASSROOM?

Each year, students in Georgia should be able to demonstrate greater capacity for connecting knowledge across, and between, the physical sciences, life sciences, earth and space sciences, and engineering design.

During grades 3–5, your child will begin to form deeper connections between concepts and skills previously learned in grades K–2, such as evaluating methods for collecting data, revising models based on evidence, and analyzing data to make sense of phenomena.

Classroom activities in Elementary School will look less like this:	And look more like this:
Students have infrequent exposure to science instruction or related activities.	Students engage with science concepts as a core part of instruction and are encouraged to connect lessons to their own personal experiences.
Students memorize the general structure and properties of matter.	Students use water and butter to investigate how some changes caused by heating or cooling can be reversed while others cannot.
Students learn that matter is made of particles.	Students collect data through activities, such as compressing air in a syringe, in order to create cognitive models of matter.
Students draw food webs for particular environments.	Students construct scientific arguments about how matter and energy move through ecosystems in different ways.
Students examine insects or bugs on the playground or during special events such as science fairs.	Students observe the life cycles of beetles, butterflies, and pea plants to identify patterns that are common to all living things.
Students draw static pictures of the sun to demonstrate where it is at different times of the day.	Students support claims about the movement of the sun by identifying an outdoor object that receives direct sunlight, then tracing an outline of its shadow at three different times during the day.
Students review the characteristics of various rocks and minerals.	Students gather evidence from rock formations to help determine the order in which rock layers were formed.
Students have infrequent exposure to discussions or activities related to engineering design.	Students consider or apply engineering design principles throughout each grade level.
Student discussions and activities are disconnected from mathematics or English/Language Arts instruction.	Student discussions and activities are thoughtfully integrated with mathematics and English/Language Arts instruction.

HOW CAN YOU SUPPORT YOUR CHILD'S SUCCESS?

With the adoption of more rigorous standards and changes in the way that science is being taught in the classroom, you will notice a change in how you will support your students at home.

Science instruction will occur as the students engage in the lessons and activities. In the past, you may have helped your child study using a textbook. Students will no longer be assigned a textbook but should come home with notes or worksheets from the lessons, which can be used to review concepts and start conversations about how they are applying these concepts.

Although Georgia's approach to teaching and learning K–12 science is different than the past, you can still actively support your child's success in the classroom!

1. Speak to your child's teacher(s) about how these important changes affect your school.
2. Ask your child's teacher thoughtful questions based on the information provided in this brochure.
3. Learn how you can help the teacher(s) reinforce classroom instruction at home.
4. Visit www.georgiastandards.org for more information.

5th Grade Science System Pacing Overview



This guide provides an overview of what your student will learn in his or her fifth grade science course. It focuses on the key skills your student will learn, which will build a strong foundation for success in science studied throughout elementary, middle, and high school. This guide is based on the state-adopted Georgia Standards of Excellence.

August - September

Unit 1: Earth's Systems – Processes That Shape the Earth

Building on earth science standards from kindergarten and third grade, students will obtain, evaluate, and communicate information to identify surface features on the Earth caused by constructive and/or destructive processes. Students will construct an argument supported by scientific evidence to identify surface features (examples could include deltas, sand dunes, mountains, volcanoes) as being caused by constructive and/or destructive processes (examples could include deposition, weathering, erosion, and impact of organisms). Students will develop simple interactive models to collect data that illustrate how changes in surface features are/were caused by constructive and/or destructive processes. Students will ask questions to obtain information on how technology is used to limit and/or predict the impact of constructive and destructive processes. (Clarification statement: Examples could include seismological studies, flood forecasting (GIS maps), engineering/construction methods and materials, and infrared/satellite imagery.)

September - October

Unit 2: Structure and Properties of Matter

Building on physical science standards from kindergarten and second grade, students will obtain, evaluate, and communicate information to explain the differences between a physical change and a chemical change. Students will plan and carry out investigations of physical changes by manipulating, separating and mixing dry and liquid materials. Students will construct an argument based on observations to support a claim that the physical changes in the state of water are due to temperature changes, which cause small particles that cannot be seen to move differently. Building on what they have learned in the unit, students will plan and carry out an investigation to determine if a chemical change occurred based on observable evidence (color, gas, temperature change, odor, new substance produced).

October - November

Unit 3: Energy – Electricity

Students will obtain, evaluate, and communicate information to investigate electricity. Students will obtain and combine information from multiple sources to explain the difference between naturally occurring electricity (static) and human-harnessed electricity. Students will design a complete, simple electric circuit, and explain all necessary components. Building on what they have learned in the unit about complete circuits, students will plan and carry out investigations on common materials to determine if they are insulators or conductors of electricity.

November - December

Unit 4: Energy – Magnetism

Building on physical science standards from first grade, students will obtain, evaluate, and communicate information about magnetism and its relationship to electricity. Students will construct an argument based on experimental evidence to communicate the differences in function and purpose of an electromagnet and a magnet. (Clarification statement: Function is limited to understanding temporary and permanent magnetism.) Students will plan and carry out an investigation to observe the interaction between a magnetic field and a magnetic object. (Clarification statement: The interaction should include placing materials of various types (wood, paper, glass, metal, and rocks) and thickness between the magnet and the magnetic object.)

January - February

Unit 5: Structure, Function, and Information Processing & Interdependent Relationships

Building on life science standards from kindergarten and first grade, students will obtain, evaluate, and communicate information to compare and contrast the parts of plant and animal cells. Students will gather evidence by utilizing technology tools to support a claim that plants and animals are comprised of cells too small to be seen without magnification. Students will develop a model to identify and label parts of a plant cell (membrane, wall, cytoplasm, nucleus, chloroplasts) and of an animal cell (membrane, cytoplasm, and nucleus). Students will construct an explanation that differentiates between the structure of plant and animal cells. Students will obtain, evaluate, and communicate information about how microorganisms benefit or harm larger organisms. (Clarification statement: Possible microorganisms could include Tardigrades, Lactobacillus, Probiotics, Rotifers, Salmonella, Clostridium botulinum (Botox), E-coli, Algae, etc. Students are not expected to know these specific microorganisms. The list is provided to give teachers examples.) Students will construct an argument using scientific evidence to support a claim that some microorganisms are beneficial. Students will construct an argument using scientific evidence to support a claim that some microorganisms are harmful.

cont.

February - March

Unit 6: Organisms

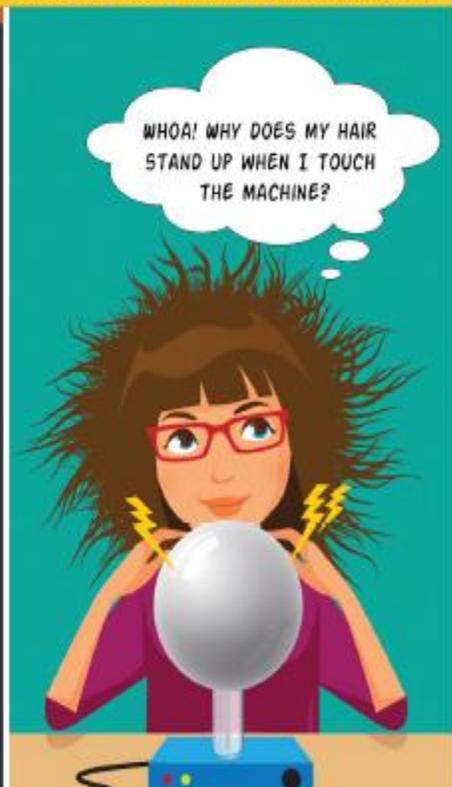
Building on life science standards from kindergarten and first grade, students will obtain, evaluate, and communicate information to group organisms using scientific classification procedures. Students will develop a model that illustrates how animals are sorted into groups (vertebrate and invertebrate) and how vertebrates are sorted into groups (fish, amphibian, reptile, bird, and mammal) using data from multiple sources. Students will develop a model that illustrates how plants are sorted into groups (seed producers, non-seed producers) using data from multiple sources.

March - May

Unit 7: Inheritance and Variation of Traits

Building on life science standards from kindergarten third, and fourth grade, students will obtain, evaluate, and communicate information showing that some characteristics of organisms are inherited and other characteristics are acquired. Students will ask questions to compare and contrast instincts and learned behaviors. Students will ask questions to compare and contrast inherited and acquired physical traits. (Clarification statement: Punnett squares and genetics are taught in future grades.)

**OBSERVING, POSING QUESTIONS
MAKING SENSE OF REAL-WORLD
OBJECTS AND EVENTS (PHENOMENA)**



IN PHYSICS CLASS, JENNY DISCOVERS WHY STATIC ELECTRICITY MAKES HER HAIR STAND UP.

**DESIGNING SOLUTIONS USING
ENGINEERING AND TECHNOLOGY**

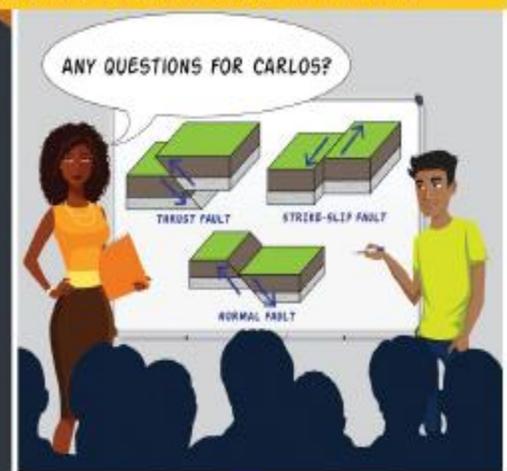


AFTER MANY DESIGNS, DEJA BUILT THE STRONGEST BRIDGE IN THE CLASS.

How today's students learn SCIENCE



**DEVELOPING MODELS TO EXPLAIN
A REAL-WORLD OBJECT OR EVENT**



MEANWHILE, IN MS. STURGEON'S EARTH SCIENCE CLASS, CARLOS EXPLAINS WHY CALIFORNIA HAS SO MANY EARTHQUAKES.

**PLANNING AND CARRYING OUT
INVESTIGATIONS AND ANALYZING DATA**



STUDENTS INVESTIGATE THE QUALITY OF WATER IN A NEARBY POND.

DISCUSSING, EXPLAINING, AND USING EVIDENCE FOR IDEAS



IN THE GYM, BOBBY DEMONSTRATES AND EXPLAINS HIS IDEAS ABOUT ENERGY TRANSFER