

# 2<sup>nd</sup> Grade Science

## Key Instructional Activities

The Second Grade Georgia Standards of Excellence for science engage students in raising questions and seeking answers about the world around them by making observations and exploring phenomena. At the appropriate times, students will ask, “How do you know?” and will attempt to answer the question. They will use whole numbers as well as basic fractions (such as one-half and one-fourth) to identify and analyze scientific data. Second graders will find sums and differences of single digit numbers and then justify the answer. They will give rough estimates to problems and estimate lengths, weights, and time intervals. They will explain to others how to solve numerical problems related to a science activity.

Second grade students push, pull, and manipulate things to see what will happen. They study the changing patterns of the moon and the sun and its effects on Earth. Second graders conduct simple investigations to understand that no matter how parts of an object are assembled their overall weight is the same as the total weight of the parts. They understand that heating and cooling cause changes in the properties of the materials. They observe changes caused by weather, plants, animals, and humans to the environment and study the life cycle of different 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 K–2, your child will begin to form connections between concepts and skills such as understanding relationships between objects, planning and carrying out investigations, and constructing explanations.

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](http://www.georgiastandards.org) for more information.

# 2<sup>nd</sup> Grade Science System Pacing Overview



This guide provides an overview of what your student will learn in his or her first 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

### Unit 1: Environmental Impact – Changes to the Environment

Students will obtain, evaluate, and communicate information about how weather, plants, animals, and humans cause changes to the environment. (*Clarification statement:* Changes should be easily observable and could be seen on school grounds or at home.) Students will ask questions to obtain information about major changes to the environment in your community. Students will construct an explanation of the causes and effects of a change to the environment in your community.

## September - October

### Unit 2: Matter – What's the Matter?

Building on physical science standards from kindergarten, students will obtain, evaluate, and communicate information about the properties of matter and changes that occur in objects. Students will ask questions to describe and classify different objects according to their physical properties. (*Clarification statement:* Examples of physical properties could include color, mass, length, texture, hardness, strength, absorbency, and flexibility.) Students will construct an explanation for how structures made from small pieces (linking cubes, building blocks) can be disassembled and then rearranged to make new and different structures. Students will provide evidence from observations to construct an explanation that some changes in matter caused by heating or cooling can be reversed and some changes are irreversible. (*Clarification statement:* Changes in matter could include heating or freezing of water, baking a cake, boiling an egg.)

## November

### Unit 3: Solar System – Where are the Acorns?

Building on earth science standards from kindergarten, students will obtain, evaluate, and communicate information to develop an understanding of the patterns of the sun and the moon and the sun's effect on Earth. Students will plan and carry out an investigation to determine the effect of the position of the sun in relation to a fixed object on Earth at various times of the day. Students will design and build a structure that demonstrates how shadows change throughout the day. Students will represent data in tables and/or graphs of the length of the day and night to recognize the change in seasons. Students will use data from personal observations to describe, illustrate, and predict how the appearance of the moon changes over time in a pattern. (*Clarification statement:* Students are not required to know the names of the phases of the moon or understand the tilt of the Earth.)

## November - December

### Unit 4: Stars – Daylight Moon

Students will obtain, evaluate, and communicate information about stars having different sizes and brightness. Students will ask questions to describe the physical attributes (size and brightness) of stars. Students will construct an argument to support the claim that although the sun appears to be the brightest and largest star, it is actually medium in size and brightness.

## January - March

### Unit 5: Force and Motion – How Do Objects Move?

Building on physical science standards from kindergarten, students will obtain, evaluate, and communicate information to explain the effect of a force (a push or a pull) in the movement of an object (changes in speed and direction). Students will plan and carry out an investigation to demonstrate how pushing and pulling on an object affects the motion of the object. Students will design a device to change the speed or direction of an object. Students will record and analyze data to decide if a design solution works as intended to change the speed or direction of an object with a force (a push or a pull).

## March - May

### Unit 6: Organisms – Life Cycles of Different Organisms

Building on life science standards from kindergarten, students will obtain, evaluate, and communicate information about the life cycles of different living organisms. Students will ask questions to determine the sequence of the life cycle of common animals in your area: a mammal such as a cat, dog or classroom pet, a bird such as a chicken, an amphibian such as a frog, and an insect such as a butterfly. Students will plan and carry out an investigation of the life cycle of a plant by growing a plant from a seed and by recording changes over a period of time. Students will construct an explanation of an animal's role in dispersing seeds or in the pollination of plants. Building on what they have learned in the unit, students will develop models to illustrate the unique and diverse life cycles of organisms other than humans.

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

WHOA! WHY DOES MY HAIR  
STAND UP WHEN I TOUCH  
THE MACHINE?



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

DESIGNING SOLUTIONS USING  
ENGINEERING AND TECHNOLOGY

DARN! IT BROKE.  
I NEED A STRONGER DESIGN.



WOO HOO. SUCCESS!



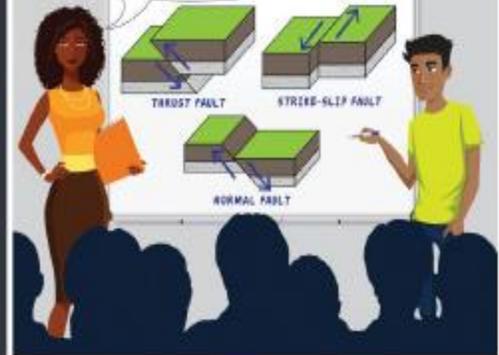
AFTER MANY DESIGNS, DEJA BUILT THE  
STRONGEST BRIDGE IN THE CLASS.

# How today's students learn SCIENCE



DEVELOPING MODELS TO EXPLAIN  
A REAL-WORLD OBJECT OR EVENT

ANY QUESTIONS FOR CARLOS?



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

PLANNING AND CARRYING OUT  
INVESTIGATIONS AND ANALYZING DATA

HOW MANY SAMPLES  
DO YOU NEED?

OK, I'LL RECORD  
THE DATA.

I'LL TAKE 3 FROM BOTH  
SIDES OF THE POND.



STUDENTS INVESTIGATE THE QUALITY OF WATER  
IN A NEARBY POND.

DISCUSSING, EXPLAINING, AND USING EVIDENCE FOR IDEAS

THE RED BALL  
STARTS OUT  
WITH ENERGY...

...BUT THEN POW...

...IT GETS  
TRANSFERRED  
TO THE BLUE ONE.



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