8th Grade Physical Science
Science

Key Instructional Activities

The Eighth Grade Georgia Standards of Excellence for science are designed to give all students the necessary skills for a smooth transition from elementary physical science standards to high school physical science standards. The purpose is to give all students an overview of common strands in physical science including, but not limited to, the nature of matter, conservation of energy, energy transformations, conservation of matter, kinematics, and dynamics. These standards are not intended in any way to take the place of the high school physical science standards.

Eighth grade students keep records of their observations, use those records to analyze the data they collect, recognize patterns in the data, use simple charts and graphs to represent the relationships they see, and find more than one way to interpret their findings. They develop conceptual understanding of the laws of conservation of matter and conservation of energy, are able to explain the characteristics of the motion of an object (speed, acceleration) and the way that forces may change the state of motion of an object. They use what they observe to explain the difference between physical and chemical changes and cause and effect relationships between force, mass, and the motion of objects. Students in eighth grade construct explanations based on evidence on the difference and similarities between electromagnetic and mechanical waves. Eighth graders plan and carry out investigations, describe observations, and show information in graphical form. The students replicate investigations and compare results to find similarities and differences.

The Science Georgia Standards of Excellence drive instruction. Hands-on, student-centered, and inquiry-based approaches should be the emphasis of instruction. The standards are a required minimum set of expectations that show proficiency in science.

HOUSTON COUNTY BOARD OF EDUCATION
HIGH-ACHIEVING STUDENTS

What resources are available for students and parents?

EOG Physical Science Study Guide

- ✓ Online Science Textbook
- ✓ Parent Portal
- ✓ Overview of Units and Pacing

8th Grade Physical Science Course Overview

Unit 1: Structure and Classification of Matter

Expected Dates: Beginning of School Year to End of August

Students will develop and use a model to compare and contrast pure substances (elements and compounds) and mixtures. Students will develop models (e.g., atomic-level models, including drawings, and computer representations) by analyzing patterns within the periodic table that illustrate the structure, composition, and characteristics of atoms (protons, neutrons, and electrons) and simple molecules.

Unit 2: States of Matter and Thermal Energy

Expected Dates: End of August to Beginning of September

Students will develop and use models to describe the movement of particles in solids, liquids, gases, and plasma states when thermal energy is added or removed.

Unit 3: Properties of and Changes in Matter

Expected Dates: Beginning of September to Mid-September

Students will plan and carry out investigations to compare and contrast chemical (i.e., reactivity, combustibility) and physical (i.e., density, melting point, boiling point) properties of matter. Students will construct an argument based on observational evidence to support the claim that when a change in a substance occurs, it can be classified as either chemical or physical.

Unit 4: Conservation of Matter in Chemical Reactions

Expected Dates: Mid-September to Beginning of October

Students will construct an explanation based on evidence to describe conservation of matter in a chemical reaction including the resulting differences between products and reactants

Unit 5: Kinetic and Potential Energy and Its Transformations in a System

Expected Dates: Beginning of October to Mid-October

Students will analyze and interpret data to create graphical displays that illustrate the relationships of kinetic energy to mass and speed, and potential energy to mass and height of an object. Students will plan and carry out an investigation to explain the transformation between kinetic and potential energy within a system (e.g., roller coasters, pendulums, rubber bands, etc.).

Unit 6: Energy Transformations within a System

Expected Dates: Mid-October to End of October

Students will construct an argument to support a claim about the type of energy transformations within a system [e.g., lighting a match (light to heat), turning on a light (electrical to light)].

Unit 7: Heat Transfer and Molecular Motion

Expected Dates: Beginning of November to Mid-November

Students will plan and carry out investigations on the effects of heat transfer on molecular motion as it relates to the collision of atoms (conduction), through space (radiation), or in currents in a liquid or a gas (convection).

Unit 8: Magnetic, Gravitational and Electric Fields

Expected Dates: Mid-November to End of November

Students will construct an argument using evidence to support the claim that fields (i.e., magnetic fields, gravitational fields, and electric fields) exist between objects exerting forces on each other even when the objects are not in contact

Unit 9: Conductors and Insulators
Expected Dates: End of November to Mid-December
Students will plan and carry out investigations to demonstrate the distribution of charge in conductors and insulators.

Unit 10: Electric and Magnetic Forces
Expected Dates: End of November to Mid-December
Students will plan and carry out investigations to identify the factors (e.g., distance between objects, magnetic force produced by an electromagnet with varying number of wire turns, varying number or size of dry cells, and varying size of iron core) that affect the strength of electric and magnetic forces.

Unit 11: Effects of Force on Motion
Expected Dates: Beginning of January to Beginning of February
Students will analyze and interpret data to identify patterns in the relationships between speed and distance, and velocity and acceleration. Students will construct an explanation using Newton's Laws of Motion to describe the effects of balanced and unbalanced forces on the motion of an object. Students will construct an argument from evidence to support the claim that the amount of force needed to accelerate an object is proportional to its mass (inertia).

Unit 12: Properties of Waves
Expected Dates: Beginning of February to Mid-February
Students will ask questions to develop explanations about the similarities and differences between electromagnetic and mechanical waves. Students will develop and use a model (e.g., simulations, graphs, illustrations) to predict and describe the relationships between wave properties (e.g., frequency, amplitude, and wavelength) and energy.

Unit 13: Electromagnetic Spectrum and Energy
Expected Dates: Mid-February to End of February
Students will construct an explanation using data to illustrate the relationship between the electromagnetic spectrum and energy.

Unit 14: Behavior of Waves
Expected Dates: Beginning of March to Mid-March
Students will develop and use a model to compare and contrast how light and sound waves are reflected, refracted, absorbed, diffracted or transmitted through various materials. Students will analyze and interpret data to predict patterns in the relationship between density of media and wave behavior (i.e., speed).

Unit 15: Application of Wave Properties and Behaviors
Expected Dates: Mid-March to Mid-April
Students will design a device to illustrate practical applications of the electromagnetic spectrum (e.g., communication, medical, military). Students will develop and use models to demonstrate the effects that lenses have on light (i.e., formation of an image) and their possible technological applications.

EOG Preparation/Administration and Enrichment
Expected Dates: Mid-April to End of School Year
Review all physical science standards. Students will take the Physical Science EOG. Students will participate in enrichment activities.

Helpful Tips for Parents and Guardians

Believe that every child can be successful in science.

Science has led to the discovery of everything from gravity to medicine. Science is a way of understanding the world, a perspective, and a pattern of thinking that begins in the very early years. That is why parent involvement is so important in a child's science education.

Tips to Help Children Learn Science

Explore, explore, explore. See science everywhere. Always encourage your child to question their surroundings, and then discuss. Parents can take opportunities to ask, "What would happen if …?" questions or present brainteasers to encourage children to be inquisitive and seek out answers.

Lead family discussions on science-related topics. Dinnertime might be an ideal time for your family to have discussions about news stories that are science based, like space shuttle missions, severe weather conditions, or new medical breakthroughs. Over time, children will develop a better understanding of science and how it affects many facets of our lives. Movies and TV shows with science-related storylines are also great topics for discussion.

Encourage girls and boys equally. Many fathers might be inclined to fix a problem for a daughter without challenging her to find the solution on her own. Many girls are left out of challenging activities simply because of their gender. Be aware that both girls and boys need to be encouraged and exposed to a variety of subjects at a very early age.

Do science together. Children, especially elementary-age children, learn better by investigating and experimenting. Simple investigations done together in the home can bolster what your child is learning in the classroom. Check with your child's teacher on what your child is currently learning in class and what activities you can explore at home. There are also many books on the market and numerous websites that present ideas for investigations.

In addition to exploring and communicating as a family, it is important to invest in your child's willingness to learn. There are many programs available that are fun and interactive, helping them build a solid foundation in science.

From life sciences to environmental science, physical science to earth science, when children express interests in these subjects, encourage them and learn with them.

How You Can Support Your Child's Success?

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.