

8TH GRADE SCIENCE

Students should be able to use science and engineering practices and understand the following content:

Science and Engineering Practices

- Development of habits of mind that are necessary for scientific thinking and that allow students to engage in science in ways similar to those used by scientists and engineers
- Asking and answering questions about the natural world
- Developing and using models to (1) build understanding of phenomena, processes and relationships, (2) test devices or solutions, or (3) communicate ideas to others
- With teacher guidance, conduct structured investigations to answer scientific questions, test predictions, and develop explanations
- Collecting and analyzing data from investigations to construct explanations and communicate results
- Using mathematical and computational thinking in collecting and communicating data
- Using technology to collect data and in communication of results

Physical Science (Forces and Motion)

- Demonstrate an understanding of the effects of forces on the motion and the stability of an object
- Plan and conduct investigations to test how varying the force on an object affects the motion, shape, or orientation of an object
- Develop and use models to compare and predict the resulting effect of balanced and unbalanced forces on an object's motion
- Explain the relationship between the mass of an object and the concept of inertia (Newton's First Law of Motion)
- Support claims that for every force exerted on an object there is an equal and opposite force exerted (Newton's Third Law of Motion)
- Describe and predict the effects of forces on the speed and direction of an object
- Use mathematical and computational thinking to generate graphs that represent the motion of an object's position and speed as a function of time
- Use mathematical and computational thinking to describe the relationship between speed and velocity ($v=d/t$)

Physical Science (Waves)

- Demonstrate an understanding of the properties and behaviors of waves
- Explain the relationships between matter and energy based on the characteristics of mechanical and light waves
- Describe the basic properties of waves (frequency, amplitude, wavelength, velocity)
- Describe the behavior of waves as they interact with various materials
- Describe the behavior of intersecting mechanical waves
- Describe and predict the effects of forces on the speed and direction of an object
- Construct explanations of how humans see color
- Communicate information about how various instruments are used to extend human senses and describe the technology that supports these

Earth Science (Earth's Place in the Universe)

- Demonstrate an understanding of the universe and the predictable patterns caused by the Earth's movement in the solar system
- Model the position of the Sun in the universe, the shapes and

composition of galaxies, and measurements needed to identify star and galaxy locations

- Discuss the scientific claims about the origins of the universe
- Describe and model the characteristics and movements of objects in the solar system
- Explain how gravity affects the motion of objects in the solar system and tides
- Develop models to explain seasons, day length, and heating of the Earth's surface
- Develop models to explain the moon phases, eclipses, and tides
- Describe ways in which technologies are used to collect data about the universe
- Analyze and interpret data from the Sun's surface and discuss how events on the Sun may affect Earth

Earth Science (Earth Systems and Resources)

- Demonstrate an understanding of the processes that alter the structure of Earth and provide resources for life on the planet
- Explain how the processes of weathering, erosion and deposition change the surface features of the environment
- Use the rock cycle model to describe the relationship between the processes and forces that create igneous, metamorphic, and sedimentary rocks
- Describe the relative positions, density, and composition of the Earth's layers (crust, mantle, core)
- Discuss how the theory of plate tectonics accounts for distribution of fossils, earthquakes, and features of the ocean floor
- Discuss the patterns that occur with locations of volcanoes and earthquakes along plate boundaries
- Discuss problems resulting from catastrophic events and solutions used to address these problems
- Describe the physical and chemical properties of minerals, ores, and fossil fuels, and also describe their importance as resources

Earth Science (Earth's History and Diversity of Life)

- Demonstrate an understanding of Earth's geologic history and its diversity of life over time
- Develop and use models to organize Earth's history using evidence from rock layers according to the geologic time scale
- Analyze and interpret data from index fossils to infer the relative ages of rocks and fossils
- Explain how catastrophic events may impacted Earth and any life forms
- Discuss how fossils are used to provide evidence about Earth's history
- Discuss what kinds structures tend to be fossilized
- Describe and discuss how adaptations and genetic variations may lead to survival
- Discuss events and factors that can lead to the extinction of a species

Activities:

- Visit a museum or university that has fossils on display.
- Visit a park and try the playground equipment to investigate force and motion.
- If you rollerblade or skateboard, analyze what you need to do to change direction and motion. Remember safety.
- Go online and investigate extinct species. What were some causes of extinctions?

8TH GRADE SCIENCE Continued

- On a map of South Carolina identify areas where you can find fossils. What do the fossils tell you about life in the past?
- Go to library and locate books on Earth's history, rock and mineral guides, and fossil guides.

Books:

- Carruthers, M. W. *The Moon*
- Downs, Sandra. *Earth's Fiery Fury*
- Fullick, A. *Under Pressure: Forces*
- Grace, K. *Forces of Nature: The Awesome Power of Volcanoes, Earthquakes, and Tornadoes*
- Heinlein, Robert. *Have Spacesuit - Will Travel*
- Kittinger, Jo. *Stories in Stone: The World of Animal Fossils*
- Lafferty, P. *Eyewitness: Force and Motion*

- Maslin, Mark. *Restless Planet Series: Earthquakes*
- Ride, S. and T. O'Shaughnessy. *Exploring Our Solar System*
- Sauvain, P. *Motion (The Way It Works)*
- Spangenburg, R. and K. Moser. *A Look at the Sun*
- Stille, D. *Waves: Energy on the Move*
- Sussman, Art. *Dr. Art's Guide to Planet Earth*

Web Sites:

- AAAS Science Netlinks - www.sciencenetlinks.com
- Franklin Institute - www.fi.edu
- Force and Motion - www.physics4kids.com
- Virtual Solar System - www.nationalgeographic.com/solarsystem