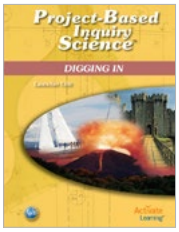
6th Grade

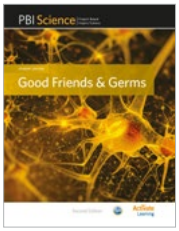
Digging In (Launcher Unit)



Big Question: How do scientists work together to solve problems?

Within the context of Earth science, students explore variables, reliable procedures, fair tests, case studies, models and simulations, and use evidence to construct scientific explanations and make recommendations to answer the Big Question. Students explore and learn about such fundamental principles as matter, atoms, molecules, volume, density, erosion and deposition, volcanoes, and rocks and minerals.

Good Friends and Germs



Big Question: How can you prevent your good friends from getting sick?

Using the practices of epidemiologists, students collaborate to investigate communicable diseases and their affects on people. Students learn about bacteria and viruses that cause disease, cell structure and theory, levels of organization of living organisms, structure and function, interdependence of human body systems, and how to track a disease. Students use this information to develop a set of recommendations for staying healthy, and helping others stay healthy.

Air Quality

Big Question: How can you improve the air quality in your community?

Through numerous investigations and case studies, students learn about the nature and composition of air and other matter, states of matter, atomic theory, bonding, the periodic table of the elements, and many other fundamental chemistry topics, as well as sources and effects of pollution. Students apply their knowledge by investigating the air quality in their own community and examining the sources, effects, and potential solutions to the pollution problems identified.

7th Grade

Weather Watch

Big Challenge: Write a plan for responding to a severe-weather event.

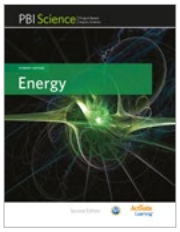
Students explore how weather is measured, the difference between weather and climate, and the factors that affect the weather and climate in six different climatic regions of the United States. They discover that latitude, the tilt of Earth's axis, and the proximity to large bodies of water affect surface temperatures. They investigate what causes precipitation, and in the process, they learn about the transfer of thermal energy, the water cycle, and effect of winds and ocean currents on weather and climate.

Living Together

Big Question: How does water quality affect the ecology of a community?

Students give advice to a small river town about how to deal with a new industry that wants to move into the area. Using some of the practices and skills employed by ecologists, students learn about food chains and webs, ecosystems, biomes, photosynthesis and cell respiration, classification of living things, water quality and its effect on living organisms, and the effects of human activity on ecosystems.

Energy



Big Challenge: Design a Rube Goldberg machine to turn off the lights.

In the process of addressing the challenge, students learn about the following types of energy: kinetic, elastic potential, gravitational potential, thermal, chemical, light, sound, and electrical. They also learn about energy indicators, and recognize that energy has the ability to do work or cause a change. They also learn about conservation of energy and renewable and nonrenewable energy sources.

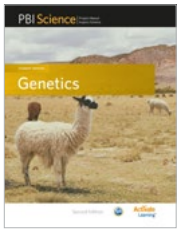
8th Grade

Ever-Changing Earth

Big Question: What processes within Earth cause geologic activity?

Students use a variety of methods, including software, the Internet, and two-dimensional maps to observe differences in topography, and earthquake and volcano patterns. In the process, they learn about the structure of Earth, the theory of plate tectonics, interactions of Earth systems, and the history of Earth.

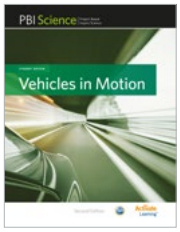
Genetics



Big Question: How can knowledge of genetics help feed the world?

Students provide advice about developing a rice plant that is nutritious and can be grown in places that do not get a lot of rain. After being introduced to the worldwide problem of food shortage, students investigate how to develop varieties of rice that could help to alleviate the shortage. Within this context, students learn sexual and asexual reproduction, Mendelian inheritance, Punnett squares, meiosis and mitosis, chromosomes and DNA, how traits and the environment interact, evolution and natural selection, variation, natural and artificial selection, and the promises and potential threats of genetic engineering.

Vehicles in Motion



Big Challenge: Design and build a vehicle that will go straight, far, and fast, and carry a load.

Students explore principles of motion and force, including relative motion, velocity, acceleration, Newton's laws, friction, gravity, balanced and unbalanced forces, and net force. They use these principles to improve their design of two cars—one with and one without a propulsion system.