

# BMS 6th Grade Science

The Science of Engineering, Processes, and Crosscutting Concepts are used to facilitate student sensemaking of the disciplinary core ideas through investigations, models, and engaging in an argument from evidence.

## Course Objectives

1. Ask questions to examine an interpretation about the relative ages of different rock layers within a sequence of several rock layers.
2. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
3. Collect data and use digital data analysis tools to identify patterns to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.
4. Analyze and interpret data to determine similarities and differences among features and processes occurring on solar system objects.
5. Analyze and interpret data on the distribution of fossils, rocks, continental shapes, and seafloor structures to provide evidence of past plate motions.
6. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
7. Develop and use scale models of solar system objects to describe the sizes of objects, the location of objects, and the motion of the objects; and include the role that gravity and inertia play in controlling that motion.
8. Students will Develop a model, based on observational evidence, to describe the cycling and movement of Earth's rock material and the energy that drives these processes.
9. Develop a model, based on observational and experimental evidence, to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
10. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.
11. Construct a scientific explanation based on evidence for how the uneven distribution of Earth's mineral, energy, or groundwater resources is the result of past geological processes.
12. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
13. Construct an argument, supported by evidence, for how geoscience processes have changed Earth's surface at varying time and spatial scales.
14. Communicate how a series of models, including those used by Minnesota American Indian Tribes and communities and other cultures, are used to explain how motion in the Earth-Sun-Moon system causes the cyclic patterns of lunar phases, eclipses and seasons.

## Course Outcomes

- Students will interpret rock layers using geologic principles like superposition and cross-cutting relationships.
- Students will understand the major role that human activities play in causing the rise in global temperatures.
- Students will explain how weather at a fixed location changes in response to moving air masses and to interactions at frontal boundaries between air masses.
- Students will analyze data from Earth-based instruments, space-based telescopes, and spacecraft to determine similarities and differences among solar system objects.
- Students will analyze data that includes similarities of rock and fossil types on different continents, the shapes of the continents (including continental shelves), and the locations of ocean structures (such as ridges, fracture zones, and trenches).
- Students will interpret how some natural hazards, such as volcanic eruptions and severe weather, are preceded by phenomena that allow for reliable predictions, but others, such as earthquakes, occur suddenly and with no notice, and thus are not yet predictable.
- Students will analyze the regularity of the motion and account for Earth-based visual observations of the motion of these objects in our sky. Emphasis is also on recognizing the limitations of any of the models.
- Students will observe the processes of weathering and erosion of soil and rock, deposition of sediment, and crystallization of lava to inform model development. Emphasis of the core idea is on how these processes operate over geologic time to form rocks and minerals through the cycling of Earth's materials.
- Students will develop a way to represent the mechanisms of water changing state, the global movements of water and energy, and on how the observational and experimental evidence supports the model.
- Students will analyze the rock formations and the fossils they contain are used to establish relative ages of major events in Earth's history.
- Students will interpret the resources that are limited and typically non-renewable on a human timeframe.
- Students will apply scientific principles about Earth's natural processes (like how water moves through the ground and air) to designing solutions to problems caused by human activity. Emphasis of the core idea is on how human activity impacts Earth's environments.
- Students will interpret how processes like erosion, deposition, mountain building, and volcanism affect the surface of Earth. Some processes, like mountain building, take a long time. Other processes, like landslides, happen quickly.
- Students will question the limitations of their models and revise them to account for new observations. Models may be physical, graphical or conceptual.

## Grading Policy

- Daily Work
- Assessments