

Earth Sciences

STUDENTS SHOULD KNOW

EXAMPLES OF WHAT STUDENTS SHOULD BE ABLE TO DO

Act

Matter and Minerals

1. Matter is composed of atoms and molecules that combine to form the basic minerals of our Earth.
2. Minerals and rocks have world wide use and economic importance.
3. Currently, the Big Bang theory is the most widely accepted theory to explain how the Universe may have begun.

- Make a Bohr model of an atom.
- Demonstrate the difference between minerals and rocks.
- List economic resources and where they may be found.
- Write a story describing what you might have seen from the perspective of watching the formation of the Universe at the time of the Big Bang.

Earth History

1. The origin of planets and how they formed including the sources for the atmosphere and oceans.
2. Geologic time scale including the continual changes in the biotic and abiotic environments.

- Act out a skit illustrating the formation of protoearth.
- Build a time line.

Dynamic Earth

1. Heat is the power source for natural processes.
2. Major portions of the materials of the crust have been recycled over and over many times.
3. The Earth is composed of layers.
4. The crust sections move very slowly.
5. The crust of the earth, including both the continents and the ocean basins, consist of separate plates that ride on a denser layer of the earth.
6. The material of the continents is generally older than that of the ocean floors.

- Conduct an experiment showing convection.
- Illustrate or model the different plate boundaries and interactions between them.
- Make a concept map of the rock cycle.
- Construct a model of Earth showing the inner structures.
- Design a model that illustrates sea floor spreading and explains the idea that continents are older than ocean basins.

STUDENTS SHOULD KNOW

7. Volcanoes form over unusually hot spots in the interior of the earth, along separating plate boundaries, or near descending plates.
8. Earthquakes occur primarily along plate boundaries. Volcanoes and earthquakes can have a significant impact upon human activities.

Reshaping the Earth's Surface

1. Rocks formed by internal processes are unstable at the earth's surface and are susceptible to processes of weathering and erosion.

Atmosphere

1. Winds/aircurrents/mixing of gases are caused by the action of gravitational force and the effect of the earth's rotation on regions of different densities which causes them to rise and fall producing circulation.
2. The processes of weather (formation of clouds, snow, rain, lightning, tornadoes, hurricanes, etc.) are short-term changes involving the transfer of energy in and out of the atmosphere.

Oceans

1. Ocean currents are caused by the action of gravitational force and the effect of the earth's rotation on regions of different densities which causes them to rise and fall producing circulation.
2. Gravitational attraction and the effect of the earth's rotation are the cause of tides

Climate

1. Global cooling and global warming are long term changes involving the transfer of energy in and out of the atmosphere.

EXAMPLES OF WHAT STUDENTS SHOULD BE ABLE TO DO

- Construct models of different types of volcanoes.
- Construct models of different types of faults.
- Locate the epicenter and estimate preliminary magnitudes given 3 seismograms.
- Write an earthquake preparedness or hazard preparedness document for their family.
- Model the transport of materials from the mountains to the oceans.
- Discuss the importance of greenhouse effect(gases) and sources.
- Read a weather map.
- Predict or forecast the next day's weather.
- Draw a map of major currents and up wellings.
- Predict the effects of El Nino and La Nina on our weather patterns.
- Show why there are two tides a day for most places.
- Model a glacier.
- Differentiate between natural variations versus the role of man-made pollutants.

Act