



Project Idea Starters



Rocks, Minerals, and Fossils

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BACKGROUND

Do you know that table salt is a mineral? Have you ever thought about animals other than dinosaurs that are extinct and fossilized? Do you know that dull gray limestone and shiny green marble share the same chemistry? These and other questions can be understood with a basic knowledge of rocks, minerals, and fossils.

By definition, a mineral is an inorganic substance with a chemical formula and crystal structure that can be found in nature. But what does this mean? The word inorganic describes all things that are not living, or have no carbon in their makeup. The chemical formula of each mineral is like its list of ingredients. Table salt has a chemical formula of NaCl, or sodium chloride. This tells us that all pieces of salt contain sodium (Na) and chlorine (Cl.) Crystal structure is the shape of a well formed mineral. If you look closely at a piece of salt from your salt shaker, you might notice that it is shaped like a cube. This cube is characteristic of every salt crystal.

Rocks are made of one or more minerals. If you look closely at concrete or blacktop, you will notice there are many tiny pieces of minerals that are glued together. Because humans create concrete and blacktop, most geologists do not think of them as true rocks. However, many common rocks such as granite and sandstone have visible pieces of minerals in a "glue"-like background.

Rocks are grouped into three categories: sedimentary, igneous, and metamorphic. These groups reflect the manner in which the rock was formed. Sedimentary rocks are formed by processes we can observe on the surface of the earth, such as erosion, precipitation, and cementation. Limestone is a sedimentary rock that is formed when calcium carbonate (CaCO_3) precipitates, or dries, from water. Igneous rocks are formed when the magma underneath the earth solidifies. When a sedimentary or igneous rock is exposed to high temperature or pressure underneath the surface of the earth, the rock becomes metamorphic. If limestone is exposed to heat and pressure, it becomes marble, a metamorphic rock that looks very different from limestone but actually has the same chemical elements.

Fossils are the remains of animals and plants that have been preserved in rocks or minerals. Fossils can be grouped into body fossils and trace fossils. Body fossils are preserved parts of the original body of the organism. Trace fossils are evidence of the mode of life of ancient plants and animals. They include tracks, burrows, borings, and feces that tell us directly about the way an animal or plant lived and moved. Although dinosaur bones are the most well known fossils, they are not the only fossils that have taught us about the ancient past. The remains of snails, clams, ferns, and many other organisms are common and also provide clues to life on Earth before humans.



Planning Your Self Determined Project

AREAS OF INTEREST

- Learn about rocks and minerals.
- Build a rock collection.
- Make a mineral set.
- Study fossils.
- Assemble a fossil collection.

THINGS TO DO

- Obtain a rock and mineral identification guide.
- Draw the rock cycle.
- List four common rocks in each category: sedimentary, igneous, and metamorphic.
- Explain at least three uses of minerals and describe the most important mineral for each use.
- Find out what common minerals are found in Ohio.
- Explain the characteristics used to identify minerals.

Collect at least eight rock specimens.

- Use a rock and mineral guide to identify each specimen.
- Make a display of these rocks.
- Include the type of rock (sedimentary, igneous, or metamorphic) and common name on the display.
- List the location of each rock when it was found.

Collect at least five mineral specimens.

- Use a rock and mineral guide to identify each mineral.
- Make a display of these minerals.
- Include the name and chemical formula of each mineral on the display.
- List the common uses of each mineral.

Collect at least five fossil specimens.

- Use a fossil guide, such as *Fossils of Ohio*, to identify the family of each specimen.
- Make a display of your fossils.
- On the display, include the name of the fossil and tell if it is a body or trace fossil.
- Sketch what the animal or plant might have looked like for each fossil collected.

Explain what type of animal the state fossil of Ohio is, when it lived, and its living habits.

- Draw the state fossil of Ohio.
- Make a geologic time scale showing animals that lived during the different geologic ages.
- Explore different modes of fossil preservation.
- Visit a natural history museum to see examples of rare fossils. (Try the Ohio Historical Society in Columbus, the Cleveland Museum of Natural History, or Cincinnati Museum of Natural History and Science.)

RELATED WEB PAGES

GeoFacts from Ohio Division of Natural Resources:
http://www.dnr.state.oh.us/odnr/geo_survey/geo_fact/geo_fact.htm

Virtual Smithsonian:
<http://2k.si.edu/>

Tour of National Museum of Natural History Hall of Geology, Gems, and Minerals:
<http://www.bsu.edu/teachers/academy/gems/tour.html>

Ask a Geologist:
<http://walrus.wr.usgs.gov/ask-a-geologist/>