

What is a rock?

The answer to this question might seem easy until you actually try to describe a rock. Rocks are hard solid objects, created naturally (without any human help) and made of a mix of minerals. And what are minerals? **Minerals** are very similar to rocks because they are solid and naturally made, but the biggest difference is that minerals are made of the same stuff throughout while a rock can be a mix of things. Minerals are also crystalline, which means they are made from a specific recipe of ingredients that are arranged in a certain way. Minerals are also made of inorganic material (things that were never alive).

Rocks tell us about the history of the Earth, and every rock has a story. A rock that is now in a river might have been created thousands of feet below the Earth's surface. A rock might contain fossils of ancient creatures or may have been thrown out of a powerful volcano long ago. Some rocks even have tiny organisms called endoliths living

in them (often bacteria, fungus or algae). Scientists try to understand the stories of rocks so they can learn how the Earth formed and how it is changing.

Rocks are classified by what they are made of, by the texture of the materials that make them up, and by how they were made. There are

three main kinds of rocks: igneous, sedimentary and metamorphic.

Igneous rocks form when melted rock from deep in the Earth (magma) cools and hardens. **Sedimentary rocks** are formed at the surface of the Earth, either in water or on land. They are layers of tiny material (sediments) that have stacked up over time and then been stuck together through pressure and heat. **Metamorphic rocks** are formed when other rock types are exposed to really high temperatures and pressures that are different than those in which the original rock was formed (the rocks don't melt, they recrystallize into a new form of rock).

Geology is the study of rocks and all the solid material that makes up the

Earth. Geologists research all kinds of topics, like where an earthquake or landslide might happen, or how mountains form. Through the work of geologists, we now know that the Earth is constantly changing.

At Montana State University, many geologists are studying the mysteries behind how various places on Earth formed and what will happen to them in the future. David Lageson, a geology professor at Montana State University, will be climbing Mount Everest to learn more about it. Did you know that the rocks on top of Mount Everest, the highest mountain in the world, used to be at the bottom of an ancient ocean? To learn more about this expedition to Everest visit www.montana.edu/everest.

Try this!

Now that you know how important rocks are and that they have interesting stories, start paying more attention to the rocks around you. You can find them everywhere! You can be a rock detective and try to unlock some of the secrets of rocks around you.

Materials needed

- * Several pieces of paper
- * A pencil
- * A clipboard (optional)
- * A magnifying glass (optional)

Try drawing a map of an area outside such as your school grounds, your yard, a park, etc. Walk around the area you mapped and look for interesting rocks. When you find one, mark it on your map with a number. Then on another piece of paper, write the same number you used to mark the rock on the map. Next to the number, draw a picture of the rock and write a one-sentence description of the rock. Then write a sentence in which you try and guess the history of the rock.

Here are some questions to think about.

- Is what you found really a rock? Could it be manmade like concrete or a brick?
- What color is your rock? What shape is it? Is it smooth or rough?
- Is your rock the same color all over? Does your rock seem like it is the same throughout, or are there layers and lines in it, or chunks of different textures and materials in it?
- Are all the rocks you are finding the same or are you finding many different kinds? What might that tell you about the rocks and places you are finding them?

