

Discovering Rocks

Students will be introduced to different rock types and hone their observational skills.

Grade Level : K-6th

Objectives:

- Students will be able to work with a partner to sort and classify rocks according to similarities and differences.

Materials:

- paper or plastic bags
- large butcher paper for word web and magic markers
- Carmel apple and knife (optional)
- boxes of labeled rocks
- * optional: *The Magic School Bus: Inside the Earth* by Joanna Cole (or another book on the rock cycle)

Time Considerations

2 class periods

Related Activities:



Nevada Department of Education Standards

- **Earth's Composition and Structure (Unifying Concept C)** Earth is composed of materials that move through the biogeochemical cycles. Earth's features are shaped by ongoing and dynamic processes. These processes can be constructive or destructive and occur over geologic time scales.

Excellence in Environmental Education Guidelines

Strand 1—Questioning, Analysis, and Interpretation Skills (A, B, C, G) Learners are able to develop question, design investigations, collect information, and draw conclusions in order to learn about the environment.

- Strand 2.1 The Earth as a Physical System (A): Learners are able to identify changes and differences in the physical environment.

Background

There are three families of rocks: (1) Igneous Rocks, (2) Sedimentary Rocks, and (3) Metamorphic Rocks.

Igneous Rocks:

The Igneous Rocks are those that form from molten magma. Magmas are melted rock and they rise through the earth's crust. Those magmas, that cool very slowly at great depths in the crust as giant magma chambers, eventually solidify to form "Intrusive Igneous Rocks" such as granite (the granite is composed of an interlocking network of minerals rich in quartz and feldspars). These very large intrusions tend to form the cores of

major mountains, and can be later exposed by erosion. Classic examples occur as the Sierra Nevada Mountains of California, The Rocky Mountains and the Appalachians. If the magma actually makes it to the earth's surface before cooling, a volcano is born and the magma erupts at the earth's surface to form lava. Rocks that form in this way are thus called "Extrusive Igneous Rocks."

Sedimentary Rocks:

When mountains are weathered, broken down and eroded away and thus produce sediment. The sediment (such as sand and mud) is carried to inland basins and to the oceans where it is deposited. The sediment accumu-

lates, is buried by succeeding layers of sediment and is eventually compacted and cemented together to form a sedimentary rock. Examples include conglomerates (very coarse, boulder-like or pebbly deposits), sandstones (composed of sand sized grains of quartz), and mud rocks called shale. Sedimentary rocks can also form by biological processes, such as the formation of limestone as a result of the proliferation of coral reefs and their surrounding biology; such limestone have formed vast deposits over the continents during times when sea level stood much higher than today and the oceans flooded large areas of the continents (up to 125 meters above present sea level). They may also form inorganically, such as when a large body of salt water dries up to form an evaporate deposit. An example is that about 5 million years ago, the Mediterranean became isolated from the Atlantic Ocean as tectonic forces closed the Gibraltar Straits. The entire Mediterranean Ocean dried up,



and all the salt of the sea water precipitated out to form extensive salt deposits there. You can try it yourself, by evaporating a gallon of seawater to completion.

Metamorphic Rocks:

The last family of rocks are called the Metamorphic Rocks. They get this name because they undergo a metamorphism (a change in form). After great burial and due to the confining pressures of the overlying rocks (overburden), as well as to the great heat that occurs with depth in the crust, any rock will be forced

to re-crystallize and transform into a new rock to conform with its new surroundings. In this way, sandstone is metamorphosed to form a chert (quartzite), and a limestone is used to form a rock called marble. However, at greater burial depths, the rocks all melt completely to form a new magma, and the process starts all over again. Thus we call this the rock cycle.

Preparations



Begin the lesson by telling students they are going on a Rock Hunt. Give each student a bag and go looking for rocks—either at Water Canyon or close to school. Have each student choose three rocks for this activity. If you are unable to go rock hunting, have students bring in three rocks from home. The wider the variety of rocks, the more fun this activity will be!

Now that your students have collected rocks for your class rock collection, brainstorm what your class already knows about rocks. Do this by having your students sit in a circle and place the rock collection in the middle. On the butcher paper, make a word web of rock facts. Ask students the following questions to record on your word web of rock facts.

Doing the Activity

Ask students the following questions to record on your word web

1. What color are the rocks?

2. What texture do the rocks have? How do they feel?
3. How big or small are the rock?

After recording your class's observations, explain that the earth's crust is made of rock. Explain to the students that the earth is like a Carmel covered apple. The soil is the Carmel, the skin of the apple is the crust, the fleshy part of the apple is the mantle, and the core of the apple is the earth's core. Cut up a Carmel apple with a knife as you explain this to your class.

Optional: Read to your class a book, such as *The Magic School Bus: Inside the Earth* by Joanna Cole, to illustrate the rock cycle. Discuss the rock cycle with your class.

Have each child take the rocks that they found for this lesson and a length of yarn (only one per group). In groups of two or three, have the children sort and classify rocks by taking the length of yarn and making a circle. Have the students discuss how the rocks are similar and different. Students should place the rocks that are similar inside the circle and the rocks that are different on the outside. Review with your class what you learned about rocks. Refer back to the word web you created. Discuss with students how rock is used to make buildings and other objects. Brainstorm a list of things in your school that are made of rock. For homework, have students find three things in your town that are made of rock.

Conclusion—

Review with your class what you learned about rocks. Refer back to the word web you created. Discuss with students how rock is used to make buildings and other objects. Brainstorm a list of things in your school that are made of rock. For homework, have students find three things in your town that are made of rock

Evaluation—

Evaluate students' knowledge by observing them as they work in groups to sort and classify rocks. Informally assess students by their contributions to the class discussion and their ability to answer questions .

Extension Activities—

Read to your class a book, such as *The Magic School Bus: Inside the Earth* by Joanna Cole, to illustrate the rock cycle. Discuss the rock cycle with your class. Bring in boxes of rocks and minerals and show to children.



Vocabulary

Mantel: the dried molten lava layer underneath the earth's crust

Core: the center of the earth

Sources—

<http://www.soest.hawaii.edu/GG/ASK/rocktypes.html>