

TRB 4:3 - Investigation 1 - Minerals vs. Rocks

Summary

This activity will help students understand the basic properties of rocks and minerals.

Group Size

Pairs

Materials

For every student or pair of students:

Mock rocks (see list of ingredients in ["Preparation"](#) section)

Paper plate

Large nail

Hand lens

Crayons or colored pencils

Piece of string

Metric ruler

50 ml graduated cylinder

Evaporation dish / clear plastic plate

Pipette or medicine dropper

Vial with lid (or small bottles such as spice bottles)

Worksheet: ["Mock Rocks"](#) (pdf)

Worksheet: ["Mock Rocks in Water"](#) (pdf)

For class or one for each group:

Scale

Additional Resources

Books:

Earth Materials (FOSS, Lawrence Hall of Science)

Agencies:

The Mock rock activity is a modified version of "Mock Rocks" from the FOSS science module.

Kits may be ordered through Delta Education at 1-800-258-1302.

Background for Teachers

Minerals are the building blocks from which rocks are made. Some minerals, such as gold and copper are made up almost entirely of one chemical element. Others are mixtures of elements. Rocks are nearly always made of mixtures of different minerals. More background in the Invitation to Learn section.

Geologists study the rocks on Earth. They make detailed observations of the rocks they discover to identify the various minerals found in the rocks they find. To do this they use different techniques to try to sort out all the minerals to identify them. They look at texture, appearance, shape, color, and smell to identify them.

Preparation:

(One week prior to this activity make mock rocks and allow them to air dry.)

Materials: 2 bowls, white flour, granulated salt, alum, water, red food coloring, blue food coloring, yellow food coloring, coarse sand, aquarium gravel (mixed colors) and egg shells or sea shells

Mix 1 cup white flour, 1/2 cup salt, 2 tsp. alum.

In a separate bowl mix 1/2 cup water, 5 drops red food coloring, 5 drops blue, 3 drops yellow food coloring.

Add the water mixture to the flour mixture. Knead the mixture until it no longer sticks to the side of the bowl.

Add 1 cup coarse sand, 1/4 cup aquarium gravel (mixed colors). Knead until it is well mixed.

Divide the mixture in 18 equal pieces about the size of a ping-pong ball.

One by one place each ball into the palm of your hand and with your thumb make a small indentation in the center. Place 3 or 4 pieces of seashell or eggshell in the indentation. This represents fossils. Mold the dough around them.

Smooth the surface of the ball and flatten the rock so that it is about 1 cm thick. Let them air dry for a week. (do not bake).

Intended Learning Outcomes

1. Use a Science Process and Thinking Skills

4. Communicate Effectively Using Science Language and Reasoning

Instructional Procedures

Pre-Assessment/Invitation to Learn

Explain that geologists study the earth. One thing that they study is rock. Geologists must make detailed observations of the rocks they discover. Ask students what they might observe about rocks (texture, shape, colors, smell, size). Tell students that these are the properties of the rock.

Show students a mock rock. Tell them that they are going to investigate this mock rock. To mock means to imitate or copy. This special rock imitates the properties of real rocks, but it is easier for young scientists with simple equipment to thoroughly investigate. They will be using some of the same observation techniques and skills that geologists use.

Geologists try to figure out what kind of rock they are examining. They do this by identifying the various ingredients in the rock. These ingredients are called minerals. The goal of the student is to use different techniques to try to sort out all the materials in order to identify them.

Instructional Procedures

Distribute a mock rock to every pair of students. Have them investigate the rock, recording all the properties they observe on their Mock Rocks in Water record sheet.

Draw the mock rock on the grid on the Mock Rocks worksheet. Strive for details and accuracy. Examine the mock rock with the hand lens. Have students draw what they see.

Measure the rock. Find its diameter, circumference, depth or height, and weight. Record the measurements in the log.

Break the mock rock in half. Students should use a nail to separate all of the different ingredients, sorting them into different piles. List the ingredients in the log. Include descriptions of colors, shapes and textures. (If the mock rock is very hard, place it in a plastic bag between padding and use a hammer to break it up. Be careful not to pulverize the shells.)

Explain that rocks are made up of more than one ingredient, including different minerals. The shells were not observable without breaking the rocks open. They could represent fossils imbedded in sedimentary rock.

Ask students to describe the leftover material that is too small to be separated with a nail. Ask for ideas on how they might further separate these small pieces. Suggest they might mix this material with water.

Give each pair of students a vial with a lid. Have them fill the vials 1/3 full of material. Water should be measured and added so the vial is about 3/4 full. (Have them measure precisely. the amount depends on the size vial or jar being used.)

Put the cap on and shake vigorously.

Set the vial down and immediately sketch what the cloudy, muddy mixture looks like before settling. (If it starts to settle before they finish drawing invite them to shake the vial again.)

Label the vials and set aside to settle overnight.

The next day have students carefully retrieve the vials and observe and draw what they see after settling.

Add to their list of ingredients (sand, silt (flour), and possibly a thin white mineral layer (alum)). Ask students to look closely at the liquid in the vials. Ask if it looks as clear as it did when they added it the day before. Suggest that they might evaporate the water to see what, if any, materials are left behind.

Have the students use a pipette to withdraw some of the clear water. Pour just enough water into the evaporation dishes to barely cover the bottom. Set aside to evaporate for a few days. This step could be done with the following activity: Crystals. They will be learning about crystals and should be able to identify the material as salt crystals. Have them draw and record what they see on their record sheets. Have them notice the little cubes with X's in them. They should add salt to their ingredient list.

Give students samples of minerals such as iron pyrite, and rock such as granite, and a piece of conglomerate. Instruct the students to observe the differences between the mineral (all one material, color, and texture) and the rock (made of pieces of different kinds or minerals and other materials).

Extensions

Math-

Determine measurements using appropriate tools and formulas. (*Standard IV, Objective 2*)

Language Arts-

Help students build vocabulary and become more precise in their descriptions of the minerals and various components of rocks and the mock rocks. (*Standard VI, Objective 1*)

Texture is gritty, rough, smooth, or powdery.

Colors are not just a certain color but shades of color: grey-white, eggshell white, golden-yellow, or lemon yellow.

Appearance can be speckled, banded, spotted, or streaked.

Shapes include faces, edges, cubes, rectangular prisms, and other geometric terms.

Check out some books about rocks and minerals. (*Standard VII, Objective 1, 2*)

Fine Arts-

Draw pictures of the different minerals the students are required to learn. In caption form, write the color, shape, appearance, and texture of each mineral. (*Standard II, Objective 2*)

Draw pictures of the different rocks students are required learn. In caption form, write the minerals that make up each rock. (*Standard II, Objective 2*)

Homework & Family Connections

Have students gather some rocks/minerals around their house.

Have them tell their families what they have learned, telling them the difference between rocks and minerals.

Have them point out the characteristics of minerals.

Have them point out minerals they see in some rocks.

Assessment Plan

Write what the difference is between a rock and a mineral.

Give students samples of pure minerals and rocks. Have them sort them into two groups and explain why they put the rock or mineral in the group they did.

Authors

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