

LEVEL: Grades K-3 (with extensions for grades 4-5)

SUBJECTS: Science, Consumer Education, Geography, Art, Language Arts.

PROCESS: Through observation and sensory exploration, students will recognize a crystal, understand that it is removed from the ground, and that it is valuable to people.

OBJECTIVES: The student will:

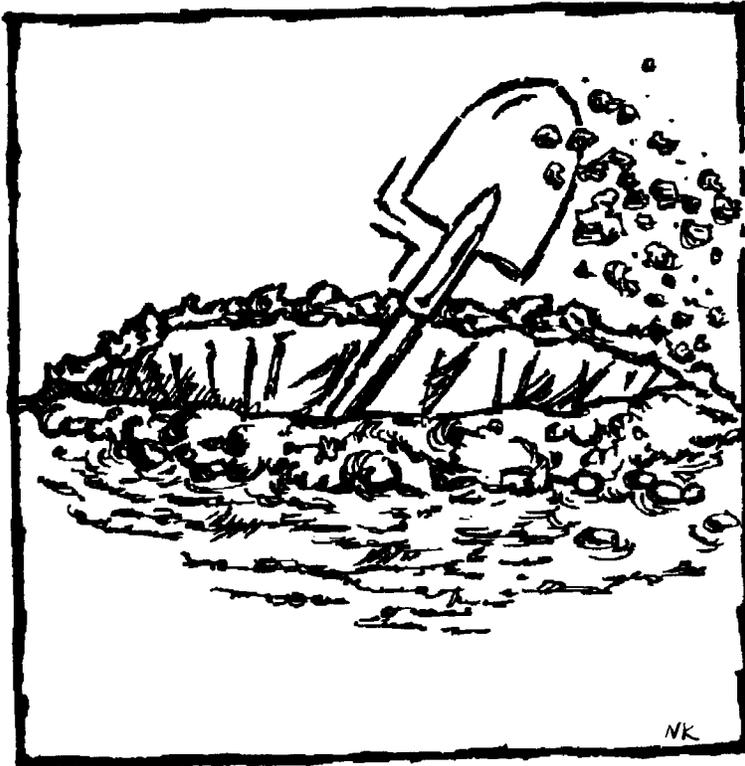
1. Determine that salt comes from the earth.
2. Determine that salt is mined from someone's property.
3. Apply their senses to compare and contrast unknown objects.
4. Describe the multiple uses of salt and other minerals.
5. Develop scientific observational skills.

TIMEFRAME: two 40-minute sessions.

SKILLS: Analyzing, comparing similarities and differences, describing, developing vocabulary, drawing, experimenting, generalizing, inferring, listening, observing, predicting, working in small groups.

MATERIALS: Foil-lined baking cups (one per two students), cupcake baking pan, kosher, marquerite, sea or other coarse salt, water, oven, magnifying glasses, popcorn, pretzels, table salt, craft sticks (one per student), small plastic cups half full of table salt (one for every four students), copper wire, clay, marbles, toilet paper tubes, "Eat a Rock" worksheet one per student (attached).

VOCABULARY: Crystals, diamonds, factory, landowners, magnifying glasses, managers, mineral, mines, mining, public land, salt.



EAT A ROCK

OVERVIEW: If you look around your home and your classroom, you'll find all kinds of minerals. The copper used for wiring, the glass for windows, and the salt used on your foods are just a few of the minerals in your world. These minerals come from the earth. Many of the minerals are from mines or huge holes in the ground that miners dig in order to find the minerals. Only minerals that have a use are mined. Since mining is expensive, no one is going to develop a mine for a mineral that is not in high demand.

Mining the land is expensive for many reasons. The mine must be dug; people are paid to work there; the land eventually has to be repaired; and minerals must be taken from the mine to a factory where they are changed into something people can use. For example, copper comes from a mine and is taken to a factory to be changed into wire. It certainly doesn't come from the ground

looking like wire.

One mineral used by people is salt. It, too, comes from the land. Once it was seawater, but when the water dried up, it took the form of a rock. Along with being an important part of our diet, salt is used for many things. Soap, mouthwashes, and medicines are made from salt. It also is used in developing photographs and in de-icing airplanes and roads.

Crystals are often very valuable objects mined from the earth. Crystals have forms and shapes with flat sides and usually edges that come together at points. Some crystals have many points, and some have only a few. Diamonds are crystals, and so is salt. Crystals can be formed in the classroom in a way much like they would appear naturally. Dissolve salt in water in a container. Leave it to dry, and then look at the interesting shapes along the sides of the container. The salt crystals

look like tiny clear boxes. Because they are so small, they must be seen under a magnifying glass. Unfortunately, diamonds cannot be formed in the classroom. Diamond crystals are very difficult to make. That's why they are very expensive.

Who owns the land minerals come from? People do. Sometimes one person might own it. Sometimes the land is owned by a large country, like the United States, and is called public land. Other times the land is owned by a company that paid a lot of money to mine the land. Depending on who owns the land, there may be many users of the land. You and some of your relatives or friends might camp or hike on some of these lands, for example. Animals and plants use the land that the minerals come from too.

PROCEDURE:

PRE-ACTIVITY

1. Make salt mines by filling half of the foil cupcake papers with a coarse salt (enough for one per two children) and fill to top with water. Stir to dissolve salt and place in hot oven (450 degrees). Bake until water cooks off (approximately 3 hours). Cool.

2. Give students opportunities to review their skills for using magnifying glasses. Have each student stick a marble on a small piece of clay to keep it from rolling away. Let students examine their marble first through an empty toilet paper tube, while practicing closing their eyes one at a time. Have everyone attempt to draw their marbles as seen through the tube. Then use a magnifying glass to look at the marble. Follow this up with class discussion. Ask everyone to describe the marbles as seen through the tube and under the magnifying glass. Compare what each did to study the marble with one eye. Since some students have difficulty with this skill, it will be beneficial for them to hear how others were successful. What others say they do to look with one eye can be beneficial for all.

Ask:

-What are at least five items in this classroom that came from a mine?

-It costs money to mine and use miner-

als. What are some costs for removing minerals from the land and turning them into products that we buy and use?

-What does a diamond look like? What does salt look like? Go home and see if someone in your family or a friend has a diamond that you can look at.

ACTIVITY

1. Give each student three large salt-covered pretzels. Tell students to put one pretzel to the side in a safe place. [Pass out copies of "Eat A Rock" worksheet to each student.] With a craft stick students gently scrape off the "lumps" on two of their pretzels into "A". (Save these pretzels for use at conclusion.) Pass out the cupcake salt mines (one per two students). Look carefully now at the mines without removing or disturbing them. Mines are fragile and shouldn't be entered or disturbed without permission. After a few minutes, have students hold their mines above "B" and tip them so that a few minerals fall into "B."

2. Tell students: "Using all of your senses explore both "A" and "B," but keep the inside of "A" and "B" separate. (Your students can work with a partner if they wish.) With a magnifying glass look closely at the contents of each rectangle and draw on your worksheets (below the rectangle) the shape of the contents of each rectangle as you see it through the magnifying glass."

3. "Next, try to pick up only one of the grains (crystals) from each rectangle and roll it around in your fingers. Describe how it feels. Is it soft, hard, smooth, ragged, sharp, wet, dry, or other texture?" List these descriptions on the board for "A" and "B."

4. Repeat the process for smelling. Do they differ in smell, and if yes, how?

5. Finally, dampen one fingertip and dip it into "A" and taste; repeat for "B." Again, describe tastes for each rectangle and list them on the board.

6. Return to the mine; have students describe the interior of the mine using these same senses. See if they can apply some of the

same words just used to describe the contents of both rectangles ("A" and "B").

7. Have four students work together as a team with a small cup half-filled with salt. Predict what is in the cups and compare it to the objects from the pretzels and from the mines. Place water in the cups. Stir the contents and then observe and report what happens to the salt. Ask everyone to eat their remaining salty pretzels and one of their pretzels without salt. Compare the tastes.

8. List other mined minerals found in the classroom. The following list identifies some locations around the western United States where these minerals are mined but there are minerals mined in most regions of the country. Locate these on a map. Have students list ten items found at home that have been manufactured from mine

Mineral	Use	Location in United States
copper	wire, pipe	Arizona
silver	jewelry, silverware	New Mexico
clay	kitty litter pottery	Hawaii
gold	watch, dentist fillings	Alaska
asbestos	oven mitts	California
tungsten	light bulbs	Idaho
petroleum	oil, telephones	Colorado
lead	car batteries television glass	Montana
salt	foods	Utah
iron ore	cars	Wyoming
marble	government buildings	Washington
mercury	florescent light bulbs	Oregon

ASSESSMENT:

Ask:

1. In what ways do you use salt?
2. Where does salt come from?
3. What are foods you eat that taste like the crystals in the "mines"?
4. List five items found in the school that have been made from a mineral.

EXTENSIONS:

1. Students can grow their own "salt mines" by letting their cups of salt water sit in the classroom. Put student's names on the cups and place in a safe location. Over a period of one to two weeks, the water will evaporate, and salt formations will develop along the sides of the cup. When all of the water has dried up and salt crystals have re-formed, students can review their knowledge of salt crystals and explore them again from a sensory level. You may find that they have become possessive about their mines and might not want to disturb them. If this occurs, you can explore the problem of land ownership and the conflict of uses for the land and consumer needs for the minerals found in the land.

2. Activity "Home of Mine, State of Mine" can be used to extend "Eat a Rock" for 3rd to 5th grade students.

3. Write for mineral summaries for your state.

4. Invite a geologist to your classroom to discuss mineral mining in your state and public lands that provide the minerals.

RESOURCES: Major Minerals and Energy Occurrences - United States by Mineral Information Institute, Inc., Denver, Colorado.

State Mineral Summaries from U.S. Bureau of Mines State Mineral Officer, some Regional offices:

(CO) Building 20, Denver Federal Center, Denver, CO 80225

(AK) P.O. Box 550 - Mayflower Island, Juneau, AK 99802

(ND,SD) 5629 Minnehaha Avenue South, Minneapolis, MN 55417
 (CA, HI, NV) 1605 Evans Avenue, Reno, NV 89512
 (ID, MT, OR, WA, WY) East 360 Third Avenue, Spokane, WA 99202
 (AZ, NM, UT) 210 E. 7th Street, Tucson, AZ 85705

STATE GEOLOGISTS:

Some are listed below. Check with your own state government for local resources if not listed here.

Alaska: Director and State Geologist, Alaska State Geological Survey, Division of Geology and Geophysical Surveys, 794 University Avenue Suite 200, Fairbanks, AK 99709-3645, (907) 474-7147

Arizona: Arizona Geological Survey, 845 North Park Avenue #100, Tucson, AZ 857719-4816, (602)882-4795

California: Department of Conservation, Division of Mines and Geology,, 801 K Street Mail Stop 14-33, Sacramento, CA 95814-3534, (916) 323-5336

Colorado: Colorado Geological Survey, 1313 Sherman Street, Room 715, Denver, CO 80203, (303) 866-2611

Hawaii: Hawaii Geological Survey, Division of Water and Land Development, P.O. Box 373, Honolulu, HI 96809, (808) 587 0230

Idaho: Director and State Geologist, University of Idaho, Morrill Hall, Room 332, Moscow, ID 83843, (208) 885-7991

Montana: Montana Bureau of Mines, Montana College of Mineral Science and Technology, West Park Street, Main Hall, Butte, MT 59701, (406)496-4180

Nevada: University of Nevada-Reno, Mail
Stop 178, Reno, NV 89557-0088, (702) 784-6691

New Mexico: New Mexico Institute of
Mining & Technology, Campus Station, Socorro,
NM 87801, (505) 835-5420

North Dakota: North Dakota Geological
Survey, 600 East Boulevard, Bismarck, ND
58505-0840, (701) 224-4109

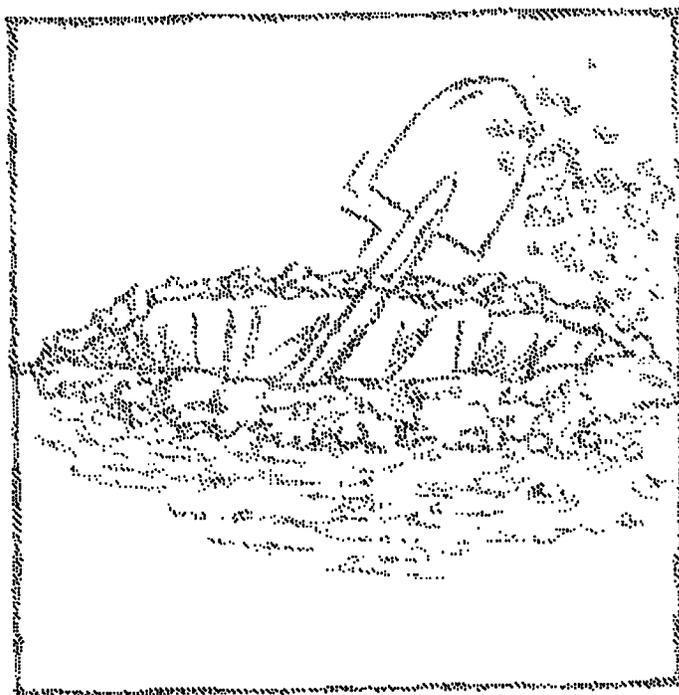
Oregon: Dept. of Geology and Mineral
Industries, 800 NE Oregon Street, #28, Suite 965
Portland, OR 97232, (503) 731-4100

South Dakota: South Dakota Geological
Survey, USD, Department of Water & Natural
Resources, Science Center, Vermillion, SD
57069-2390, (605) 677-5227

Utah: Utah Department of Natural Re-
sources, 2363 South Foothill Drive, Salt Lake
City, UT 84109-1491, (801) 467-7970

Washington: Washington Department of
Natural Resources, Geology/Earth Resources,
Washington Dept. of Natural Resources Mail
Stop PY-12, Olympia, WA 98504, (206) 459-
6372

Wyoming: Geological Survey of Wyoming,
P.O.Box 3008, University Station, Laramie, WY
82071-3008, (307) 766-2286



NAME: _____

Eat A Rock



A

B