

EDIBLE ROCKS II

Teacher Page –

This activity has been modified from a lesson plan for meteorite education from NASA. It has been 'refitted' for more common rocks. The web site for the original lesson plan is <http://www-curator.jsc.nasa.gov/outreach1/expmetmys/Lesson8.pdf> and the original activity is courtesy NASA's "Exploring Meteorite Mysteries" NASA Publication EG-1997-08-104-HQ by Marilyn Lindstrom et al.

Purpose: To observe and describe physical characteristics of a familiar model (candy bars) and apply to the unfamiliar (rocks). This is also an excellent activity to introduce geological terminology used in describing rocks.

Background: This activity fits in well with a unit on rocks and minerals. Examples of all three rock types, igneous, sedimentary and metamorphic, are all presented. Some teachers may be unfamiliar with a few of the descriptive terms used by geologists. A 'glossary' of terms is listed in the rock description section, which you may want to share with students before or after the activity. The activity focuses strongly on the importance of observation, even of an item a child may see once, or several times (!), a week. Encourage them to look at textures, shapes and sizes of the materials.

Preparation:

1. Obtain the rock samples you wish to use (it is not necessary to use all examples). Obtain the corresponding edible samples. If you are using the garnetiferous schist in our kit, make the chopped peanut brittle, unless you have a nice sample of garnetiferous schist with BIG garnets! Then you can use store bought peanut brittle.
2. Cut the samples so that a flat, cut face exposes the interior (this works better with cold candy). Reserve part of each sample to be eaten by students afterwards (or have extra).
3. Place each sample in a small plastic bag or on a sheet of paper or cardboard. Each team of two or three students will have one sample.
4. Give one student sheet to each team.
5. Cut apart the candy bar "Field Note" sample descriptions. These descriptions are written the way a geologist might take notes in a field record book. A nice way to do this is to glue the descriptions to foam board before cutting them out, they will last longer and look nicer.
6. Arrange the "Field Note" sample descriptions on a table with the corresponding rock so that students may attempt to match their own descriptions with these "key" descriptions. Cut out the rock descriptions and place those next to or under the rocks.

In Class:

Distribute a sample and student sheet to each team. Note: Content vocabulary may not be expected initially. The processes of observing and recording should be kept simple. Explain that each team is responsible for describing and sketching its sample. Encourage teams to describe their observations using familiar vocabulary; however, use no food

terms. Emphasize that working together is important. When finished, all students should go to the "Field Note" sample descriptions and rock samples which you have arranged on the "key" table. Emphasize that their observations will not be exactly like the "Field Notes". They will likely try several matches before they have the accurate pairing. Once they have the right one, require that they copy the correct answer key description onto their answer sheet while looking at their candy and the rock it is paired with. Reward the students with pieces of candy.

Another option would be to have each team share their description and sketches with the class. Conduct a discussion that includes the following points which emphasize basic skills needed to be good scientists: (1) The students made detailed observations of a sample, (2) The task was accomplished by using teamwork, (3) Although the student's descriptions differed from those provided and each team has a different style, the skills and processes used to observe and record the data were the same for each group. The students communicated and shared their observations and sketches. During the discussion of the observations, you may expand and discuss how the rocks formed, using geologic vocabulary and encouraging students to apply it to their own samples.

***Recipe for Rock 6:**

Easy Chopped Peanut Brittle

2 Cups granulated sugar
1 Cup Karo Syrup (supposed to be white, use dark for activity)
1 tsp. baking soda.
1/2 lb. raw peanuts, chopped to near size of garnets

Cook sugar and corn syrup over medium heat until sugar has melted. Pour in raw peanuts. Continue cooking until mixture forms a hard ball when dropped in cold water or just until syrup starts to turn an amber (about 15-20 mins.) Add 1 tsp soda and stir well. Pour into lightly greased cookie sheet. **DO NOT SPREAD OR TOUCH AT ALL.** When cool, break into pieces.
This recipe has been in the family for years and one of the best I have ever eaten.
Pat, from Nutcrackers.com

Names: _____

EDIBLE ROCKS

Student Page

Purpose: To observe and describe physical characteristics of a familiar model (candy bars) and apply to the unfamiliar (rocks).

Background: Good observations set the foundation for good interpretations. The ability to carefully observe and describe things improves with practice. Here is a chance to practice your observation skills on something you are already familiar with: candy bars! Can you describe the physical characteristics of these edible samples without using food terms? Could you or someone else identify the sample after reading your descriptions? Try it!

Materials: Each team should obtain one prepared edible sample; sketch paper.

Procedure:

1. Choose a sample to observe and describe. You may remove the sample from the bag, but handle it as little as possible to prevent melting. Do not taste it!
2. Make a detailed sketch of the sample on the sketch paper. Draw what you see, not what you think it is. Show the interior and exterior details. You may label parts of the sketch, but do not use any food terms.
3. Write 2 to 3 sentences describing the physical characteristics of the interior and exterior of the sample on the back of this page. Do not use food terms. For example, do not use the word chocolate. Make your description as clear and complete as you possibly can.
4. How descriptive were you? If all the samples were placed in a row, could a classmate match your description to the correct sample? Try it! Can you match your description to the "Field Note" Sample Descriptions on the "key" table? Go and try to find your sample. Ask your teacher if you are right. When you have found the correct description, compare the rock sample to your candy bar sample. Do they look alike? Remember, color is not necessarily indicative of rock type, so the color of candy sample and rock sample may differ. Under your own description on the back of this page, write the name and type of rock you have and write out the field note description. List all the similarities between your candy bar and the rock **and** any dissimilarities you may see.

Candy Bar Descriptions

These food descriptions are in geologic “Field Note” style. Therefore, they may be short and sometimes cryptic with geologic terminology. The descriptions refer to the interior of the candy bar if it has a chocolate coating unless otherwise noted.

1. Interior: Alternating light and medium-colored material in parallel layers.

2. Interior is a buff-colored matrix containing rounded particles of varying sizes cemented together.

3. Dense medium-brown sample, fine-grained and homogenous; flat on the bottom with three parallel ridges on top.

4. Interior: Poorly consolidated, friable, shiny to dull golden, platy fine-grained fragments.

5. Interior: some fine-grained layers and some layers with rounded inclusions.

6. Thin, fine grained medium-colored matrix with strong layering, containing small inclusions.

7. Medium brown fine-grained matrix with small light-colored, rounded inclusions or phenocrysts.

8. Sample has a thin layer of dense brown material, containing angular, very light inclusions.

9. The material appears to be a matrix of minerals of varying size and composition, often interlocking.

10. Sample has a homogeneous light brown interior with a frothy vesicular texture, indicating a high percentage of gas in the liquid material during formation.

ROCK DESCRIPTIONS

1. Sandstone: medium-grained, light-colored sedimentary rock made of quartz sand with evident layering.
2. Conglomerate: a coarse-grained clastic sedimentary rock with rounded clasts.
3. Shale: well-bedded, fine-grained clastic sedimentary rock made up primarily of clay. May come in a variety of dark colors.
4. Schist: a foliated (layered) metamorphic rock with predominant mica.
5. Gneiss: a strongly foliated (layered) metamorphic rock with bands or streaks of light and dark minerals.
6. Garnetiferous schist: a foliated (layered) metamorphic rock with garnet and two types of mica. Garnets are red-black equant porphyroblasts.
7. Porphyritic basalt or andesite: a mafic igneous volcanic rock, with a dark to medium fine-grained matrix containing lighter-colored phenocrysts.
8. Porphyritic basalt or andesite: a mafic igneous volcanic rock, with a dark to medium fine-grained matrix containing lighter-colored phenocrysts.

9. Granite: A coarse-grained, light-colored igneous rock with interlocking grains of quartz, feldspar and mica.

10. Pumice: a highly vesicular and glassy, light-colored, igneous volcanic rock. A hand lens shows the glassy texture and vesicles. The vesicular texture indicates a high percentage of gas in the molten material during formation.

GLOSSARY:

Amygdaloidal: A textural term describing volcanic rocks that contain numerous **amygdules**, which are gas cavities ([vesicles](#)) in volcanic rock that have been filled with mineral matter such as calcite, chalcedony, or quartz.

Density: the amount of mass per unit volume of an object; the distribution of a quantity (as mass, electricity, or energy) per unit usually of space (as length, area, or volume).

Felsic: an igneous rock composed chiefly of light-colored minerals. Opposite of mafic.

Garnetiferous: Containing garnets, a red-black semi-precious mineral. A garnetiferous schist contains garnet produced during metamorphism.

Matrix: the natural material (as soil or rock) in which something (as a fossil or crystal) is embedded.

Mafic: an igneous rocks composed chiefly of dark, iron and magnesium-rich minerals.

Molten: rock material that is a melted, hot liquid.

Phenocrysts: the larger crystals in a porphyritic igneous rock, surrounded by the finer grained matrix

Porphyritic: An igneous rock that has two distinct crystal sizes is said to have a porphyritic texture. A porphyritic rock is often formed when a body of magma cooled slowly at first, allowing the larger crystals to form, and then more rapidly later, forming the fine-grained matrix. For this activity, use a fine-grained basalt (dark) or andesite (medium) with one set of crystals dispersed throughout it.

Texture: **a:** the disposition or manner of union of the particles of a body or substance. **b:** the visual or tactile surface characteristics and appearance of something.

Vesicular: gas bubbles that are trapped in cooling lava are called **vesicles**, and the rock is said to have a vesicular texture.

Answer Key:

Sample	Candy Bar	Rock
1	Kit Kat	Sandstone with evident layers, preferably with one layer coarse grained (sedimentary)
2	Snickers Crunch or Rice Cereal Treat	Conglomerate (sedimentary)
3	Hershey Bar	Shale (sedimentary)
4	Butterfinger	Schist (metamorphic)
5	Snickers	Granitic Gneiss (metamorphic) - Use a gneiss with straight foliation.
6	Chopped Peanut Brittle* – see recipe	Garnetiferous schist (metamorphic)
7	Nestle Crunch or Hershey's Krackel	<u>Porphyritic andesite</u> (igneous) [see glossary]
8	Mr. Goodbar	Amygdaloidal andesite (igneous) [see glossary]
9	Chewy Chocolate chip granola bar	Granite (igneous)
10	3 Musketeers	Pumice or frothy scoria (igneous)

*See recipe on Page 2.