Edible Rocks

Supplies

edible rock samples (see below)	knife
small plastic bags	paper
pencils	colored pencils or crayons
copies of field note sample descriptions	copies of glossary sheet

Objective: To observe and describe the physical characteristics of an edible sample. To provide an introduction to some of the terms used in describing meteorites.

1. Prepare the samples ahead of time. You will need one for each group of 2 girls. Recipes are included for some of the samples at the end. The first six listed on the answer key are especially important since they closely represent meteorite characteristics. The answer key contains the list of kinds of samples and the numbers match up with the "field note sample descriptions." If you choose not to use any of the suggested samples be sure to remove their matching field note description. Cut the field note sample descriptions into numbered segments.

2. Cut the samples so that a flat interior surface is exposed. Reserve part or most of the sample - to be eaten as a reward. (Or you may choose to make marshmallow cereal treats or brownies as a snack reward.)

3. Give each team of girls a sample, paper, pencil, and colored pencils or crayons. Give them the following instructions:

Does anyone know what rocks that come from space and land on the earth are called? (Meteorites) Scientists find out more about the rocks that land on earth by cutting them and looking inside. then they carefully describe and draw what they see. Today you are going be a scientist and look at your own special "rock" sample. Its is a sample of an edible rock. With your partner you are to carefully observe the sample. You may remove the sample from the bag but handle it carefully and do not eat it or taste it! Make a large, detailed sketch of the the sample. The sketch should show the interior cut surface that is flat and any important details of the exterior. Write 2-3 sentences describing the cut surface. Do not use any food terms. For example do not use chocolate.

When you have finished you description and sketch take it to the table with the field note descriptions are located. Try to find the description that fits your sample. Check with a leader to see if you are right. Place your description, sketch and sample beside the "field note" description for your sample. There is a glossary of geological terms available to help you with the field notes.

4. Once the girls have found the right field note reward them with the rest of the sample or other snack.

Recipes

Rocky Road (#2 Edible Rock)
6 oz. semi-sweet pieces melted
2 cups mini-marshmallows

Butter a loaf pan or folded foil. Pour about half of melted chocolate into pan. Add the marshmallows and mix so that they are covered with chocolate. Pour the remaining chocolate over the marshmallows and spread flat. Refrigerate until cold. Cut a cube so the vertical surface is exposed.

Solid Chocolate (#3 Edible rock)

Use any thick chunk of solid chocolate.

Chocolate Brownies (#6 Edible Rock)
brownie recipe or mix nuts
large chunks of semi-sweet baking chocolate or large chocolate candies

Use any recipe for dark chocolate brownies or a mix. Add large chunks of semi-sweet baking chocolate or solid chocolate candy and nuts (add enough so that the solid candy and nuts will be exposed on a cut surface). Bake and cool completely.

Cut a cube of brownie exposing some solid chocolate and nut chunks. Cut the cube into several pieces. Then reassemble the cube in a jumbled fashion and allow to dry. Cut into slices so that chunks of nuts and chocolate are exposed.

Regolith Breccia simulant (#5 Edible Rock)
One batch of marshmallow crispy rice cereal treats
6 oz. semi-sweet chocolate pieces melted
jelly beans, chocolate chunks, or other large edible lumps

Mix up the cereal treats and spread 1/2 of the mix into buttered pan. Spread the melted semi-sweet chocolate over the mixture in the pan. Top with the remaining cereal treat mix.

As soon as the mix is cool enough to handle, but not hard cut out one cube about an inch square. Then cut it into 2 or three slices. Embed one or two jelly beans in part of the cube and mold back together again to form a “breccia.” Allow to harden and then recut to expose the jelly bean.

Edible rock answer key

1. Peanut Brittle (chondrites)
2. Rocky road (chondrites)
3. Chocolate (iron with fusion crust)
4. 3 Musketeers (achondrite with fusion crust)
5. Rice Cereal Treats (meteorite regolith breccia)
6. Chocolate brownie (carbonaceous chondrites)
7. Snickers
8. Milky Way
9. Bar None
10. Hersey Bar
11. Twix
12. Butterfinger
13. Skor
14. Rolo
15. Kit Kat
16. Symphony
17. M & M
18. Nestle Crunch
19. Whatchamacallit
20. Mounds
21. P.B. Max
22. Mr. Goodbar
23. Hersey with Almonds

These food descriptions are in geologic “field note” style. Therefore, they may be short and sometimes cryptic.

1. Sample is a thin layer. There is a golden matrix surrounding tan rounded or broken inclusions. The inclusions have a reddish brown rim or crust.

2. Sample consists mainly of white, soft rounded to angular blebs completely surrounded by a uniform dark brown matrix.

3. Sample is a sold dark brown dense mass with no obvious fusion crust.

4. Sample has a homogeneous light brown interior with a few small vesicles. The exterior looks fairly regular, dark brown fusion curst with some patterning.

5. Sample appears to have been distorted. The dominate phase is made of rounded light tan fragments containing may void spaces. A dark brown layer fill spaces between some rounded fragments. There are some large foreign inclusions.

6. Sample is totally dark brown with two phases. The dominant phase is shiny and crumbly. The other phase is dense and slightly lighter in color. A light fusion curst appears on only one side.

7. Outside: Thin medium-brown layer with ripple-marks on bottom.
Inside: Bottom - (~1/3) flat dense buff layer.
Top - (~2/3) pebbles consolidated in a fine grained tan matrix.

8. Outside: Thin medium brown layer with wavy ripple marks on the bottom.
Inside: Bottom - dense dark buff layer
Top - shiny, smooth, medium tan layer

9. Outside: Medium brown layer, thin on the bottom, the thicker top contains angular inclusions
Inside: Thin alternating horizontal layers of smooth dark brown and fragmented dark brown.

10. Dense medium brown sample, flat on bottom with three parallel ridges on top.

11. Outside: Thin medium brown layer with wavy ripples on the bottom
Inside: Bottom - poorly consolidated light tan porous layer
Top - shiny smooth medium tan layer

12. Outside: thin medium brown layer
Inside: Poorly consolidate, friable, shiny to dull golden platy fragments.

13. Outside: Thin medium brown layer, very thin in bottom and side, thicker on top with large wavy ripples
Inside: Thin dense layer of shiny light-golden unfractured material

14. Outside: Thin, medium brown, edges higher on outside of top, sides slanted.
Inside: Smooth material that is yellowish brown and sticky

15. Four segments of layered material.
Outside: Thin, medium brown
Inside: Alternating light and medium

16. Dense layer, solid medium brown with a few light tan angular fragments.

17. Sample consists of unconsolidated pebbles with various colors and regular shape. Each individual pebble has a medium brown interior with a thin, hard colored shell.

18. Sample has a thin layer of dense brown material, containing very light inclusions at the bottom. The sample top has a depression in the middle with a ridge on each side.

19. Sample is a rectangular layer of rounded light pebbles surrounded by a thin coating of medium brown. Some yellowish brown sticky material is above the pebbles.

20. Sample interior consists of white, moist-looking fragments. These are surrounded by a dark brown exterior layer.

21. Irregular sample.
Outside: Bumpy medium brown
Inside: Yellow brown solid material resting on light tan fragments, some large tan fragments are found near the top.

22. Outside: Dense layer of medium brown with a dip in the top
Inside: Light tan pebbles that have settled to the bottom

23. Dense sample of medium brown material, rounded on the top and flat on the bottom, with a few light brown pebble inclusions.

Glossary

Achondrite: stoney meteorite without chondrules.

Bleb: a small, usually rounded fragment of another rock enclosed within a rock.

Breccia: rock consisting of angular, coarse fragments embedded in a fine-grained matrix.

Carbonaceous chordate: a primitive type of meteorite usually with chondrules; they contain water and carbon compounds, including organic molecules.

Chondrite: stone meteorite containing condrules embedded in a find grained matrix of pyroxene, olivine, and metallic nickel-iron.

Chondrule: a small rounded body of various materials, chiefly olivine or pyroxene, found embedded in a usually fragmental matrix in certain of the stoney meteorites.

Crust: the outermost layer.

Friable: easily crumbled rock fragments.

Fusion crust: dark glassy coating on the surface of a meteorite, caused by heating as the meteorite enters the atmosphere.

Inclusions: a fragment of another rock enclosed within a rock.

Homogeneous: composed of one type of material.

Matrix: the smaller sized grains in a rock, where the rock consists of large grains or fragments surrounded by smaller grains.

Platy: the texture of a rock that is composed of flat minerals or rock fragments.

Regolith: loose, unconsolidated rock, mineral, and glass fragments; on the Moon and some planetary bodies, this debris is produced by impacts and blankets the surface.

Unconsolidated: materials loosely packed, but no cemented to each other.

Unfractured: does not contain breaks or cracks.

Vesicle: bubble-shaped cavity in a volcanic rock formed by expanding gases.