Hands On Earth Science Activity No. 11
Is it a Rock or a Mineral?

This activity can be used to help teach the following Topics and Content Statements for the Ohio Revised Science Standards (2018) and Model Curriculum (2019):

Grade	Content Standard	Topic	Content Statement/Subtopic
Kindergarten	Physical Science	Properties of Everyday Objects and Materials	K.PS.1: Objects and materials can be sorted and described by their properties.
Grade 3	Earth and Space Science	Earth's Resources	3.ESS.1: Earth's nonliving resources have specific properties.
Grade 6	Earth and Space Science	Rocks, Minerals and Soil	6.ESS.1: Minerals have specific, quantifiable properties. 6.ESS.2: Igneous, metamorphic and sedimentary rocks have unique characteristics that can be used for identification and/or classification. 6.ESS.3: Igneous, metamorphic and sedimentary rocks form in different ways.
Grade 6	Physical Science	Matter and Motion	6.PS.1: Matter is made up of small particles called atoms.

Division Of Geological Survey
HANDS ON EARTH SCIENCE
No. 11

IS IT A ROCK OR A MINERAL?

by Sherry L. Weisgarber

Kids love rocks and minerals. However, many kids (and adults!) do not know the difference between a rock and a mineral. This activity is designed to train K-5 young scientists to observe and classify while learning how to tell the difference between a rock and a mineral.

What is a mineral? A material must fit the following four general criteria to be called a mineral:

1. Minerals are inorganic, meaning they typically do not form from the remains of plants or animals.

2. Minerals are naturally occurring. True minerals are not manmade.

3. Minerals have the same chemical makeup wherever they are found. For example, the mineral quartz always consists of one part silicon (an element) to two parts oxygen (another element). Some minerals, like gold, copper, and sulfur, are made up of only one element. However, most minerals are combinations of several different elements.

4. Minerals have specific repeating patterns of atoms. This orderly arrangement of atoms forms the mineral's characteristic crystal shape. For example, a crystal of quartz is always hexagonal because of the way the atoms of silicon and oxygen join together. However, if a quartz crystal does not have much room to grow, it may not look hexagonal on the outside, even though the atoms on the inside are arranged in the same orderly pattern.

What is a rock? Minerals are the building blocks of rocks. A rock is made up of one or more minerals. Rocks can be placed in one of three categories depending on how they form:

1. Igneous rocks form from magma (molten rock) either deep within the Earth (for example, granite), or on the Earth's surface when lava cools and hardens (for example, pumice).

2. Sedimentary rocks are layered rocks that form primarily from the accumulation and compaction of sediment which is derived from preexisting rocks by erosion (weathering by water, wind, or ice) (for example, sandstone). Some sedimentary rocks form by precipitation from solution (for example, gypsum).

3. Metamorphic rocks form when preexisting rocks—igneous, sedimentary, or metamorphic—are subjected to extreme temperatures and pressures deep within the Earth. The intense heat and pressure cause the mineral composition and grain size to change. For example, limestones become marbles and shales become slates.

Now that you know the general definitions, how can you tell the difference between rocks and minerals? This is where observation and classification becomes important. Minerals are homogeneous (the same throughout). A mineral will generally have the same appearance both on the interior and exterior of the sample. The properties of color and texture generally do not vary sharply because of this homogeneity. However, color and texture generally do vary sharply in rocks because rocks are made up of a variety of different minerals.

Before having the students classify actual rocks and minerals, have them observe and classify some things they may like better . . . candy. For this exercise you will need to choose bags of the following candies. Make sure you have some candies from both the "rock" list and the "mineral" list. The more variety, the better the exercise. The "rock" list includes: Peanut M & M's™, Nestle's Buncha Crunch™, Butterfinger BB's™, and Hershey Kisses with Almonds™. The "mineral" list includes: Hershey Kisses™, gummy bears, jelly beans, and chocolate or peanut butter chips. (This activity assumes that none of the students is diabetic or allergic to chocolate, peanuts, or almonds.)

After explaining to them the difference between rocks and minerals, distribute to each child a variety of candies making sure each child has some "rocks" and some "minerals." Tell the students that geologists generally break open rocks and minerals to help them identify (or classify) a rock or mineral sample. Therefore, the students should bite open their "rocks" and "minerals" to help them with their classification. Remind them that half of each sample is to be eaten and half is to be saved to observe and classify. They can eat the other half after the exercise is finished.

Have the students keep a record of their observations. Which samples seem to be homogeneous? Which samples are made up of more than one substance or "mineral"? Which samples would they classify as "minerals"? Why? Which samples would they classify as "rocks"? Why?

After they are through classifying the candy, they may want to try classifying real rocks and minerals. You can have them bring in their collections (if they have one) from home, take them outside and let them do some collecting during class time, or give them a homework assignment to collect a variety of rocks and minerals on their own.

When the students bring their collections into class, have them classify (group) the samples as rocks or minerals. Once again, have the students keep a record of their observations. Let them decide on their own criteria for classification. They will probably find it difficult to classify the real thing. It may take a while for them to get the hang of it. However, after they catch on, you may want to suggest that they classify their groups of rocks into subgroups, determining which rocks are the same and which are different. They will probably end up with two subgroups: igneous/metamorphic and sedimentary.

After the classifying is complete, have the students say how they decided which samples were rocks and which were minerals. Then ask how they decided to subdivide their rock group. Remind them that no criterion is dumb, and what appears dumb may even be a better way to classify. You will probably find that they used color, shape, texture, and possibly a few unique criteria! Let them know that the exercise they just completed on observation and classification is what scientists do in real life. Now, they are scientists too!

SOURCES: *Food For Thought: Edible Earth Science*, Betty Crocker, Barbara Reed, and Eddie Shaw, 1992, Idea Factory, Inc. (1-800-331-6204); and *Fairly Simple Exercises in Geology*, John J. and Barbara R. Thomas, 1994, Geology Department, Skidmore College, 100 p.