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ROCK OBSERVATIONS — ACTIVITY 1 (LP1)

Science Standards of Learning 5.8, 5.1, 4.8, 4.1, 3.1

Question

What are some of the common features and characteristics of rocks?

Rationale

In this investigation students will begin to sharpen their **observation** skills while examining some basic characteristics of Virginia rock samples. Students are expected to gain a basic fluency with a few key rock characteristics as they look at 10 samples. Very limited technical vocabulary is needed for this activity, but students are expected to begin to use and develop more precise descriptive terminology. This activity is intended to develop observation skills and basic knowledge of features and characteristics required for more complex understanding of rocks and changes in the Earth's surface.

Objectives

It is expected that students should be able to:

- Make precise observations of visible rock characteristics.
- Analyze the way that particles in rocks reflect light, using terms like “dull,” “shiny,” “glossy” “luster,” and “sheen.”
- Infer that rocks are made of particles of differing minerals that vary in size.
- Discriminate relative size among the particles that make up rocks, and use descriptive vocabulary to communicate that size. Students should use descriptions such as:
 - too small to see with the naked eye.
 - very small, smaller than a period (.) at the end of a sentence;
 - like grains of sand;
 - medium sized, the size of peas;
 - large, the size of dime or bigger.(Students should also be able to communicate particle size using metric measures when particles are greater than 1mm.)
- Discriminate relative density of rocks by *hefting* samples carefully in their hands. Students should use descriptions such as:
 - light for its size compared to many other rocks;
 - about average for its size compared to many other rocks;
 - heavy for its size compared to many other rocks.(Students should be able to explain the concept of density.)

- Use a magnifying glass correctly to observe the particles that make up rocks.

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Objectives (cont'd.)

- Analyze textural characteristics of rock samples by touch, and use descriptive terminology to communicate the observation. Examples of terms include ‘rough,’ ‘smooth,’ and ‘grainy.’
- Analyze textural characteristics of rock samples, and communicate descriptive information about the shape of particles that make up the rocks. Particle shapes may be described as angular and rounded.
- Apply the terminology “mineral,” “crystal,” and “grain” when describing rock samples.

Key Concepts

The concepts developed in this activity include the following:

- Rocks are made of smaller particles.
- The overall sizes of the particles that make up a rock vary. Some particles are very small, often too small to be seen with the unaided eye.
- The particles that make up a rock may all be the same color or may vary considerably in color.
- Small difference in the density (“heaviness for its size”) among rock samples can be noticed with careful observation.
- Rocks are generally composed either of grains or crystals of differing minerals.
- Some rocks have a shiny appearance, even when their constituent particles are very small. Rocks with crystals or well developed mineral cleavage will often be shinier than rocks made of grains cemented together.

Procedure: Description and Directions

Students will work in groups of two or three, moving in a “round-robin” fashion among the stations set up around the room. The teacher needs to prepare the activity by placing the numbered samples on the appropriate cards prior to the activity.

The numbers on the rock samples correspond to the small print in the upper left of the sample squares found on each of the ten activity cards. The rock sample numbers *do not* correspond to the station number, and it is important that students do not confuse the two sets of numbers. When the activity begins students will need a few minutes to examine the rock sample and answer the three questions on each card. After a given time period (approximately 5 minutes) students will proceed to the next higher numbered station. When they have completed station number ten (10), they will move to station number one (1). They will continue until all stations have been completed.

The teacher should prepare students by reviewing the observations skills (found in K.1, 1.1, 2.1, 3.1, 4.1, 5.1) and basic descriptive terminology related to color, texture, size, and shape. It is important to introduce the operational concept of “density” and demonstrate some of the processes required in the activity.

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Procedure: Description and Directions (cont'd.)

Students will be asked to make observations about the rocks on the ten station cards. The teacher will need to demonstrate and reinforce certain procedures to the class before the students begin the activity. These include:

- 1) “hefting” the rock in the palm of your hand to determine relative density;
- 2) moving the rock back and forth in the light to note the presence of reflections;
- 3) using a magnifying glass to help determine the size of the constituent particles.

- Instruct students not to move the samples from the original station.
- Instruct students not to damage the samples.
- Pass out the student recording sheets. Each student, regardless of the group size or teaming, should be responsible for keeping a data sheet. Clipboards or cardboard backing are helpful.
- Students will notice that in *Activity 1* each station has three questions related to an observation that s/he must make about the particular rock sample.
- In some cases, example responses are provided. If a question requires a student to answer “yes” or “no,” the student should respond with a short phrase or sentence, for example, “Yes, it is shiny.”
- Upon completion of the activity, if there are questions about samples, the teacher may consider allowing students to revisit stations.
- Depending on the time available in the schedule, it may be useful to break the activity into two parts. The ten stations in *Activity 1* may be completed over two sessions depending on how students proceed with the activity.

Class Debriefing /Follow-up

For each station a student should be selected to display the sample and give his/her response to each of the questions. Other students should examine their own response sheets and compare their observations and answers. There may be items where students have some differences, and these should be discussed. Student responses may vary, and this is to be expected. Ask students to defend what they have observed. It is important to reinforce observation skills, and especially the use of descriptive language to communicate what has been observed. (Keep in mind that the appearance of individual rock samples will vary somewhat from kit to kit.)

Performance Assessment

The student should demonstrate a systematic approach to describing the rock and looking for certain features.

Given a rock sample (from the kit or other similar-sized sample), the student should be able to make some basic descriptions of the:

- Size and shape of the constituent particles.
- The color of the constituent particles or the overall rock color.

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Performance Assessment (cont'd.)

- The relative density of the sample.
- The presence of unusual features in the rock.

When describing a rock sample, either orally or in writing, the student should use the basic rock vocabulary developed in the activity.

Vocabulary

- Crystal
- Density
- Dull, Shiny, Glossy, Greasy, Earthy
- Grain
- Luster
- Mineral
- Particle
- Sheen
- Reflect