MY ROCKS ROCK! *(MODIFIED FOR ADEED)*

INSTRUCTIONS

Science Concept:

Rocks are made up of a combination of substances.

Objectives:

The student will:

- describe how rocks are made of a combination of substances;
- observe and classify rocks by the combination of substances inside; and
- create a Venn diagram to show the classifications of rock substances.

GLEs Addressed:

Science

[3] SD1.1 The student demonstrates an understanding of geochemical cycles by recognizing that most rocks are composed of combinations of different substances.

[3] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.

Math

[3] S&P-1 The student demonstrates an ability to classify and organize data by designing an investigation and collecting, recording, organizing, displaying, or explaining the classification of data in real-world problems (e.g., literature, self, or family), using bar graphs, and Venn diagrams.

Vocabulary:

characteristic - a special quality or appearance that makes an individual or group different from others

classify - to arrange or organize by classes

clay - a family of platy silicate minerals that commonly form as a product of rock weathering

combination - to bring into or join in a close union or whole

fossil - any remains, impression, or trace of a living thing of a former geologic age, as a skeleton, footprint, etc.

geologist - a person who specializes in geologic research and study

geology - the scientific study of the origin of Earth along with its rocks, minerals, and land forms, and of the history of the changes these have undergone

pebble - loose particles of rock or mineral (sediment) that range in size from 2-64 millimeters in diameter; pebbles are the smallest type of gravel

sand – small, often rounded grains or particles of disintegrated rock, larger than particles of silt.

silt - a sedimentary material consisting of very fine particles intermediate in size between sand and clay

substances - that which has mass and occupies space

Venn diagram - a diagram using circles to represent sets, with the position and overlap of the circles indicating the relationships between the sets

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Materials:

- Rocks, a variety that have shells, fossils, wood, sand, silt, pebbles, etc. (10-12 per student; 3-4 per group)
- Index cards (one per student)
- Glue
- 20 inch x 30 inch cardboard or heavy tag board (one per student)
- Yarn for Venn circles
- Shoe-box sized containers (one per group)
- Hand lenses/magnifiers (one per group)
- Safety goggles (one per student)
- Rock hammers or other rock-breaking tool (one per group)
- 8 inch x 8 inch fabric squares, as rock protectors (one per group)
- Tweezers (one per group)
- Nails (several per group)
- Toothpicks (several per group)
- Masking tape
- Chart paper
- Cups (several per group)
- Paintbrushes or cotton swabs (one per group)
- STUDENT WORKSHEET: "My Rocks Rock!"

Resource:

http://library.thinkquest.org/J002744/adlm-album2.HTML

Activity Preparation:

Prepare rock exploration kits by placing each of the following items in a container so there is one per group: hand lens, rock hammer, fabric square, tweezers, several nails, several toothpicks, cups, and paintbrushes or cotton swab.

Activity Procedure:

Please refer to the assessment task and scoring rubric located at the end of these instructions. Discuss the assessment descriptors with the class before teaching this lesson.

Gear Up

Process Skills: observing, communicating, and predicting

1. Distribute an index card and one rock to each student. Invite students to record on their index card what they observe about the rock and predict what is inside the rock.
2. Share a few students' cards with the class. Introduce "substances" as a vocabulary word and define. On the chart paper, list other vocabulary words and ask students to define them in "kid words." Also record insightful comments or questions.
3. Ask the class the following questions:
   a What do you think rocks are made of?
   b What is your rock made of? How can you tell?
   c What can you do to see more of your rock?

Explore

Process Skills: observing, communicating, and collecting data

4. Explain students will investigate a number of rocks with the provided tools. Demonstrate how to use eye protection, how to use the rock hammer, and where to position rocks within the cloth protectors when breaking them.
5. Divide students into pairs or small groups and explain they will be student geologists. Distribute the following to each group: a rock exploration kit (see Activity Preparation) and three or four rocks. Hand out STUDENT WORKSHEET: "My Rocks Rock!" and a pair of safety goggles to each student. Ask students to complete the worksheet as they are exploring.

Generalize

Process Skills: classifying, observing, and generalizing

6. When all worksheets are completed ask the class the following questions:
   a. What did you observe about the rocks you cracked?
   b. Using your observations, how/why are the substances different?
   c. Using your observations, how/why are the substances similar?
   d. How were your observations on your index card different from what you have found during this exploration?
   e. What can you say that is true about all of your rocks?
   f. What can the fossils "tell" us? (e.g. Where did deposition occur?)
   g. Ask student geologists to make a generalization about all of the rocks they have explored.

Apply

Process Skill: observing, classifying, and communicating

7. As a class, generate a list of words used to describe rocks and what substances rocks are made of. Make a 3-circle Venn diagram on the floor by using circles with yarn. Using the word list, ask students to choose three characteristics to label the group Venn (e.g., sand, pebbles, twigs, wood, fossils, silt). As students come to the Venn diagram with one rock, ask them to place it in the appropriate circle, put their name on masking tape where their rock would be, and explain their placement.

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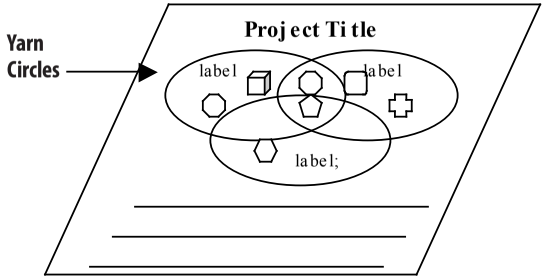
RUBRIC

Assessment Task:

Give each student 10-12 rocks. Have students classify the rocks at least three different ways on their desks/tables. Ask students to use all of the provided rocks to create a three-circle, 3-D Venn diagram on a 20-inch x 30-inch sheet of cardboard that shows how rocks are made of many substances. Your diagram should identify at least three different parts of rocks. The rocks should be glued within the yarn circles. Include a title at the top of the cardboard, and a label within each circle. You may also write sentences describing the Venn diagram in the space below the diagram.



Rubric:

Objective	GLE	Below Proficient	Proficient	Above Proficient
The student identifies rocks are made of different substances.	[3] SD1.1	The student identifies less than three parts of a rock, such as silt, shells, sand, pebbles, wood, or fossils, by listing the parts.	The student identifies three parts of a rock, such as silt, shells, sand, pebbles, wood, or fossils, by listing the parts.	The student identifies four or more parts of a rock, such as silt, shells, sand, pebbles, wood, or fossils.
The student classifies rocks by the combination of substances inside.	[3] SA1.1	The student classifies rocks less than three different ways.	The student classifies rocks three different ways.	The student classifies rocks four or more different ways.
The student creates a Venn diagram to show the classifications of rock substances.	[3] S&P-1	The student creates a two-circle, 3D Venn diagram of rocks with labeling.	The student creates a three-circle, 3D Venn diagram of rocks with appropriate labeling.	The student creates a three-circle, 3D Venn diagram of rocks with appropriate labeling and sentences describing the diagram.

NAME:_____

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STUDENT WORKSHEET

Science Teacher Education Program

STEP 1

What would you like to learn about your rocks?

STEP 2

Explore your rocks using the safety methods discussed.

STEP 3

What did you discover?

STEP 4

What was the most interesting thing you learned?