

**Science Concept:**

Rocks are made from a variety of substances.

**Objectives:**

The student will:

- describe that rocks are made from more than one substance;
- observe and classify rocks; and
- create a Venn diagram.

**Targeted Alaska Grade Level Expectations:****Science**

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

**Math**

- [2] S&P-2 The student demonstrates an ability to classify and organize data by collecting, recording, interpreting, and representing data in a variety of ways. (M6.1.1)

**Vocabulary:**

**classification** - the act or process of classifying; a systematic arrangement in groups or categories according to established criteria

**geode** - a nodule of stone having a cavity lined with crystals or mineral matter

**mineral** - a solid material that is found in nature and has never been alive

**Venn diagram** - a graph that employs closed curves and especially circles to represent logical relations between and operations on sets and the terms of propositions by the inclusion, exclusion, or intersection of the curves

**Materials:**

- Geodes (5-10)
- Hammer
- Chisel
- Screwdriver
- Safety goggles (one pair per person)
- Soft dough (one tennis-ball size in one color and one golf size ball in another color per student)
- String (approximately 12 inches per student)
- Miscellaneous materials, such as chips of rocks, sand, aquarium rocks, scraps of aluminum foil or other shiny objects, fake jewels, marbles, small pebbles, pieces of plants, wood chips, charcoal pieces, beans, etc.
- Sticky notes (one per student)
- Rocks (10-15 per student)
- STUDENT WORKSHEET: "Venn Diagram"
- STUDENT WORKSHEET: "Classification"

**Activity Preparation:**

Mix the miscellaneous materials together in one container.

**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 and describing***

1. Gather students around where they can observe a geode demonstration. Hand out goggles and go over safety procedures. The teacher will use tools to break open the geodes.
2. As each geode is broken open, ask students to share their observations. Record student observations on the board.
3. Discuss how rocks are made from more than one substance and how they can be different textures, colors, sizes, weights, etc. Introduce the word "mineral." Talk about the similarities and differences of the geodes.

**Explore*****Process Skills: describing, observing, classifying and communicating***

4. Explain students will create their own model rock from a variety of different materials (substances). Pass out supplies for the rock modeling: a handful of the material mixture, one tennis size ball of soft dough and one golf sized ball of soft dough, each of a different color; a piece of string, and a sticky note. Instruct students to draw a line down the middle of the sticky note.
5. Ask students to knead the tennis-ball sized dough until it is soft. Once the dough is soft, ask students to mix their materials into the dough and then roll it into a ball. Next, direct them to roll their golf-ball sized dough. They will wrap their ball so that the second color forms the top layer of their model rock.
6. On the top half of the sticky note, ask students to write two observations about their completed model rock, and then set the sticky note aside. Instruct students to wrap the string around the middle of the model rock and pull the string in opposite directions to cut their model rock in half. Ask students to make two new observations about their model rock and record those observations on the bottom half of the sticky note.
7. Divide students into pairs and ask them to discuss the similarities and differences between their rocks. Ask students to put their name on the back of their sticky note and put it on the board.

**Generalize*****Process Skills: communicating and classifying***

8. Ask students the following questions and discuss as a class:
  - a. What did you observe about your rock?
  - b. What substances can rocks be made of? List student responses on the board.
  - c. Where could you find rocks that are made from more than one substance?
  - d. What surprised you about this exploration?
  - e. How can we compare geodes to our model rocks? As a class, create a Venn diagram comparing model rocks to the geodes.

**Apply*****Process Skills: communicating and describing***

9. Go outdoors with your family and find rocks that are made of more than one material and describe them to your family. In your science journal, draw an illustration or describe the composition of the rocks. You should also include where you found the rock and how you explained the process to your family.

## Assessment Task:

### Task 1:

Distribute the STUDENT WORKSHEET: "Classification." Ask students to choose ten to fifteen rocks from the classroom supply (see Materials) and classify them in at least three different ways and then complete the worksheet.

### Task 2:

Pick two rocks from the 10-15 used before and complete the Venn diagram following the directions on the STUDENT WORKSHEET: "Venn Diagram." Describe how the rocks are made from more than one substance using at least three complete sentences.

## Rubric:

Objectives	GLEs	Below Proficient	Proficient	Above Proficient
The student observes and classifies rocks.	[3] SA1.1	The student classifies a variety of rocks in zero to two ways (size, color, shape, weight, texture, etc.).	The student classifies a variety of rocks in three different ways (size, color, shape, weight, texture, etc.).	The student classifies a variety of rocks in four or more different ways (size, color, shape, weight, texture, etc.).
The student describes that rocks are made from more than one substance.	[3] SD1.1	The student writes zero to two complete sentences describing how rocks can be made up of more than one substance (contains pebbles, sand, mud, sticks, silt, etc.).	The student writes three complete sentences describing how rocks can be made up of more than one substance (contains pebbles, sand, mud, sticks, silt, etc.).	The student writes four or more complete sentences describing how rocks can be made up of more than one substance (contains pebbles, sand, mud, sticks, silt, etc.).
The student creates a Venn Diagram.	[2] S&P-2	In a Venn diagram, the student does not show rocks are made up of more than one substance. The student uses no words or one-word descriptors in each of the three sections.	In a Venn diagram, the student shows rocks are made up of more than one substance with two word descriptors in each of the three sections.	In a Venn diagram, the student shows rocks are made up of more than one substance with three or more word descriptors in each of the three sections.

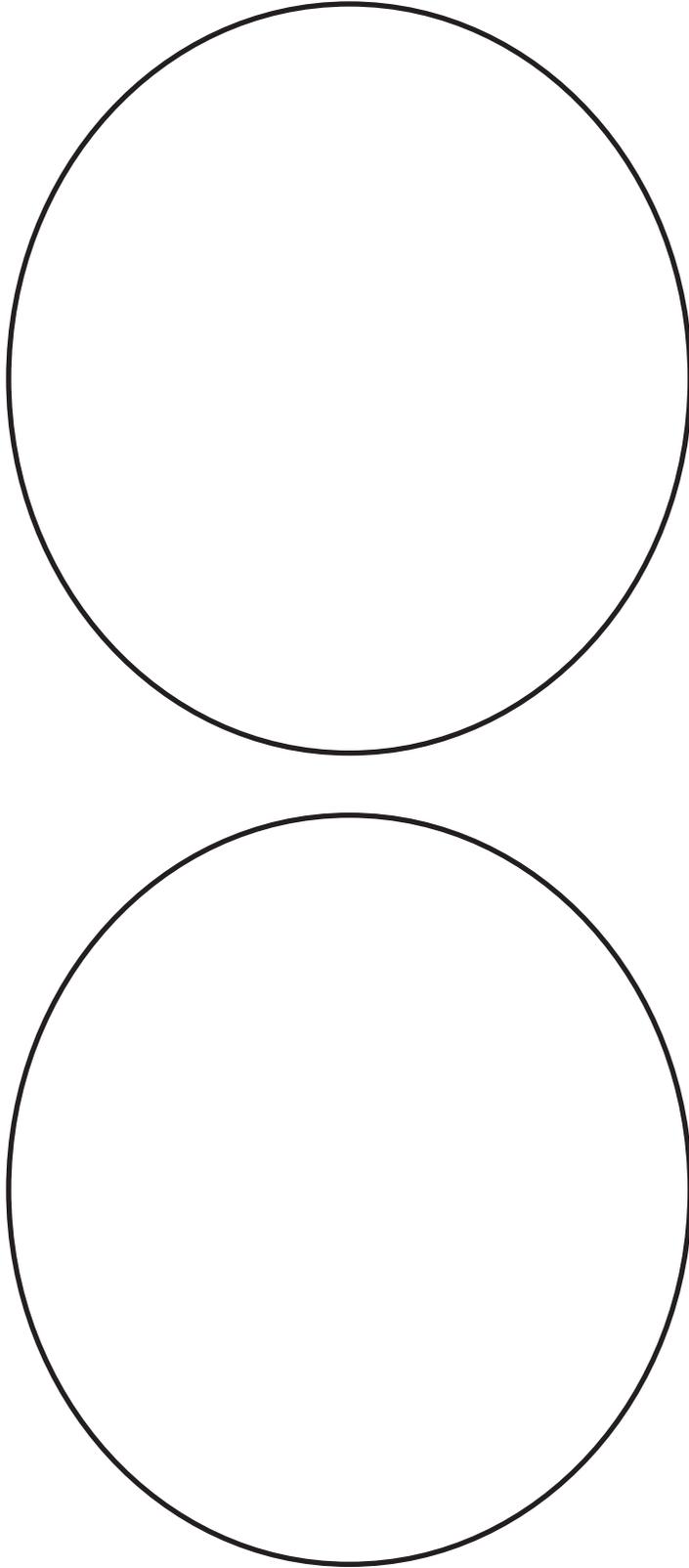
## Resources:

Hill, L., Bland, C., House, K., Wiebe, A., Courtney, B., Rayfield, H., Wiens, G., Dixon, S., Rudig, A., & Williams, N. (1987). *OVERHEAD and UNDERFOOT*. Hillen, J. and Wiebe, A. (eds). CA: AIMS Educational Foundation.

Young, R. M. (1994). *Rocks and minerals*. Forbes, E. D., and Kelly, W. (eds). CA: Teacher Created Materials.

NAME: \_\_\_\_\_  
CLASSIFICATION

**Directions:** Choose 10 - 15 rocks. Classify them in at least 3 different ways (e.g. color, size, weight, texture, shape).

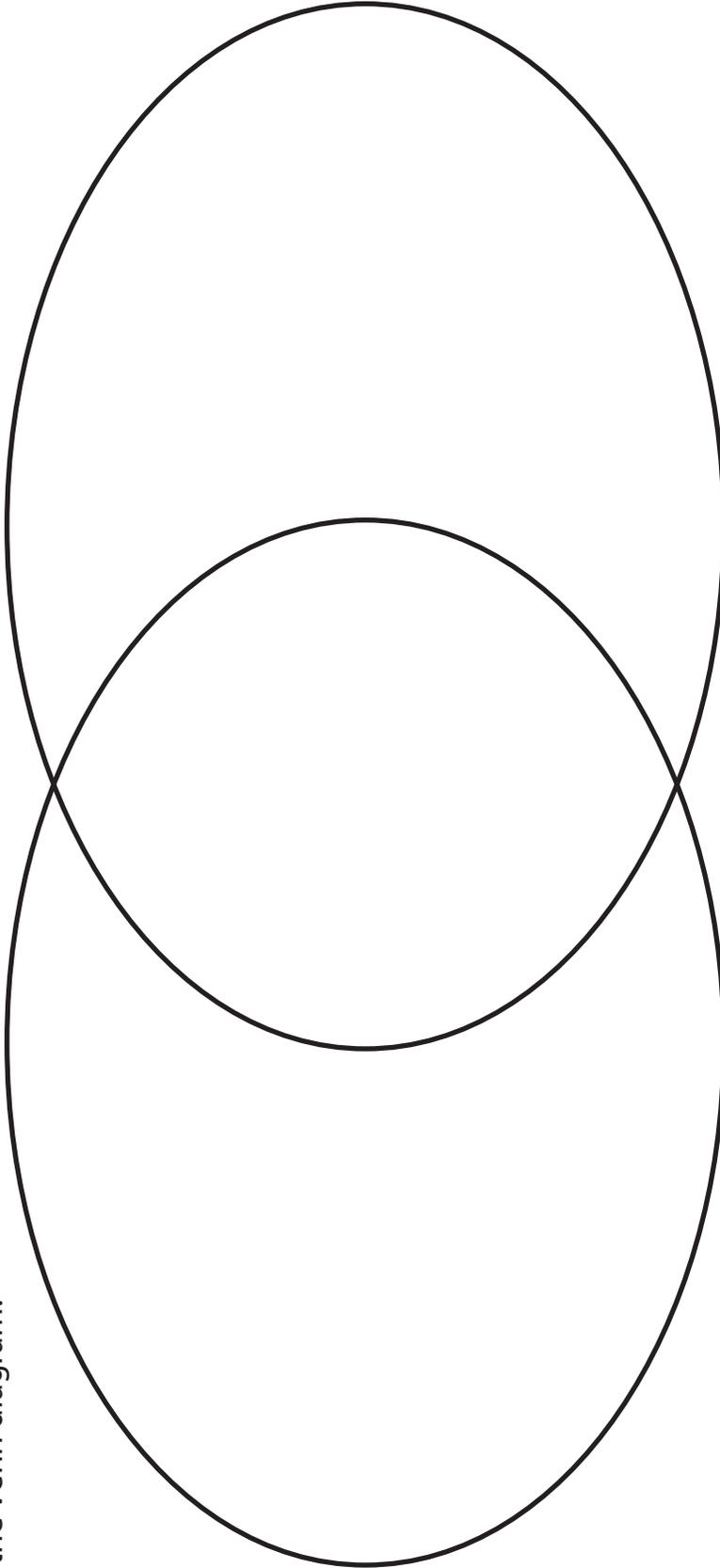


List the ways you classified the rocks.

1. \_\_\_\_\_ or \_\_\_\_\_
2. \_\_\_\_\_ or \_\_\_\_\_
3. \_\_\_\_\_ or \_\_\_\_\_
4. \_\_\_\_\_ or \_\_\_\_\_

NAME: \_\_\_\_\_  
VENN DIAGRAM

**Directions:** Choose two rocks to classify using at least two word descriptors in each of the three sections of the Venn diagram.



Write at least three complete sentences describing how rocks are made up of more than one substance (pebbles, sand, mud, sticks, silt, etc.).

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