

MOVERS AND SHAKERS

Science Concept:

The size and shape of rocks affect the settling rate of rocks.

Objectives:

The student will:

- describe how size and shape affect the settling rate of rocks;
- infer and make generalizations about rock movements; and
- create a poster that illustrates and labels rock movement.

GLEs Addressed:

Science

- [6] SD1.1 The student demonstrates an understanding of geochemical cycles by exploring the rock cycle and its relationship to igneous, metamorphic and sedimentary rocks.
- [6] 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.

Writing

- [6] W2.2.2 The student writes for a variety of purposes and audiences by writing in a variety of nonfiction forms using appropriate information and structure (i.e., step-by-step directions, descriptions, observations, or report writing).

Vocabulary:

agitation - the act or process of moving or forcing into violent, irregular action

compaction - occurs when the weight of overlying material compresses more deeply buried sediment. Along with cementation, this process converts sediments to solid rock

deposition - the accumulation of settled material dropped because of a slackening movement of the transporting medium, e.g., water or wind. Also, the transition of a substance from the vapor phase directly to the solid phase, without passing through an intermediate liquid phase, also referred to as "precipitation"

erosion - removal of material by water, wind, or ice. The gradual wearing away of land surface materials, especially rocks, sediments, and soils, by the action of water, wind or a glacier.

sediment - the word geologists use for loose, uncemented pieces of minerals and rock that come in all sizes and described in decreasing size as boulders, cobbles, pebbles, and silt and clay

settling - the process of sinking or being deposited out of suspension; when referring to sediment, "settlings" is used

Materials:

- Dirt
- Sand
- Pea gravel
- Rocks, marble sized
- Clear plastic containers (one per group)
- Cups (four per group)
- Sander/agitator
- Safety goggles (one per student)
- Science journals

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, inferring, and communicating

1. Fill the sander or agitator container with various sizes and shapes of rock cycle debris. Turn on the sander or agitator. Ask students to observe and document what they see in their science journals. Ask students to observe as the vibrating container is filled with rocks from the three different classifications of rocks in a specific order.
2. Ask them what is happening and why. Why was an agitator used? What natural phenomena does it represent? If necessary, explain the concept. Otherwise, list student responses on the board.

Explore

Process Skills: investigating, predicting, and developing models

3. Divide students into small groups and distribute containers, safety goggles, and one cup of each type of dirt/rocks. Instruct groups to design, draw and build rock movement models without the use of the agitator.
4. For each trial, students should fill their containers with rocks and agitate according to their model. Record process and observations.
5. Instruct groups to modify and repeat this process.
6. Record and document each trial.

Generalize

Process Skills: inferring, describing, and making generalizations

7. Ask students the following questions and discuss as a class:
 - a. What happened to the materials/debris?
 - b. Why do you think this happened?
 - c. How did the size and shape of materials/debris affect the results?
 - d. How did the intensity of the agitation affect the results?
 - e. What would have happened if you used all similar sized material?
 - f. What would happen if you add water to the materials/debris? Why?
 - g. What are some natural events that cause rock movement?
 - h. What is the term that describes the settling movement of rocks?

Apply

Process Skill: inferring, describing, and making generalizations

8. Ask students to explain in their science journal why rocks appear in a garden, yard or playground every summer, even though the area is cleaned the previous fall.

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RUBRIC

Assessment Task:

Create a poster that describes how rocks settle due to size and shape. The poster may also describe the process of deposition. Include at least one inference and one generalization about rock properties and rock movement. The poster must have correct spelling and at least three labels with supporting details about rock movement.

Rubric:

| Objective | GLE | Below Proficient | Proficient | Above Proficient |
|---|-------------|--|--|--|
| The student describes how the size and shape of rocks affect the settling rate. | [6] SD 1.1 | The student may describe how the size or shape of rocks affect their settling rates. | The student describes how the size and shape of rocks affect their settling rates. | The student describes how the size and shape of rocks affect their settling rates; and describes the process of deposition. |
| The student infers and makes generalizations about rock movement. | [6] SA 1.1 | The student may make either an inference or a generalization about rock properties and rock movement. | The student makes both an inference and generalizations about rock properties and rock movement. | The student makes multiple inferences and generalizations about rock properties and rock movement. |
| The student creates a poster that illustrates and labels rock movement | [6] W 2.2.2 | The student may create a poster that illustrates rock movement. The poster may have fewer than three labels with supporting details and contain spelling errors. | The student creates a poster that illustrates rock movement. The poster has three labels with supporting details and has no spelling errors. | The student creates a poster that illustrates rock movement. The poster has four or more labels with supporting details and has no spelling or punctuation errors. |