Move it!

Summary

Students work through stations exploring the erosive effects of waves, streams, glaciers, and wind.

Group Size

Small Groups

Materials

- Toy dump truck
- Toy hammer
- Hard hats
- Cookies
- *What Happens to Rock*
- Plastic boxes
- Block of wood
- Water
- Play sand
- Flexi-straws
- Cornstarch
- Small pebbles
- Overhead grid
- Cotton twine
- Diatomaceous earth
- Condiment bottle
- Sprayer bottle
- Washers
- Nut
- Student journals
- Goggles
- Lab Cards
- Clothes hanger
- Overhead marker
- Bowl scraper
- Pipettes

Additional Resources

Books

Sand, by Ellen J. Prager; ISBN 0-7922-7104-1

Kids Discover: Glaciers, by Stella Sands; ISSN 1054-2868

What Happens to Rock big book by Fred & Jeanne Biddulph; ISBN 0-7802-2794-8

Articles

"Rock Stars", by Beth Geiger. *National Geographic Explorer*, National Geographic Society; Vol 7, No. 5, March 2008; pp. 10-17; ISSN 1541-3357

"Earth Movers", by Lesley J. MacDonald. *National Geographic Explorer*, National Geographic Society; Vol 6, No. 2, Oct 2006, pp. 18-23; ISSN 1541-3357

Organizations *Minerals Management Service*, 1849 C Street, NW Washington, D.C. 20240, http://mms.gov/mmshome.htm

Background for Teachers

When water, wind and ice move rock, soil or another material it is called erosion. Erosion is the mover and weathering is the breaker. Helping students understand the differences between erosion and weathering is important.

The three simplest causes of erosion are wind, water, and glaciers. Wind carries away loose bits of soil and rock, particularly in dry areas with no plants to cover and protect the land. Water can erode in several different ways. Flowing water carries soil and rock particles down streams, rivers and into lakes and oceans. Ocean waves pounding the shore and ocean currents can also carry particles away. Finally, glaciers, massive slow moving rivers of ice, gouge the land beneath them and scrape away particles and rocks away.

The scientific investigations in this activity will demonstrate three different types of erosion. They can either be presented as individual whole class investigations or as centers with small rotating groups. Four plastic boxes will be used: the stream and wave box will demonstrate water erosion, and the wind and glacier boxes will represent their respective types of erosion.

The following activities will allow the students to simulate the four types of erosion listed above. Students will follow the directions on task cards at each station and record their observations in their student journals.

Intended Learning Outcomes

1. Observe simple objects and patterns and report their observations.
2. Compare things and events.
3. Conduct a simple investigation when given directions.

Instructional Procedures

Invitation to Learn

Two volunteers will act out a skit that illustrates the differences between weathering and erosion. Each actor will wear a hard hat labeled with "Weathering" or "Erosion." Different types of cookies representing the different types of rocks--sandwich cookies to represent sedimentary rocks, gingersnaps to represent metamorphic rocks and chocolate chip cookies to represent igneous rocks--will be used to illustrate how the rocks are broken up and transported away. A toy dump truck will represent erosion and a toy hammer will represent weathering. Write the analogy "Weathering is to a hammer as erosion is to a dump truck."

Read to the students from the book *What Happens to Rock*. Emphasize throughout the reading that weathering is the breaking action of rocks and erosion is the moving action of the particles.

Instructional Procedures

Prepare Erosion Boxes

- Wave Box

  -- Place 4 cups of play sand at one end of a plastic box. Prop up that end of the box approximately 2 to 3 cm with a book or some other stable object. Use a piece of wood 26cm x 13cm x 1cm and place it at the opposite end of the box from the sand. Pour water into the box until it touches the sand (see diagram). Reproduce lab card.

- Stream Box

  --Prop up one end of a plastic box approximately 4-5 cm with a stable object. Carefully pour diatomaceous earth into the box. (Diatomaceous earth is a fine-grained powder that is used in swimming pool filters. Even though it may look soft like flour, it is actually very abrasive and eye protection should be used when in close contact with it.) Thread the cotton string through the nozzle of the condiment lid and tie the nut to the string sothe nut will be inside of the bottle if the lid is attached. Next tie the washer to the other end of the string. Using a bent hanger, suspend the condiment bottle over the high end of the inclined box so the string end with the washer

touches the bottom of the box and is covered by the diatomaceous earth. Use the sprayer bottle and wet down the diatomaceous earth until it is damp. Fill the condiment squirt bottle with water and replace the lid. Place it in the hanger support and let the water d rizzle down the string and into the diatomaceous earth. Continue adding water to the condiment bottle as needed.

- Glacier Box

  -- Duplicate the centimeter grid onto an overhead transparency and tape it to the outside bottom of the box. Pour the 16-oz box of cornstarch into a container and add water slowly until it is the consistency of toothpaste. Be careful that the mixture is not too runny. Raise one end of the box between 2 to 4 cm. Have bowl scraper and glass pebbles on hand for the students.

- Wind Box

  -- Place the rocks inside the last plastic box. Pour sand over the top of the rocks so they are completely covered (there should be 3-4 inches of sand in the box. Have the bendy straws available for student use.

Erosion stations

Group the students so that 3 to 4 of them will be at a station at a time. Explain that they will need to follow the Investigation Procedure listed on the card and then discuss with their small group the Investigation Questions on the opposite side of the card. Have them complete the required questions, and if time permits, the optional questions.

Extensions

Curriculum Extensions/Adaptations/ Integration

If more small groups are needed, you can use the "Rock Stars" and "Earth Mover" articles listed in the additional resources. These readings can offer a non-hands-on inquiry opportunity.

Assessment Plan

Teacher observation of activity and discussion.

Journal Entry using a rubric you and your students have made or the *Take a Tumble Journal Rubric* .

Bibliography

Research Basis

Chesbro, R., (2006). Using Interactive Science Notebooks for Inquiry-Based Science. *Science Scope* . 29(3) 30-34.

The interactive science notebook is an opportunity for students to create and use a notebook that represents their science learning throughout the year. Interactive science notebooks enhance learning by encouraging students to write across the curriculum and promote personal connections to learning.

Klentschy, M., (2005). Science Notebook Essentials. *Science & Children*.

This article focuses on the effective components of student science notebooks and their use as an effective teaching tool to assist students in developing a deeper understanding of science content.

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