Water "Digs" It!

Stop and think about the soil beneath your feet. It isn't all the same. Topsoil is rich in nutrients that seeds or plants need to grow. It is the soil layer that is the most exposed to the environmental factors, like rain, and can wash away quickly. The process of moving soil and its nutrients is called soil erosion. Water, wind, and humans can all contribute to soil erosion. In this activity, you will see how water can change the land and move nutrients from one place to another.

Materials

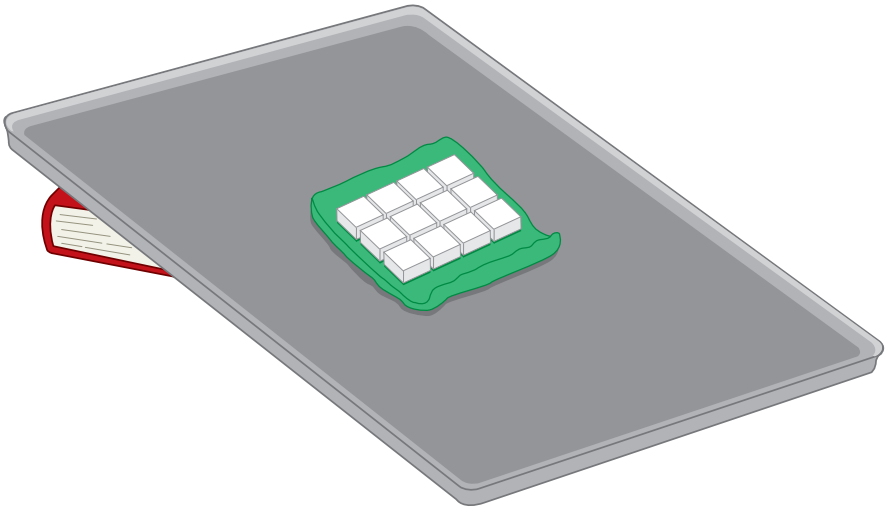
- Modeling clay
- Wax paper
- Flat baking pan
- 12 sugar cubes
- Food coloring (red, green, or blue)
- 2½ cm thick book (1 inch)
- Water

NOTE: A small pitcher may be easier to pour from than a cup. Children may need to wear an apron or smock to protect their clothes.

SAFETY! *Be sure to follow Milli's Safety Tips and do this activity with an adult! Do not eat or drink any of the materials in this activity!*

Procedure

1. Flatten a piece of clay on a hard surface; use a piece of wax paper to protect the surface.
2. Place the clay in the pan, and curl up one edge just a bit, as shown, so that the sugar cubes will not slide off when the pan is lifted up.
3. Arrange the sugar cubes on top of the clay in the baking pan as shown.
4. Carefully place one drop of food coloring on top of one of the sugar cubes, chosen at random, and turn that cube on its side. Make note of which cube you colored in the "What Did You Observe?" section.
5. Place the book under the top half of the pan. Pour water onto the clay and through the sugar cubes. Stop pouring before the water overflows the pan.
6. Record what happens to the sugar cubes in the "What Did You Observe?" section. Also note if any food coloring is mixed in with the water.
7. Clean your pan with warm water and be careful not to let any clay fall into the sink. Thoroughly clean the work area and wash your hands.



What Did You Observe?

Location of the cube that had the food coloring drop:

What happened to the sugar cubes when the water flowed between them?

What evidence is there that the food coloring mixed in with the water?

Do you think you might have seen mixing any sooner if you had colored a different cube?

Explain your answer.

Try this...

Try the activity again and vary the location of the sugar cubes, the rate at which you pour the water, and/or the sugar cube with food coloring. Try using warm water versus cold water.

Make variations in the clay layer to represent differences in the land formation. If the clay is shaped into a "canyon" will the water wash away the sugar cubes that fit in the canyon more quickly?

Where's the Chemistry?

In this activity, the sugar cubes represent the topsoil. The clay represents the subsoil layer. Just as the sugar cubes were easily washed away, the topsoil can easily be washed away. This can happen during a rainstorm. Erosion is more likely to happen if there are no plants or trees. Plants and trees put their roots down into the ground. The roots then help to hold the soil in place.The food coloring represents nutrients in the soil. Just as you observed the water in the activity carrying the food coloring away, water also carries the nutrients away with the topsoil. Look around your local area for signs of soil erosion. You often see these signs at the bottom of hills without plants or trees growing. Look for ways that you can help to prevent erosion. And remember, stay on pathways when hiking or biking.

The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The *Activities for Children* collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at www.acs.org/kids.

Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

Never eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

Never experiment on your own!

For more detailed information on safety go to www.acs.org/education and click on "Safety Guidelines".