

Explore Soil Erosion

In this activity, learners will experiment with the idea of soil erosion, which is the washing or blowing away of soil. Your scientist will also hypothesize about ways to help prevent soil erosion. Throughout the experiment, you will ask questions that will inspire your child to think about soil erosion, as well as to consider more ways to make discoveries and draw conclusions about soil erosion. Note: This assignment requires preparation and about a week or so for the grass to grow.



Explain to your child that soil is found on the uppermost layer of the Earth's crust. Soil is a mixture of four main ingredients: weathered rock, long-dead plants and animals, air, and water. Soil is important because it provides a place where organisms and bacteria can live. Plants rely on soil for nutrients, water, and mineral salts. Plants in turn provide the oxygen we breathe, the food we eat, the clothes we wear, and the foundation and building materials we use to make our homes. We could not meet our basic needs without soil!

What You Need:

- Three clear plastic cups that can hold at least 2 cups of water
- Thick rope-like string
- Three 1.5-2 liter bottles
- Soil
- Grass seeds
- Mulch (mix of leaves, wood chips, or other dead plant material)
- Permanent marker
- Adult scissors
- [Concept Web](#) worksheet

Water Filtration System

What You Do:

Prep the Three Bottles

1. Have your child draw one rectangle along the side of each of three plastic bottles, from the top to the bottom. Make sure there is about an inch of plastic left above and below the width of the rectangle.
2. Cut out the rectangle your child drew from each of the bottles. Make sure the lid is attached to each of the bottles.

3. Lay all three bottles on the table with the cut-open bottle facing up.
4. Put the same amount of soil into each bottle so that the level of the soil is just below the spout of the bottle when the bottle is laying on top of the table.
5. Sprinkle grass seed on top of the soil for the first bottle.
6. Sprinkle the mulch mix on top of the soil of the second bottle.
7. Make sure the third bottle only has soil in it.
8. Lay the three bottles at the edge of a strong table outside so that the spout is at the edge of the table. Make sure the bottles are placed in sunlight.
9. Water all three bottles once a day so that the soil stays moist. The grass will take about one week to grow.

Make Three Mini Buckets

1. Make two small holes across from each other in the tops of all three cups.
2. Thread a piece of string through the two holes and tie the ends to each of the cups. Make sure there is enough slack for the cup to hang at least one inch below the bottle spout.
3. Repeat step 2 for the other two cups.

Conduct the Experiment

1. Take the caps off of the bottles that are on the table.
2. Hang the cup buckets from the spout so it can collect water.
3. Add water through the cut-open rectangle. Put the same amount of water on the soil of each bucket so that the overflow will transfer to the hanging bucket. Place enough water so that the overflow cup will fill at least halfway.
4. Ask your learner to look at the water in each cup. Ask the following questions to inspire observations and stimulate conversation about the overflowed water:
 - What do you see, notice, or wonder?
 - What is clouding up the water?
 - Why would one cup have clearer water than the others?
 - What conclusions can you make based on the overflowed water?
 - Why can soil erosion hurt ecosystems?
 - Why would soil erosion happen in areas that have had trees cut down?
 - Can you think of other ways to vary this experiment?
5. Discuss the definition of soil erosion again and see if your child can draw conclusions about soil erosion given these three types of soil combinations.
6. Have your child fill out the Concept Web worksheet with their conclusions, making sure to write soil erosion in the middle circle.

After your scientist has finished their design, encourage them to make adjustments to test out other theories. Ask questions like, "Does the result change? If so, why?" Possible adjustments include:

- Slanting the bottles so the spout is about 30 degrees towards the sky, or 30 degrees towards the ground.
- Increasing the amount of soil or water but keeping the other ingredients constant.
- Using different types of grass to see if a specific species of grass changes the amount of soil erosion through the spout.

Check out the [Maker Lab: Outdoors](#) book by Jack Challoner for more information and Maker Lab experiments.