

Soil needs to absorb water so that the water reaches the roots of plants. But the water needs to drain through the soil and also evaporate so that the roots are not always in water. In the next activity, see how well different soils allow the rain to drain!

Materials:

- 4 plastic cups
- 2 rubber bands
- 3/4 cup potting soil
- 1/4 cup water
- 1/4 cup sand

Procedures:

1. Use the masking tape and pen to label one empty cup soil and the other empty cup soil + sand. Label your other two empty cups water.
2. Place a piece of tape on the side of each cup as shown. Use a ruler to mark lines for 1, 2 and 3 cm measured from the bottom of the cup.



3. Lay a paper towel over the top of the soil and the soil + sand cup, and push the towels about halfway in. Fasten each paper towel in place with a rubber band as shown.



4. Gently pour about 1/2 cup of the soil sample into the paper towel in the soil cup.
5. In your mixing container, add 1/4-cup sand to 1/4-cup soil and mix thoroughly with a spoon. Pour this mixture into the paper towel in the soil + sand cup.
6. Pour water up to the 2-cm mark in each water cup. What do you think will happen when you and your partner pour water into each soil sample at the same time? Do you think there will be any difference between the way the water moves through the two soil samples? Why?



7. Now add the water to the sample in each paper towel. Be sure to add the water to each cup at the same time. Watch to see how much water drips into the bottom of each cup. Is there any difference between how much water or how fast the water drips into each cup? Compare how much water comes through each sample with how much went in. What do you notice?
8. Now predict what will happen if you add the same amount of water again to each sample. Give a reason for your prediction. Repeat step 7. What do you notice?

Think about this ...

After no more water drips from the paper towels, carefully remove the paper towels from the cups. Lay them out flat and be sure to label which is soil and which is soil + sand. Which do you think will dry out first? Why?

Where's the Chemistry?

The smaller the particles, the more water the soil can absorb and hold. If a soil has a lot of clay, it can hold a lot of moisture. Sand allows water to drain through it more easily than silt and clay so more water should have drained through the sandy soil than the potting soil. The potting soil should have absorbed more water so less water should have drained through it and into the cup. In step 8, when you added water again, about the same amount should flow through the sandy soil and the potting soil. This would be true if the potting soil absorbed all it could from the first wetting and the excess water would drain through.



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".

