

Exploring Substrates

In this activity, you will explore how different types of surfaces allow different amounts of water and additional material to pass over or through them. The pepper represents a contaminant that water might pick up as it flows away from your home. The shallow containers represent your local watershed. The substrates of plastic wrap, paper towels, and cloth towel serve as three different types of surfaces that might be found near your home.

Materials

Watershed: 3 identical containers (shallow preferred)

Substrate: Plastic wrap (Alternatives: aluminum foil, plastic bag)

Substrate: Paper towel (Alternative: paper napkins)

Substrate: Cloth towel (Alternative: thin sponge)

Precipitation: Water

Contaminant: Black pepper flakes (Alternative: cinnamon, colored sand)

Procedure

1. **Identify your substrate/surface connections.** In the space below, identify each of our experimental substrates (plastic, paper towel, and cloth towel) as being similar to one or more of the ground surfaces that we talked about in class. Explain why you think the experimental substrate is similar to the ground surface you chose.
2. **Set up your substrates.** Each substrate should drape into its own container and each substrate should be set up at the same angle. Use only a single layer of each type of substrate.
3. **Add your contaminant.** Sprinkle 2 grams of pepper onto each substrate. Try to distribute the pepper evenly across the substrate.
4. **Add precipitation.** Slowly pour 60 mL of water over each substrate. Try to pour the same way each time.
5. **Record your results.** First, look at how much pepper has passed into each container and rank the amounts of pepper below.

Next, look at how much water has passed into each container. Rank the amounts of water in each container below.

Thinking Questions

1. Look at your ranking for the amount of pepper in each container at the end of the activity. Are you surprised by these results? Why or why not?

2. Look at your ranking for the amounts of water that each container held at the end of the activity. Are you surprised by these results? Why or why not?

3. What other method could you use to determine which substrate allowed the most pepper to get to the container?

4. Look again at the connections you made in step one of the procedure. Given what you observed in this activity and the connections you made between the sample substrates and ground surfaces, answer the questions below:
 - a. What types of ground surfaces do you think are best for helping to prevent flooding?

 - b. What types of ground surfaces do you think are most likely to allow contaminants to flow into the local watershed?

 - c. What type of ground surface might be able to make things like flooding or water contamination either better or worse, depending on how it is used?