

Soil

Investigation Data Sheet



Soil Permeability

The properties of soil affect how good the soil is for plants. Water can move through some types of soil more easily and quickly than others. The ease with which water moves through a soil is what is known as a soil's permeability. The faster water moves through a soil, the more permeable that soil is. While soil that holds onto too little water is bad for plants, soil that holds onto too much water is not good for plants, either.

Objective

Test the relationship between the size of soil particles and the permeability by calculating drainage rates for four different types of soils.

Materials

- four large cups
- a spoon
- four measuring cups
- four shallow dishes
- four pieces of filter paper to fit in the bottom of each cup
- gravel, sand, potting soil, as well as a mixture of the three
- a marking pen
- water
- eight small blocks of wood
- a timer

Safety Notice: All applicable laboratory safety rules must be followed. Students should not perform any experimental activity without the teacher's supervision and express permission. Students must follow safety guidelines and wear appropriate protective gear.

Procedure

1. Use your marking pen to label the paper cups 1, 2, 3 and 4, and carefully poke eight holes in the bottom of each cup.
2. Line the bottom of each cup with a piece of filter paper.
3. Label the measuring cups 1, 2, 3 and 4.

4. Fill cup number 1 halfway with potting soil, fill cup number 2 halfway with sand, fill cup number 3 halfway with gravel, and fill number 4 halfway with a mixture of soil, sand and gravel.

- Which type of soil do you think will be the most permeable, or drain most quickly? Which sample do you think will drain most slowly?

5. Set two small blocks of wood in each of the shallow dishes and set the cups on the blocks. Be sure that the holes in the bottom of each cup are not obstructed by the blocks of wood.
6. Pour exactly 100 milliliters of water into cup number 1 and start the timer. When the water stops leaking out of the bottom of the cup, stop the timer and record the time it took for the water to drain through the soil.
7. Repeat this process with cups numbers 2, 3 and 4.
8. Pour the water caught in each dish into the measuring cup with the matching number — dish number 1 into cup number 1 and so on. Record how much water went into each cup.
9. Calculate the drainage rates. For each sample, divide the number of milliliters of water that drained by the number of seconds it took for it to drain. This will give you a drainage rate in milliliters per second. A larger number indicates a faster drainage rate.

Conclusions

- Which sample had the highest drainage rate ?

- Which sample is best for growing plants? Why?

	Soil Sample 1	Soil Sample 2	Soil Sample 3	Soil Sample 4
Time elapsed				
Amount of water collected				
Drainage Rate				