NEVADA CLIMATE CHANGE PORTAL

Soil Porosity Experiment

Grade Level: 7-8
Objective: The primary objective of this experiment is for students to become acquainted with soil porosity and the interaction water has with various soils. In this experiment we will check the porosity of gravel, sand and silt.
Duration: 30 minutes

Terms to define:

- Porosity
- Permeability
- Gravel
- Sand
- Silt

Research Questions:

- **What soil will have the highest porosity percentage?**
- **Why is soil porosity important to agriculturalists and farmers?**
- **How does low soil porosity effect the growth of water-hungry plants?**

Materials:

- Equal amounts of gravel, sand and silt
- 3 beakers, 500 milliliters each
- 100ml graduated cylinder to fill with water
- Paper and pencil or computer to report observations

Experimental Procedure:

Part 1:

1. Fill one beaker to the 350ml mark with gravel, the second beaker with 350ml of sand and the third with 350ml of silt.
2. Fill the graduated cylinder to the 100ml mark with water.
3. Slowly and carefully pour the water into the first beaker until the water just reaches the top of the gravel. Record exactly how much water you use. If you need more than 100ml of water, fill the graduated cylinder again.
4. Follow step 3 again for the beaker with sand, and again for the beaker with silt.

Part 2:

For each material, calculate the porosity by dividing the volume of water that you were able to pour into it by the total volume of the material. Then express this result as a percentage. For example If you were able to add 90ml of water to 350ml of gravel, the porosity would be

$$\frac{90 \text{ ml}}{350 \text{ ml}} = .2571 = 25.71\%$$

Use the chart below to record your data and calculations. There are extra spaces if you want to try this with some other materials.

Type of Material	Volume of Material	Volume of Water (pore space)	% Pore Space (porosity)
gravel			
sand			
silt			