

Name _____

Soil Compaction - Student Worksheet

Spaces between grains in soil are necessary because they permit air and water to enter soil.

Activity 1: Air in Soil



You can estimate how much air is in a particular soil by finding out what volume of water will displace air held in the soil. The water should be seen to soak all the soil and form a thin layer above it.

Materials

- 2 or more dry soil specimens
- 2 test tubes
- 1 teaspoon (most teaspoons hold 5ml)
- Pasteur pipette or transfer pipette
- Water
- A clock or watch
- A pen or pencil

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Method

1. Place 10ml (2 teaspoons) of dry soil into a test tube
2. Fill the pipette with exactly 3ml of water
3. Drop by drop add the water to the soil in the test tube until it is soaked and can accept no more water.
4. Refill the pipette as required
5. Using the measuring gradations on the side of the pipette estimate the volume of water that was used to displace air

Observations

Original volume of soil + air _____ ml

Volume of water that replaced the air _____ ml

$$\begin{aligned} \text{Percentage of air in soil} &= \frac{\text{Volume of air}}{\text{Volume of soil + air}} \times 100 \\ &= \underline{\hspace{2cm}}\% \end{aligned}$$

Activity 2: Air in Compacted Soil

Method

1. Place 10ml (2 teaspoons) of dry soil into a test tube
2. Mark the height of the soil
3. Compact the dry soil with the blunt end of a pencil or pen.
4. Keep adding more soil and compacting it until it regains the initial height of the loose soil.

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Predict

What do you predict will happen because you have now compacted the soil?

I predict that _____

Observations

Original volume of soil + air _____ ml

Volume of water that replaced the air _____ ml

Percentage of air in soil = $\frac{\text{Volume of air}}{\text{Volume of soil + air}} \times 100$

= _____ %

Has compaction had a measurable affect on the amount of air and water in the soil?
