

DEMONSTRATIVE ACTIVITY – WALKING WATER

Description:

In this simple experiment, three cups are aligned in a row. Water with green food colouring is placed in one cup on one end, and water with yellow food colouring is placed in the other cup on the opposite end. Folded paper towels connect the cups with coloured water to the empty cup in the centre.

As the experiment progresses, students observe how the coloured water is drawn up through the paper towels into the middle cup, where the colours mix. This demonstration illustrates the principles of capillary action and matric suction, showing how water moves against gravity through porous materials. It can be used to explain phenomena in soil science, geotechnical engineering, and plant biology.

Materials:

- 3 cups with water
- Green and yellow food colouring
- Paper towels

Main Objectives:

- **Demonstrate Capillary Action:** Show how liquids can move against gravity through narrow spaces, illustrating the concept of capillary action.
- **Introduce Matric Suction:** Present the concept of matric suction, demonstrating how the attractive forces between water and porous materials result in water movement.

Key Learnings:

Capillary action and matric suction are fundamental processes observable in everyday situations, such as the movement of liquids through porous materials. These concepts are crucial in fields like soil science, geotechnical engineering, and plant biology, helping explain how water is transported in soils and how plants absorb moisture from the environment. Understanding these processes offers valuable insights into the natural world and can guide various practical applications.

Before the Demonstration:

1. Before we start, what do you think will happen when we add green and yellow water to the cups at the ends and connect them to the middle cup with folded paper towels?

During the Demonstration:

2. What do you observe happening to the paper towels?

3. What happened to the water in the middle cup? Did the colour of the water change? If so, why?

 **After the Experiment:**

4. How are the principles of cohesion and adhesion related to the phenomena of capillary action and matric suction? How do these combined forces explain what happened to the paper towel in this experiment as the coloured water moved through it?

5. How did your initial predictions align with what actually happened? Was there anything surprising or unexpected in the results?

6. Can you think of real-world situations where understanding matric suction and capillary action would be important or useful?