

Just Passing Through

Purpose: To develop an understanding of how water flows through different soils and how it is transformed when it flows through these soils.

Overview: Participants time the flow of water through different soils and observe the amount of water held in these soils. They will also observe the filtering ability of soils by noting the clarity and pH of the water before and after it passes through the soil.

Instructions:

Equipment:

Four soda bottles with the bottoms cut off, pantyhose rubber-banded to the bottle neck
Four samples of different types of soils (clay, sand, loam, impervious, etc.) in the same volume
Four beakers of water (filled to 300mL with water)

Divide participants into teams (per table)

Distribute data sheets and Team name papers

Four samples of soil (same volume)

- ▲ Same soil samples from Scoop of soil
- ▲ High clay content soil (kitty litter)
- ▲ Impervious or highly compacted soil with ground cover on top
- ▲ Samples will sit in soda bottles (with pantyhose as permeable stoppers)
- ▲ Soda bottles will rest on 500mL graduated cylinders

Initial inquiry.

Potential Questions

- ▲ What do you see?
- ▲ How does it feel?
- ▲ Describe it
 - Shapes
 - Colors
 - Treasures
 - Textures
- ▲ Comparisons to other soil samples

Ask Participants to obtain water in equal volumes (one per sample of soil to be obtained in 500mL beakers)

- ▲ Discuss good science practices
 - Reading volume, meniscus, etc.

Predictions (Facilitator will consistently ask for reasoning behind predictions and discussion [surface area, pore space, rate of rainfall, etc.]

- ▲ Which will begin to flow through first
- ▲ Which will begin to flow last
- ▲ Which will finish fastest

- ♣ Which will finish slowest
- ♣ Which will have the fastest flow rate
- ♣ Which will have the slowest flow rate
- ♣ Which will soak up the most water
- ♣ Which will soak up the least
- ♣ Does vegetation make a difference
 - What difference (Land Cover tie-in)
- ♣ Which will filter through the clearest (most transparent)
 - What does it mean
- ♣ Which will filter through the cloudiest
 - What does it mean
- ♣ What is pH
 - What will happen to the pH of the water that flows through
 - What might cause pH change?
 - Participants to take pH of water (pre filtration)
- ♣ Tie-in to Atmosphere Precipitation
 - Discussion and solicitation of answers. (Connections to other parts of the water cycle)
 - Does the group want to have a slow pour (a gentle spring rain. What sorts of clouds cause this type of rain? Can we discover/establish that?)
 - Does the group want to have a fast pour (summer thunderstorm. What sorts of clouds cause this type of rain?)
 - Explore differences in quality of rainfall and erosion, run-off
- ♣ With Timer ready, volunteers begin to pour simultaneously. Volunteers attempt to finish simultaneously
- ♣ Real time discussion of activity and developing results (Team leads this part)
- ♣ Post Activity Discussion
- ♣ Measurement of volume of filtered water and discussion of results
- ♣ Measurement of pH of filtered water
 - Discussion of pH change
 - What are some of the reasons pH changed or didn't change?
- ♣ What are the results? How accurate were the predictions?
- ♣ What conclusions can they draw?
- ♣ Experiment practices idea
 - *How do you control an experiment*
 - *Variables that you need to control*
 - *Write them on the board*
 - *Go through an investigation*
 - *Isolate the variable*
- ♣ Team with most accurate predictions receives prize.