

Speed of Groundwater Contamination

Groundwater contamination is as destructive to the environment as water contamination on the surface. When groundwater becomes contaminated it poses many challenges in terms of the clean up because the flow of contamination cannot be seen. Environmental engineers and geologists use contour maps and their knowledge of how fast contaminants spread through the different layers of soil to effectively clean the groundwater. How much water a type of soil can hold is called its *porosity*. How well a soil transmits water is called *permeability*.

Purpose: In this lab, you will investigate how quickly contaminants spread in dirt, sand, clay and gravel.

Hypothesis: Which soil will allow contamination to flow through it the fastest? Which soil will allow the most amount of water to flow through it?

Procedure:

- Obtain your four soil samples, four spoonfuls of Kool-Aid mix and a pie tin.
- Place one spoonful of the Kool-Aid in the bottom of the pie tin at the opposite end of the tin from the drainage hole
- Carefully scatter your soil sample over the Kool-Aid so that the bottom of the tin is completely covered with an even layer of soil.
- Elevate the Kool-Aid end of your pie tin and place the small plastic cup under the drainage hole.
- Pour 50 mL of water at the high end of the tin
- Begin timing as you pour the water.
- Stop timing when you first see water begin draining out of the drainage hole.
- When the water has completely drained, pour the drainage into a graduated cylinder to record the amount of water that drained out of the tin.
- Record all of your measurements and observations in the data table below.

Data Table:

Soil Type	Water Flow Time (s)	Amount of Water Drainage (mL)	Color of Water and Other Observations
Dirt			
Sand			
Clay			
Gravel			

Questions:

1. In which soil sample did the groundwater contamination spread the fastest in?
2. Which soil sample is the most porous? How do you know?
3. Which soil sample is the most permeable? How do you know?
4. Explain how this data could be used by engineers to try to clean up contaminated groundwater.