Sec:____Name:_____

Experiment: Soil Infiltration By Groundwater
(E. Science 9-7-3c)

Purpose: To measure the rate at which **water filters through the soil (infiltration)**, to plot the rate of infiltration against time, and to compare various materials to see which are most suitable for filtering groundwater.

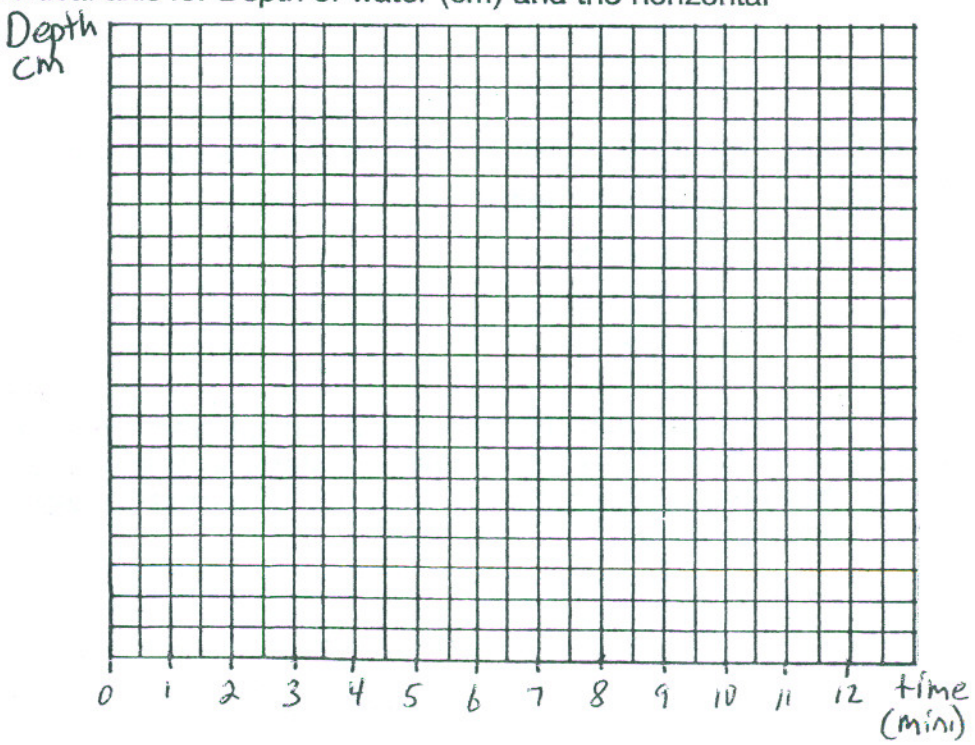
Materials:	beaker (500 mL)	500 mL gravel
500 mL sand	500 mL soil	large juice can
can opener	cardboard	metric ruler
scissors	cheesecloth	elastic band
1 slab of clay	pen (felt - tip)	meter stick

Methods:

1. With the can opener, cut out both one end of the can. Puncture holes into the other end and place cheesecloth across the bottom of the can and fasten it with an elastic band.
2. Place the can on a metal rack stainer over the sink, cloth side down.
3. Place a layer of gravel in the bottom of the can. Place a layer of clay on the layer of gravel. Place a layer of sand on the top of the clay. Place a thick layer of soil on the top of the sand. Do not fill the can more than about half full.
4. Cut a small hole (about the diameter of the meter stick) in the cardboard cover. Through this hole, you will be able to observe the water level.
5. Fill the rest of the can with water. Place the cover over the top of the can.
6. After one minute, insert the pointed stick into the can through the small hole until it just touches the top of the water. Record the distance to the water level in results.
7. Repeat this process until the water level is down to the soil.
8. Determine the various water depths by <u>subtracting the water level for each time from the total water depth</u>. Record your data in the third column of the results table.
9. Graph your data using the vertical axis for Depth of water (cm) and the horizontal axis for Time (min).

Results:

time	to water	water depth
0 m	0 cm	cm
1 m	cm	cm
2 m	cm	cm
3 m	cm	cm
4 m	cm	cm
5 m	cm	cm
6 m	cm	cm
7 m	cm	cm
8 m	cm	cm
9 m	cm	cm
10 m	cm	cm
11 m	cm	cm
12 m	cm	cm



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Conclusions:

1. Is the rate of infiltration constant? Explain.

2. Would the rate of infiltration be faster in wet soil or in dry soil? Why?

3. Which layer probably filters out impurities most efficiently? Why?

Discussion:

1. Which layer (in our experiment) infiltrates too slowly to be a good soil type for a septic tank? (Think of yesterday's lab as well)

2. Which layer (in our experiment) might allow the water to move through it too rapidly to be a good filter?

3. Use the diagram of a soil profile to answer the following questions. (Use A,B,C in answer).
   a. Which soil layer contains the most humus?
   b. How far into the soil do plant roots extend?
   c. Where in this soil profile are worms and insects breaking down organic matter in the soil?
   d. Where in this soil profile is solid rock being weathered into soil?
   e. What is the name of the process by which water carries materials from the upper horizons down to the lower levels?

4. What factors help determine the type of soil, the thickness of the layers, and their composition in an area?

5a. Read the parable of the sower and the seed in Mark 4:3-8. For each location where the seed landed record what happened to it.

beside the road -

rocky ground -

thorny places -

good **soil** -

5b. Then read verses 14-20 to explain the spiritual meaning of each.

beside the road -

rocky ground -

thorny places -

good **soil** -

6. Fungi and bacteria are decomposers, found mainly in horizon A. Decomposers break down the complex organic material in animals and plants into smaller molecules, creating humus. Infer from this what our world would be like without decomposers?