Soil Percolation Lab

Name: Mrs. Renn Date: 01/30/20 Period: _____

LT1: I can investigate percolation and how it effects the water cycle.
LT2: I can revise my model of the water cycle to include what I have learned.

Background Information:

Much of the rain that falls on land soaks into the ground. The rest runs off into streams and rivers. The downward entry of water into the soil or rock surface is called **infiltration**. **Percolation** is the flow of water through the soil and spongy or cracked rock. How well rain infiltrates and percolates into the ground depends on many factors including: the slope of the land, the amount of space between the particles of soil and the ~~ability of the~~ soil's capability to allow water to pass through it (called **permeability**). This water, that continues downward through the soil will eventually reach rock material that is full of water. The water moves slowly and may eventually discharge into streams, lakes, and oceans. aquifer

The time that it takes for the water to move through soil is called its **percolation rate**. In this activity you will test the rate that water moves through two different types of soil components – topsoil and sand.

Pre-lab check-in: Define the following terms.

1. Infiltration: Infiltration is the entry of water into soil or rock.
2. Percolation: Percolation is the flow of water through soil or rock.
3. Permeability: Permeability is the capability of the soil to allow water to flow through it.
4. Percolation rate: Percolation rate is how fast water flows through the soil.

Testable Question: Does the soil component (topsoil or sand) affect how fast water flows through it?

Definition of Variables:

IV: soil component (topsoil or sand) DV: rate of flow of water

CVs: temperature, amount of soil, containers used, amount of water.

Hypothesis: Do you think that the percolation rate will be faster in top soil or sand? Why?

If the soil component affects the rate of water flow through the soil, then _____ will allow water to go through faster because

Materials:

Topsoil	Sand	Water	
Timer	Plastic Cup (10 oz.)	2 - Paper Cups (3 oz.)	Plastic Cup (16 oz.)
Funnel	2 - Coffee Filters	50mL Graduated Cylinder	

Procedure:

1. Gather materials.
2. Fill 10 oz. plastic cup (smaller cup) ¾ full with water.
3. Fill one paper cup with sand and the other with topsoil.
4. Line the funnel with one coffee filter and place in the 16 oz. cup.
5. Pour the topsoil sample in the coffee filter.
6. Measure 50 mL of water in the graduated cylinder.
7. With one group member ready to start the time, pour the 50mL water through the sample. Start the timer simultaneously.
8. When 30 sec. has passed, measure the amount of water collected in the 16 oz. cup by pouring it back into the graduated cylinder and record the volume in the data table.
9. Dump the sample into the appropriate used sample bucket at the front of the classroom.
10. Repeat steps 4 – 9 with the sand sample.

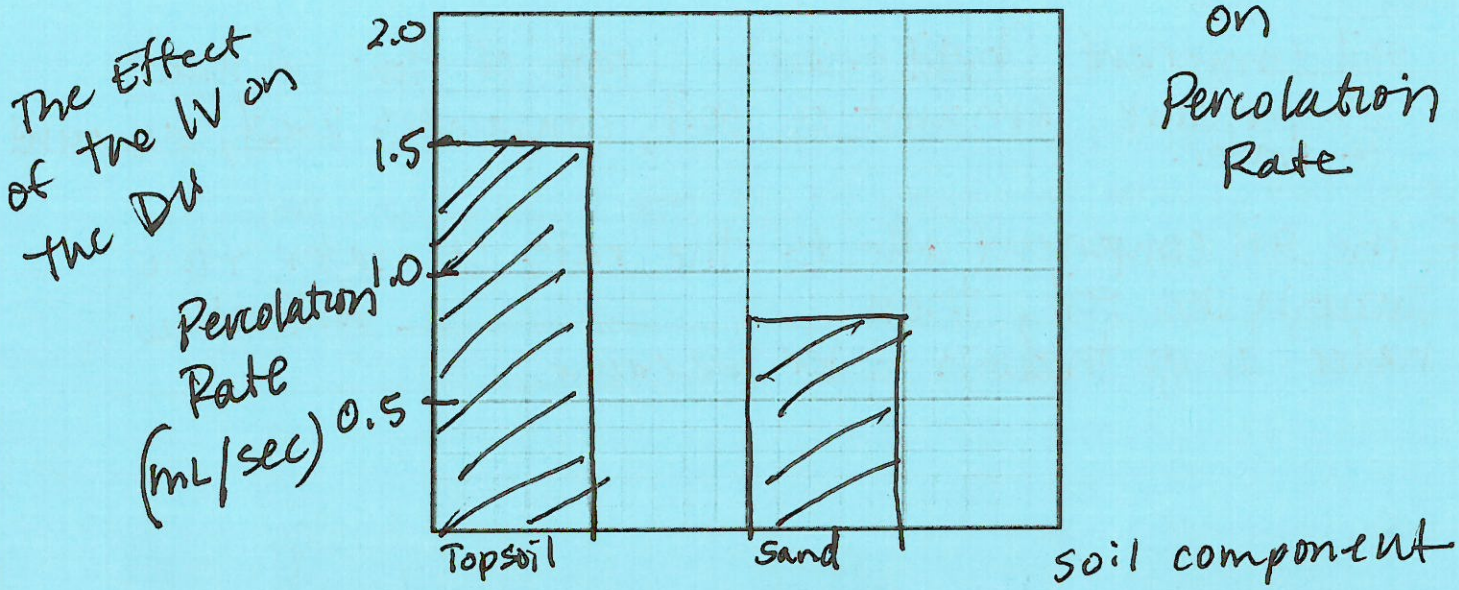
Observations and Data Analysis:

Data Table

Sample	Water Volume (from step 8) in mL	mL/sec.	Percolation Rate (mL/sec)
Topsoil	46mL	46 ÷ 30	1.5 mL/sec
Sand	25mL	25 ÷ 30	0.8 mL/sec

Graph:

1. What type of graph will you use to display your data? bar graph
2. Graph your data. *(Remember TAILS)* The Effect of soil component on Percolation Rate



Conclusions:

1. Was your hypothesis supported or refuted? depends on page 1
2. Which soil component had the fastest percolation rate? topsoil
3. What properties or characteristics does that component have that might contribute to the percolation rate?
   Some of the properties that topsoil has that might give it a higher percolation rate is that it is less dense, there are more air pockets & the particles are larger.
4. Which soil component had the slowest percolation rate? sand
5. What properties or characteristics does that component have that might contribute to the slower percolation rate?
   Sand probably has a slower percolation rate due to its greater density. There are less air pockets in the sand and it is more compact.
6. How do you think that soil with a slower percolation rate would affect the water cycle? (Hint: Think about what it would mean to the cycle if the water would be caught in the soil longer.)
   Soil with a slower percolation rate would slow down the water cycle because a slower rate means that it takes the water longer to flow through the soil and into an aquaphor to be leached back into surface water where it can then be evaporated.
7. What part do infiltration and percolation play in the water cycle?
   Infiltration and percolation store water in the ground and basically work to slow down the water cycle. The longer the water is in the ground, the longer it will take to be evaporated & returned as precipitation.
8. Modify your water cycle model to include infiltration/percolation if you do not yet have them listed.