Virtual Lab Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Go to: **http://tinyurl.com/4xs4fm6**

Step 1: Read the information below and highlight important information on soil, porosity, and permeability



Based upon your reading

1. **What is meant by the permeability of a soil? What is porosity and how is it related to permeability?**

Objectives:

· Determine the porosity of various types of soil.

· Define the relationship between porosity and permeability.

· Describe how a soil's porosity and permeability affect the movement of groundwater

Procedure:

1. To select a type of soil, change the percentages of sand, silt, and clay by sliding the bars on the Soil Meter.

2. Click the Test This Soil button to move 100 mL of the soil mixture to the funnel.

3. Click the Pour Water button to begin pouring water on the soil. The water will automatically stop when the first drop of water begins to form at the bottom of the funnel.

4. Observe the readout that displays how much water was poured. This is the volume of water the soil held.

5. To find the porosity of the soil, divide the volume of water the soil held by the total volume of the soil. Multiply the decimal by 100 and type this percentage in the Table.



6. Click Reset and repeat steps 1 through 5 for each of the 13 soil types.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Soil Type | Soil Volume (Vs) | %Sand | %Silt | %Clay | Water Volume (Vw) | Porosity (%) |
| Sand |  |  |  |  |  |  |
| Loamy Sand |  |  |  |  |  |  |
| Sandy Loam |  |  |  |  |  |  |
| Silt |  |  |  |  |  |  |
| Silt Loam |  |  |  |  |  |  |
| Loam |  |  |  |  |  |  |
| Sandy Clay Loam |  |  |  |  |  |  |
| Sandy Clay |  |  |  |  |  |  |
| Clay Loam |  |  |  |  |  |  |
| Silty Clay |  |  |  |  |  |  |
| Silty Clay Loam |  |  |  |  |  |  |
| Clay |  |  |  |  |  |  |
| Heavy Clay |  |  |  |  |  |  |

**Questions:** Answer each question below in complete sentences.

1. **What determines the type of soil?**
2. **Based on your experiment, which type of soil is the most permeable? Which is the least permeable? (In this situation, the higher the porosity, the lower the permeability)**
3. **Of the three: sand, silt, and clay, which one had the greatest impact on increasing % porosity? Which had the greatest impact on decreasing % porosity?**
4. **Explain why surface runoff, or rain not absorbed by the soil, occurs much more often in areas with soils with a high clay content. (\*Remember the higher the porosity, the longer it will take for water to absorb into the soil.)**
5. **Soil type and texture are very important to farmers. Too little water in the soil may cause plants to wilt and die. Too much water in the soil can disrupt a plant's ability to take in oxygen. Based on your data, which type of soil do you think is best for agriculture? Explain your answer.**
6. **Farmers often have problems with soil erosion when they clear their fields after the growing season. Soil type is one factor that influences erosion. Some soil types are more prone to erosion than others. Based on the data you gathered in this experiment, which soil types do you think are the most easily eroded, soils with a high sand content or soils with a high clay content? Explain your answer.**