FLINN SCIENTIFIC

Name_____

Porosity and Drainage Rate of Soils Worksheet

Data Table 1. Dry Soil Drainage

	Time of Drainage	Drainage Rate (mL/s)
Tube 1 Loose Soil		
Tube 2 Packed Soil		

Data Table 2. Wet Soil Drainage

	Time of Drainage	Drainage Rate (mL/s)
Tube 1 Loose Soil		
Tube 2 Packed Soil		

Data Table 3. Permeability and Porosity

	Initial Time (s)	Amount of Water Remaining in Graduated Cylinder (mL)	Pore Space Volume (mL)	Water Drained from Tube (mL)	Water Retained (mL)
Tube 1 Sand					
Tube 2 Fine Gravel					
Tube 3 Coarse Gravel					

Analysis, Calculations, or Post-Lab Questions

Activities One and Two

1. How did the drainage rate of the loosely-packed soil compare with that of the tightly-packed soil?

2. What happened to the drainage rate when the soils were already moist (Activity 2)?

3. Given your results, would water-soaked soil be able to hold more or less water if a rainstorm occurred? Would the water seep into the soil rapidly?

4. What other types of factors could affect the drainage rate of soil?

5. List some possible sources of error in Activity 1.

Activity Three

6. Define porosity and permeability. How do they compare?

7. Use Equation 1 from the Background section to calculate the percent porosity of each of the soil samples. Show all work.

   Sand _____

   Fine Gravel _____

   Coarse Gravel _____

8. What is the relationship between the *porosity* and the grain (particle) size of each soil sample?

9. What type of soil retained the most water? Why?

10. Calculate the permeability of each soil type using the following equation:

    Permeability = 1/Initial time for water to reach the bottom of tube

    Sand _____

    Fine Gravel _____

    Coarse Gravel _____

11. What is the relationship between the *permeability* and the grain (particle) size of each soil sample?

12. Which soil type tested in this activity would cause the most water runoff? The least?