Lab: Soil Porosity and Permeability MAKEUP ASSIGNMENT
Remember: As per GHHS Policy, you have two days for each day absent to makeup assignments.

Prelab Questions:

1. Define Porosity.

2. Define Permeability.

What We Did in Class:

Students observed different soil types. Students measured the rate at which water drained through a sample to calculate permeability, then measured the amount of water retained by a sample to determine porosity. Use the class data below to analyze the three major soil types (sand, silt & clay) along with gravel and topsoil. Be sure to fill in the last two columns – Drainage Rate and % Water Retained.

Results:

Soil Type	Drainage Time (sec)	Amount Drained (mL)	Drainage Rate (Amount of water drained / time)	% Water Retained (100 - Amount of water drained, as a %)
CLAY	228.3	84		
SILT	187.1	88		
SAND	58.2	93		
GRAVEL	19.5	98		
TOPSOIL	172.8	77		

Analysis Questions:

3. Looking only at the three main soil types (sand, silt and clay), the sample that had the highest drainage rate and retained the least amount of water was the most permeable. Which sample does this describe?

4. Why can some soil samples hold more water than others?

5. Why are pore spaces in soil important to plants and organisms that live there?

6. Compare the permeability of these samples with their porosity. The sample that retained the most amount of water had the highest porosity. Was the most permeable sample the most porous as well? Is there any connection between soils' permeability and its porosity? EXPLAIN.

7. Which of these samples would you want to use for planting purposes? WHY?

8. Which of these samples would you want to place in an area that is known to get sudden bursts of precipitation? (*meaning a high amount of water very quickly*) WHY?

9. Which sample would be most similar to soil you would find here at school? Why do you think this sample best describes GHHS soil?

10. Water wells are sunk into aquifers, units of rock that store and transmit water, meaning they have good porosity and high permeability. Which of the three sediments would make the best water source for a water well? WHY?

11. Suppose a plant grows in a soil with poor water-retaining capacity. What kind of root system would be most beneficial – a deep tap root or a shallow, wide-spreading root system? Explain.

12. Which of the soil sample would be the best to build a landfill on? WHY?

Watch the video http://www.bozemanscience.com/ap-es-006-soil-soil-dynamics and answer the following
13. What are the two types of weathering that contribute to soil formation?

14. Define CEC and what does it measure?

15. What two rock types in the video gave rise to clay in the example involving chemical weathering?

16. Name the five soil horizons listed in the video.

17. Explain what happens in the three containers of soil when water is added.

18. Why is loam such a great soil to have?

19. How do compaction and salinization affect soils?

20. What have you learned from this makeup lab?