

GROUNDWATER

Name _____

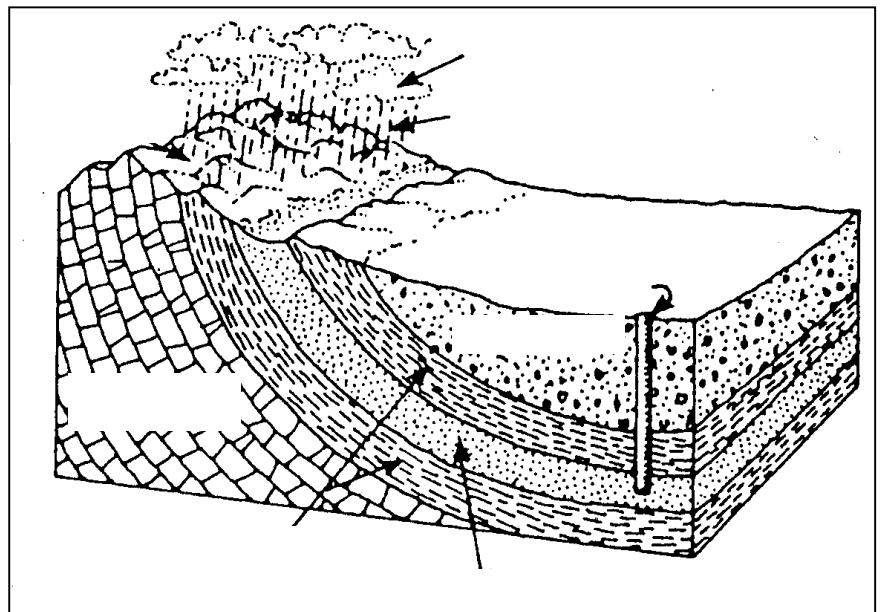
Partners _____

Directions: give the best answer to the following questions.

1. The rock _____ is very permeable, and shale is very PERMEABLE / IMPERMEABLE.
2. If the ground is saturated or frozen during a heavy storm, would you expect good infiltration or runoff and flooding?

3. The upper surface of the *zone of saturation* is called the _____.
4. The word "aerated" means filled with _____.
5. Porosity is usually given as a percentage: the volume of open spaces in a soil sample, divided by the total volume of the sample, x 100 (volume open space / total volume x 100%). What would the porosity % be for a 200ml sample with 40ml of pore space (show work)?
6. Angular particles have less pore space than rounded particles because _____.
7. Sorted particles are _____, while unsorted particles are _____.
8. Unsorted particles have low porosity because _____.
9. What effect does particle size have on the porosity of a soil, if samples are well sorted? _____.
10. Large, sorted particles have HIGH / LOW permeability.
11. Page six of the Reference Tables, at the upper right, gives various particle sizes. Which would have greater permeability, sand or clay? _____

12. Label the diagram at right with the following terms: bedrock, mountains, clouds, precipitation, impermeable shale, saturated sandstone (aquifer), surface well.
13. Which rock layer at the right contains ground water? _____



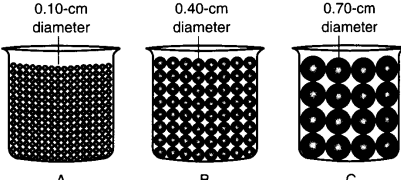
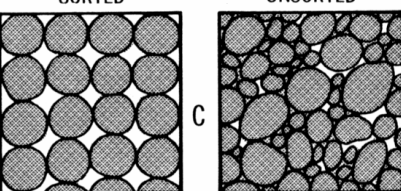



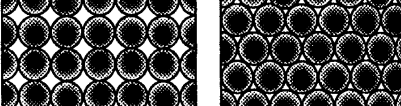
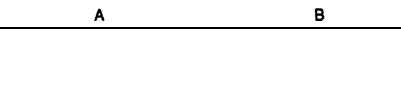


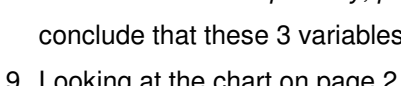
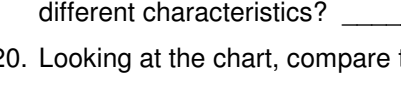

14. The ground water enters this aquifer where

15. When the water level in the aquifer reaches an elevation above the top of the well in the valley, water will gush out of the well by itself, creating an *artesian* well. In the diagram, put a dark line across the aquifer layer at the minimum water table elevation required for an artesian well to form in the valley below.

16. More water will be *retained* by a sample of LARGER / SMALLER particles, because of a difference in the total amount of _____ in the samples.

17. The capillarity (ability of water to rise through small spaces) is highest in LARGE / SMALL particles.

Directions: complete the following chart with the symbols corresponding to the correct terms (see “KEY”).

<p align="center"><u>Diagram</u></p>	<p align="center"><u>KEY</u></p> <p align="center">H = High L = Low N = No Effect - = (blank)</p>		<p align="center">Porosity</p>	<p align="center">Permeability</p>	<p align="center">Infiltration</p>	<p align="center">Runoff</p>	<p align="center">Capillarity</p>	<p align="center">Retention</p>
	<p>Large Particle Size (when sorted)</p>							
	<p>Small Particle Size (when sorted)</p>							
	<p>High Particle Sorting – High (well sorted)</p>							
	<p>Low Particle Sorting – Low (poorly sorted)</p>							
	<p>Round Particle Shape (rounding – High)</p>							
	<p>Angular Particle Shape (rounding – Low)</p>							
	<p>High Particle Packing (tightly)</p>							
	<p>Low Particle Packing – (loosely)</p>							
	<p>High Saturation – (saturated)</p>							
	<p>Low Saturation – (unsaturated)</p>							
	<p>High Slope (steep gradient)</p>							
	<p>Low Slope (gentle gradient)</p>							

18. You now know that *porosity*, *permeability* and *infiltration* are not the same. Looking at the chart on page 3, would you conclude that these 3 variables have very similar or very different characteristics? _____

19. Looking at the chart on page 2, would you conclude that *runoff*, *capillarity* and *retention* have very similar or very different characteristics? _____

20. Looking at the chart, compare the variables in question #1 with those in question #2. Do these two groups of variables have similar or opposite characteristics?