Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hour\_\_\_\_\_\_\_\_\_

**Permeability and Porosity Lab**

**Background:**

How does water move through materials such as rocks? Permeability is the measure of how easily water can flow through material (like rocks, soil, clay or sand). Over 60,000 people in Central Texas get their drinking water from the Barton Springs Segment of the Edwards Aquifer-the underground layer of water-bearing rock in our area. The Edwards Aquifer is a karst aquifer that is made of limestone that is easily dissolved away through time. The Edwards Aquifer is known for its caves, fractures, and conduits.

We pump water out of the Edwards Aquifer to use for drinking water and household, irrigation, and commercial uses. Also, the Edwards Aquifer naturally discharges through springs; Barton Springs being the most well known. Water in the aquifer is replenishes during recharge events. Recharge adds water to the groundwater system when rainfall, melting snow, surface water, or water from a creek or lake soaks in through the soil and rocks.

**Materials**

-sediment samples (clay, sand, gravel, silt) -100+ml graduated cylinder

-funnel -cotton

-paper cups with holes in the bottom

**Procedure**

1. Ask your question and make a hypothesis. Which type of sediment has the best permeability and porosity? Make your hypothesis below based on what you already know about permeability and porosity.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2.  At your table each partner group will be responsible for one sediment sample. Yellow and purple seats will be in charge of the clay, blue and orange the sand and red and green will be in charge of the gravel. Label your three cups according to their sediment.(clay, sand, gravel)

3. Punch several holes in the bottom of your cup.

4. Put one scoop of your sediment in a coffee filter or paper towel and place that in your cup. Have your sediment cover the bottom of your cup.

5. You will pour 100 ml of water into your cup and measure how much water passes through your cup and the time it takes for the water to pass through the cup. You will also measure how much water the sediment holds in the cup.

|  |  |  |  |
| --- | --- | --- | --- |
| Sediment | Amount of water passed through each sediment type. | Time | Amount of water held by each sediment type |
| Gravel |  |  |  |
| Sand |  |  |  |
| Clay |  |  |  |

6. Clean up your lab and do your “cabinet” job before moving on.

**Answer the following questions using complete sentences and a restate.**

1. Which sediment sample has the greatest permeability? How do you know?

2. Which sediment sample had the greatest porosity? How do you know?

3. Which substance allowed water to pass through it the fastest, one made up of large particles or small particles?

4. Which substance held the most water, the one made up of large particles or small particles?

5. If your backyard floods every time it rains, describe what kind of soil you might want to have under your grass to help this situation.

6. An aquifer is an underground layer of soil/rock that contains water. Identify and explain what type of soil most likely lines the bottom of this layer: