**Aquifer in a Cup Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Hour \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Background:** **Groundwater is a very important source of water for many people. Groundwater is water that comes from underground sources, usually wells, springs, and aquifers. An aquifer is a body of saturated rock through which water can easily move through. Groundwater is always on the move, and lies below the water table, which is the zone that is saturated with water.**

**The depth of the water table depends on the types of geological materials and slope of the land surface. The saturation zone can be 100 meters underground or a few kilometers. The depth of the underground water is not always the same, as it goes up in rainy periods and down in times of drought.**

**Groundwater is not easily contaminated as surface water, but when it is, the cleanup is very difficult and length. If there are chemicals in Earth’s layers such as pesticides and fertilizers, these materials may seep into the groundwater. Where there are contaminants present, it has been found that sinking a well deeper into the ground can often reach safe water.**

**Materials:**

**-Clear plastic cup -Modeling clay**

**-Sand -Gravel**

**-Red food coloring - Bucket of clean water**

**Procedure**

**1. You will be working with your table partner. Ms. Murphy will move seats if necessary.**

A. You have a bucket of sand in your materials. Sand is often found as a layer in an aquifer. Is sand permeable or impermeable? Explain your answer.

**2. Pour enough sand in your cup to cover the bottom of your cup.**

**3. WHILE adding water to your cup I would like you to pay attention to the sand. You should observe how the water is absorbed by the sand, but remains around the sand particles as it is stored in the ground and ultimately in the aquifer. Pour enough water into the sand to wet it completely, with no standing water on top of the sand.**

B. The sand is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ once the water is added and represents a

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the aquifer. **4. Next we will be adding a layer of clay which is often found in aquifers. Flatten the modeling clay and cover about 3/4 of the sand with clay. Spoon a small amount of water on top of the clay and observe that the water does not pass though the clay.**

C. Clay is an example of an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ layer in an aquifer which water cannot pass

through. These layers are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ layers.

**5. The next layer in our aquifer will be gravel. Place gravel over the sand and clay covering the entire container. Slope the gravel to one side of the cup forming a hill and a valley. Now fill the cup with water so that the valley contains water, but the hill is not covered with water. Notice how the water fills in between the porous gravel. Also notice that you now have both groundwater in the aquifer and surface water in the form of a lake in the valley.**

D. Gravel is often the next layer of Earth and is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because water can flow through its cracks.

**6. Often time’s aquifers are pumped to provide water for crops.**

**7. The food coloring represents the improper disposal of chemicals, such as pesticides and motor oils, which can leak into the ground. Raise your hand and wait patiently for Ms. Murphy to add pollution to your model. Notice Ms. Murphy will put a few drops of pollution along the gravel hill, as close to the wall of the cup as possible. The chemicals are disposed at the surface, and will seep into the ground and contaminate the groundwater. Let the aquifer sit for a moment while you answer the following question.**

E. What is happening to the pollution? Where is it going? What is this process called?

**8. Pump a little water out of your aquifer. (MS.MURPHY WILL MODEL THIS STEP)**

F. Compare and contrast the water you pumped out of the aquifer before and after the pollution was added.

**9. You must clean up your lab before moving on. Separate your layers of sand, gravel, and clay into their appropriate containers. Have Ms. Murphy approve your lab area before moving on. Must get checked in!!**

**Comprehension questions must be answered using complete sentences and a restate on a separate piece of paper.**

1. Explain in your own words what an aquifer is.

2. How can the contamination at the surface affect our groundwater?

3. Describe a specific example of pollution from the surface getting into our groundwater.

4. Describe an activity around the school or your home that could pollute drinking water sources. (Must be different from question 3)