

# Building an Aquifer Model

In this part of the lab activity, you will be working with your class to create a model of an aquifer using the following materials:

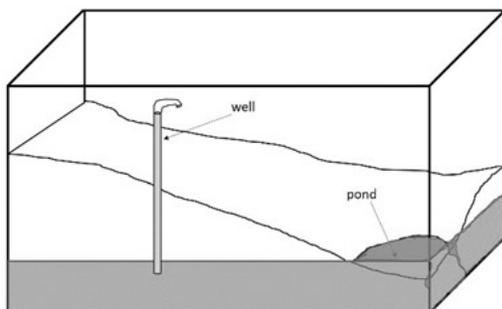
- A small to medium-sized glass aquarium or clear container
- A hand pump removed from a pump soap dispenser
- Small rocks
- Clay
- Topsoil
- Food coloring
- A small piece of pantyhose, cheesecloth, or screen
- A rubber band
- Water
- A small, clear cup

## Plan.

1. Which type of sediment (rocks, topsoil, or clay) would be best to represent the bedrock layer at the bottom of the aquifer? \_\_\_\_\_
2. Which type of sediment (rocks, topsoil, or clay) would be best to represent the top layer of the model? \_\_\_\_\_
3. Where will the other sediment layer go? \_\_\_\_\_

## Build. Build a model of an aquifer with these requirements:

- The land must be sloping downward so that a pond can be formed at one corner.
- The hand pump represents a well. Cover the end of the handpump that would be in the soap with cheesecloth, pantyhose, or screen and use the rubber band to hold it in place. This will prevent sediment from entering your pump.
- Insert the pump into the model to reach near or to the bottom of the container. This is best done as you build, rather than after. Simply push sediment around the pump as you build.



This is an example of how to slope your sediment to create a pond.

# Building an Aquifer Model

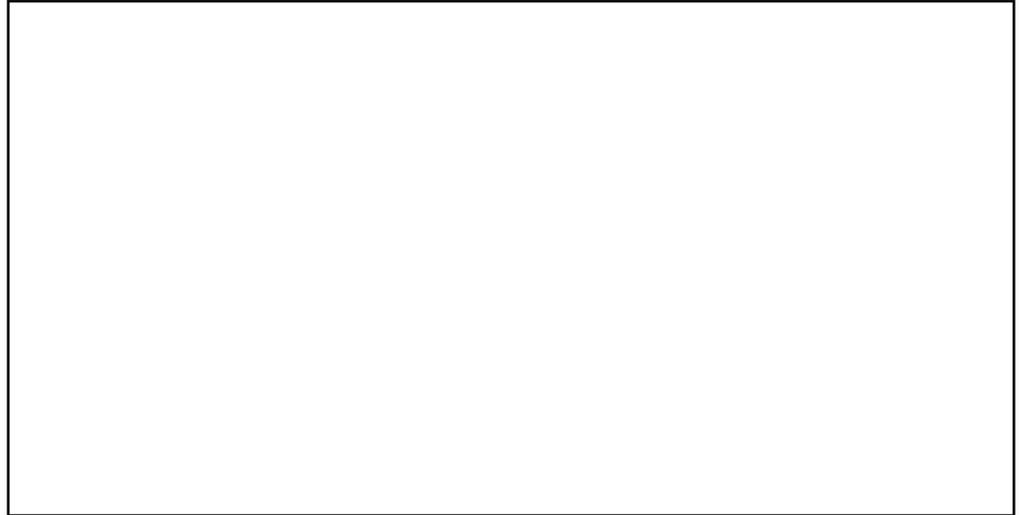
## Examine.

Once your aquifer is built, gently pour water into the aquarium until the water table allows for your pond area to be filled with some water. Make sure your well is reaching the water level.

Draw a picture of your model from the side.

Label the following:

- *Water table*
- *Surface Water*
- *Saturated Zone*
- *Aquifer*
- *Unsaturated Zone*



## Pump.

Use the hand pump to demonstrate how a well would pump out the water. Now, pump out several pumps of water into a small cup to represent water being used for drinking or agriculture.

4. What happens to the water level in the pond as you pump from the well?

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Watch this video: <https://www.youtube.com/watch?v=KMtEQqbi4CI>

5. Is the well in your model an artesian well? Why or why not?

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Next, put 5 drops of food coloring near the top of your slope. Pour the water from the cup gently back over this area to represent rain.

6. Pump your hand pump again about 5-10 times into the cup. What do you notice about the water in the cup?

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7. Explain how the food coloring can simulate the movement of pollution through an aquifer and into our drinking water.

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# Building an Aquifer Model Teacher Instructions & Key



Aquifer model



Well before pollution



Well after (green) pollution

## Plan.

1. Which type of sediment (rocks, topsoil, or clay) would be best to represent the bedrock layer at the bottom of the aquifer? rocks
2. Which type of sediment (rocks, topsoil, or clay) would be best to represent the top layer of the model? topsoil
3. Where will the other sediment layer go? between the other two layers

## Pump.

Use the hand pump to demonstrate how a well would pump out the water. Now, pump out several pumps of water into a small cup to represent water being used for drinking or agriculture.

4. What happens to the water level in the pond as you pump from the well?  
The water level of the pond drops as you pump water from the well.

Watch this video: <https://www.youtube.com/watch?v=KMtEQqbi4Cl>

5. Is the well in your model an artesian well? Why or why not?  
No. An artesian well is in a confined aquifer and therefore has a lot of pressure built from water depth. Our aquifer is unconfined.

Next, put 5 drops of food coloring near the top of your slope. Pour the water from the cup gently back over this area to represent rain.

6. Pump your hand pump again about 5-10 times into the cup. What do you notice about the water in the cup?  
The water in the cup becomes slightly colored.

7. Explain how the food coloring can simulate the movement of pollution through an aquifer and into our drinking water.

The water in the aquifer can become polluted when water is recharged into it. When that water is pumped out of the aquifer, it can cause polluted drinking or irrigation water.