

Ground Water

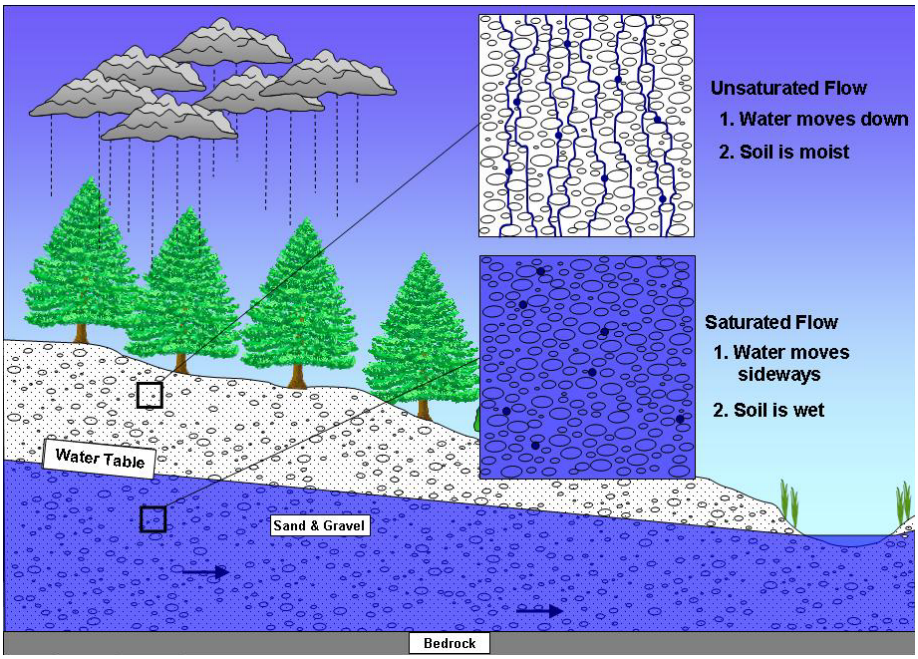
How does water under the earth's surface move?

Objectives: Learn about ground water and
- how ground water moves
- characteristics of ground water movement
- different types of ground water movement

Grades: 3-6

Materials:
- Ground water animation
- Two beakers
- 250 mil or one of cup gravel
- 250 mil or one of cup sand

Ground Water:
Ground water is water below the earth's surface. The water from rain or melting snow will seep or **infiltrate** into the surface.



The infiltrated water will move downward. The water moves in empty spaces between the soil particles. If the empty spaces only have a little water in them, then the soil is moist or **unsaturated**. If all the empty spaces are completely filled with water, then the soil is wet or **saturated**.

The amount of empty spaces in soil is called **porosity**. In general, the more porous a soil is, the easier it is for water to move through it. Which has greater porosity—the gravel or granite?



Gravel



Granite

A measure of how easy or hard it is for water to move through soil is called **hydraulic conductivity**. If water can move through a soil easily the soil has high hydraulic conductivity. If it is difficult for water to move through a soil, the soil has low hydraulic conductivity. Which has greater hydraulic conductivity—gravel or granite?

Water in the unsaturated zone seeps or infiltrates downward. It continues to move downward until it encounters bedrock or silt, something with low permeability. The water then starts to fill up all the empty pore spaces, and the soil or rock becomes **saturated.** The top of the saturated soil is called the **water table.**

Once the soil becomes saturated, water starts to move sideways. The water typically moves from high elevation areas such as hills and mountains to low elevation areas such as lakes and oceans. Remember from Lesson #1 how fast water moves? It's usually only a few feet a day.

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Ground Water

Water under the earth's surface

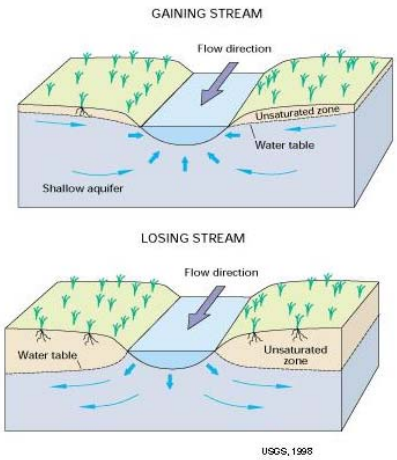
Notice in the diagram on page 1 the top of the water table is the same as the top of the stream.

The ground water is flowing into the stream. This is called a **gaining stream.** Sometimes the water table is below a stream, and the stream loses water by seeping out of the bottom. The water then flows downward to the water table. This is called a **losing stream.**



Now remove the sand and perform the experiment again but instead of sand use gravel. What's the difference between the two? Which one has greater porosity? Which one has greater hydraulic conductivity?

You can also do the experiment with a mixture of soil and gravel or sand. How does it differ from the experiments above?



Exercises:

1. Download the hydrologic animation at *www.deq.idaho.gov/Rathdrumprairieaquifer.*

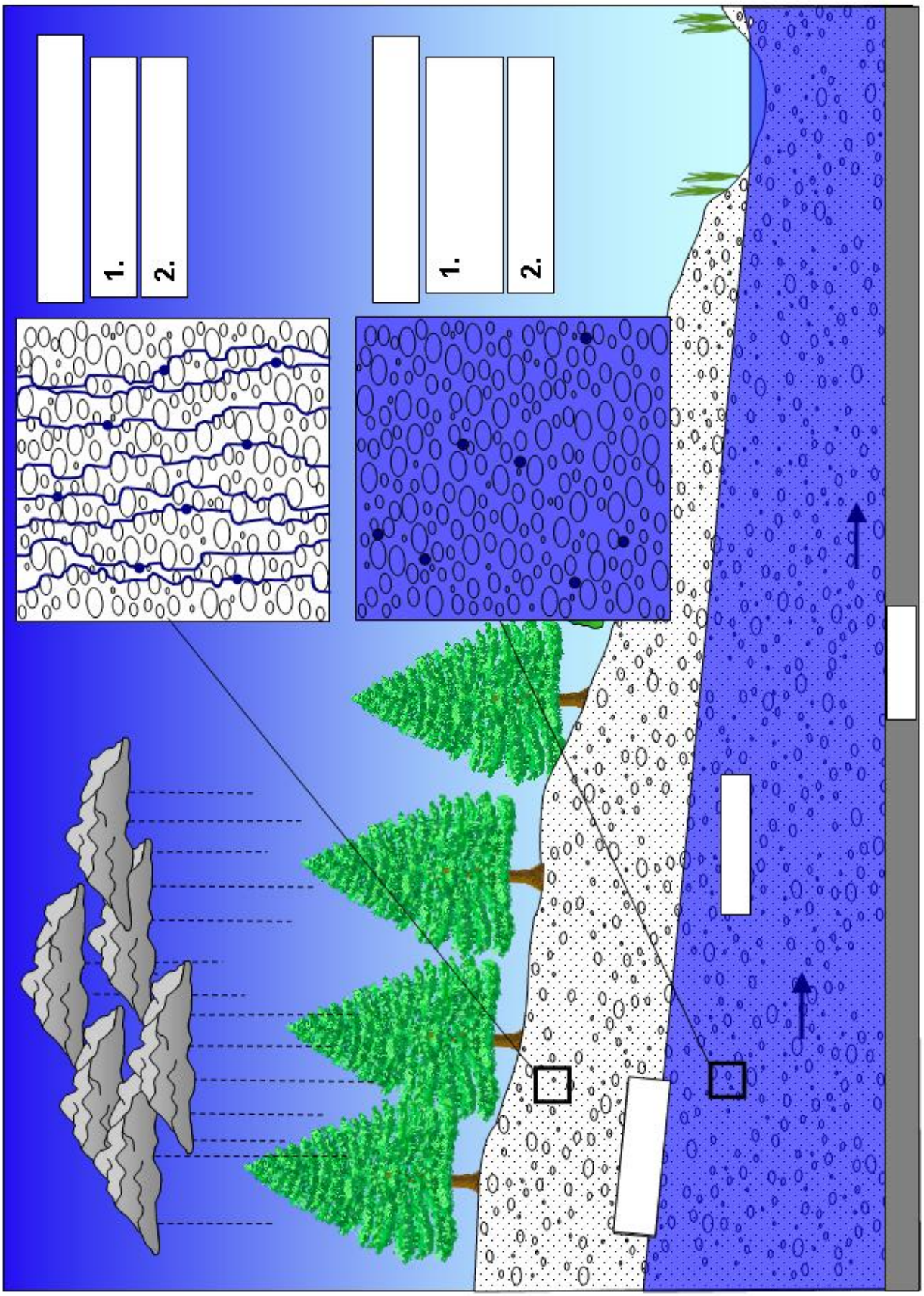
2. On page 3 is an illustration of ground water movement. Fill in the empty boxes to describe the two types of zones.

3. Fill a beaker with exactly 250 ml of sand Take another beaker and fill it with exactly 250 ml of water. Slowly pour the water from the beaker into the beaker with the sand. How much water can you pour into the sand before the water flows over the top of the sand? Determine at what point the sand is unsaturated and when it's saturated.





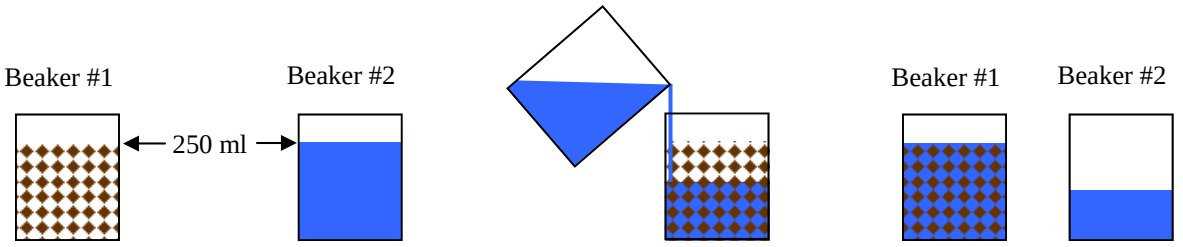
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Soil Experiment

Start with exactly 250 ml of sand in a beaker #1.
Fill another beaker (#2) with exactly 250 ml of water.
Slowly pour the water into beaker #1 with sand until the water flows out the top of the sand.
Note how much water you poured out of the beaker #1.
Repeat the experiment by replacing the sand with the same volume of gravel.
Repeat with other types of soil, sand, or gravel or mix them up!
Use this table to record the information.



Type of soil (potting soil, sand, gravel)	How much soil is in the beaker #1?	How much water is in the beaker #2?	How much water is left over in the beaker #2?

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Teacher

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