

In-Class Experiment #1

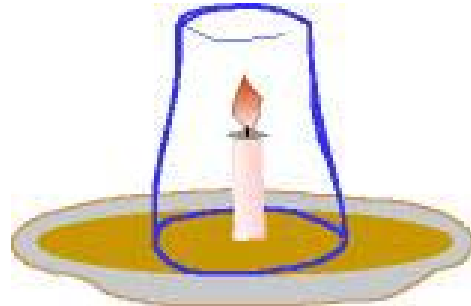
How to “make” water

Water is a chemical. It’s made of two gases, hydrogen and oxygen. Water acts like a gas sometimes (when it evaporates) but we usually think of water as a liquid – something wet.

You can make hydrogen and oxygen join to form water. Here’s how.

You will need:

- a birthday candle
- a plate
- a clear drinking glass
- a match or lighter
- an adult to help you with the match or lighter



1. Set the birthday candle on the plate and light it (ask an adult to help).
2. Cover the burning candle with the clear glass (it should be large enough to cover the whole candle).
3. When the candle goes out, look closely at the inside of the glass. What do you see?

The tiny drops of liquid inside the glass are water! The hydrogen in the candle joined with the oxygen in the air to form water. The candle flame went out when all of the oxygen in the air inside the glass was used up.

Wood, paper, natural gas, heating oil, and gasoline all contain hydrogen, which joins with the oxygen in the air as they burn. Do you think burning any of these fuels will form water?

In-Class Experiment #2

You can make your own rain gauge!

Maybe you've heard on the weather that an inch of rain fell in the last storm or a half-inch of rain might fall tomorrow. A rain gauge is a tool that measures the amount of rain that falls.

You can make a rain gauge to find out how much water falls in your yard (or anywhere else!) the next time it rains.

You will need:

- a clear plastic soda bottle
- a pair of scissors
- a permanent marker with a sharp point
- small stones or aquarium gravel
- water
- ruler



1. Cut off the top part of the bottle.
2. Fill the curved part of the bottom of the bottle with small stones or aquarium gravel. This will weight your rain gauge to keep it from falling over.
3. Use the ruler and marker to measure 1", 2", and 3" up the bottle from the baseline. Draw a line at each inch mark and label the lines.
4. Pour enough water into the bottle to cover the stones. Use the marker to draw a line at the top surface of the water.
5. Mark a "0" next to the line. This is your baseline.
6. Use the ruler and marker to measure and mark $\frac{1}{2}$ ", $1 \frac{1}{2}$ ", and $2 \frac{1}{2}$ ".
7. If you want to make your rain gauge more accurate, use the ruler and marker to measure and mark $\frac{1}{4}$ ", $\frac{3}{4}$ ", $1 \frac{1}{4}$ ", $1 \frac{3}{4}$ ", etc. on the bottle.
8. Wait for rain!
9. When the weather forecast predicts rain, or rain starts falling, add water to your rain gauge up to the baseline.
10. Put the rain gauge outside to catch the rainwater.
11. When the rain stops, check to see how many inches of rain fell into your rain gauge!

You may want to make a chart to keep track of how much rain falls in a week or a month. On the chart, list the date it rained and how many inches of rain fell. Add up the rainfall at the end of the week or month.

Important! Be sure the rain gauge is filled to the baseline before you begin collecting.

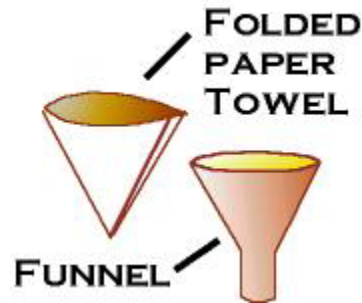
In-Class Experiment #3

You can clean dirty water!

One of the steps in making lake water clean and pure is called *filtration*. How does it work? Try this.

You will need:

- a paper towel
- scissors
- a funnel
- clean sand (from the beach or the sandbox)
- 2 clear glasses or jars
- a spoon
- water
- dirt from the back yard



- 1.** Cut a circle from the paper towel. Fold it in half, then in half again.
- 2.** Open the folded circle a little to make a paper cone.
- 3.** Put the cone inside the funnel and set the funnel in one of the glasses or jars.
- 4.** Fill the cone with clean sand.
- 5.** Fill the other jar with water. Add 3 or 4 spoonfuls of dirt to the water and stir it.
- 6.** Slowly pour the muddy water into the sand in the funnel.
- 7.** Look at the water coming out of the funnel.

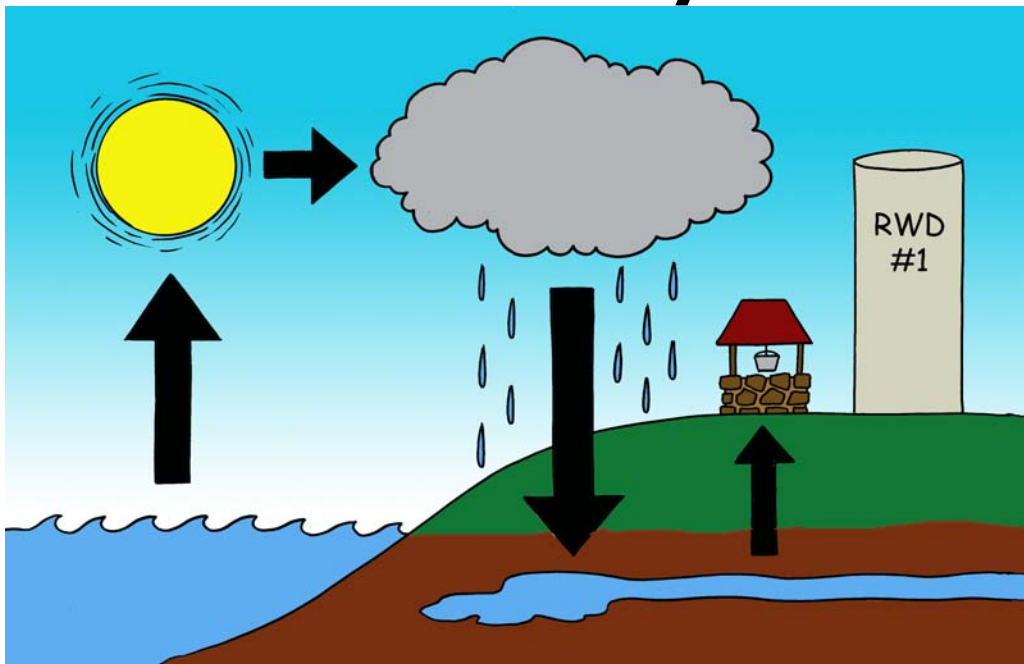
The funnel filled with sand is a filter. What happened to the dirt as the muddy water passed through the filter? Is the water in the bottom jar clear? Or is it still a little bit muddy? If it still looks muddy, the dirt particles were small enough to pass through the spaces between the sand in the filter. That's why more than one kind of filtration is used at the water treatment plant. Do you think your sand filter would remove germs from the water? (Hint: how big are germs?)

In-Class Experiment #4

You can make a miniature water cycle!

You've seen that water can be a liquid, a gas, or a solid. Outside, water is always changing from liquid to gas and back again. This process is called the *water cycle*. You can see how the water cycle works.

The Water Cycle



The sun's heat makes water *evaporate* from streams, lakes, rivers, and oceans. The *water vapor* rises. When it reaches cooler air, it *condenses* to form clouds. When the clouds are full of water, or *saturated*, they release some of the water as rain.

You will need:

- a large metal or plastic bowl
- a pitcher or bucket
- a sheet of clear plastic wrap
- a dry ceramic mug (like a coffee mug)
- a long piece of string or large rubber band
- water

- 1.** Put the bowl in a sunny place outside.
- 2.** Using the pitcher or bucket, pour water into the bowl until it is about $\frac{1}{4}$ full.
- 3.** Place the mug in the center of the bowl. Be careful not to splash any water into it.
- 4.** Cover the top of the bowl tightly with the plastic wrap.
- 5.** Tie the string around the bowl to hold the plastic wrap in place.
- 6.** Watch the bowl to see what happens.

The “mist” that forms on the plastic wrap will change into larger drops of water that will begin to drip. (You can speed up the dripping by carefully moving the bowl – don’t splash! – into the shade.) When this happens, continue watching for a few minutes, then carefully peel back the plastic. Is the coffee mug still empty? Water from the “ocean” of water in the bowl *evaporated*. It *condensed* to form misty “clouds” on the plastic wrap. When the clouds became *saturated* it “rained” into the mug!