

# Electrolysis: Splitting H<sub>2</sub>O

**YOU WILL PROBABLY NEVER** split atoms, but you *can* split water! H<sub>2</sub>O (water) is simply a chemical made up of two gases: hydrogen and oxygen. A single molecule of water has two atoms of hydrogen and one atom of oxygen.

By a process called **electrolysis**, you can break apart the bonds of the water molecules.

Adult supervision required

### You'll Need

- ✧ Safety glasses
- ✧ 2 no. 2 pencils, erasers and metal removed
- ✧ Pencil sharpener
- ✧ Small drinking glass
- ✧ Thin piece of cardboard that will fit over the mouth of the glass
- ✧ Warm water
- ✧ 1 tablespoon (20 g) table salt (NaCl—sodium chloride)
- ✧ 2 pieces of electrical wire, 9 inches (23 cm) long
- ✧ 9-volt battery

1. Put on your safety glasses.

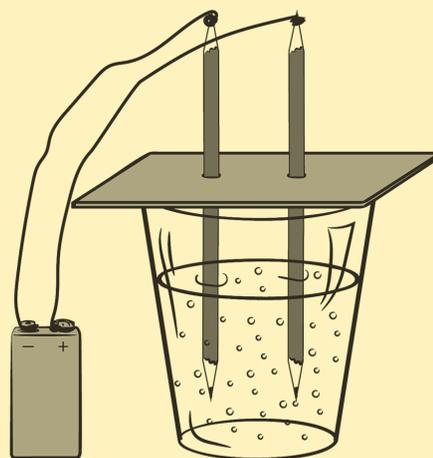
2. Sharpen both ends of the pencils and push one end of each through the cardboard. They should be about one inch apart, and the tips should be sticking up about two inches above the cardboard.

3. Fill the glass with warm water and add one teaspoon of salt. Let the salt dissolve and set aside.

4. Twist and wrap the end of one of the pieces of electrical wire to the positive terminal of the 9-volt battery. Wrap the other end of the wire to one of the pencils, to the graphite point that's 2 inches from the cardboard.

5. Connect one end of the second piece of electrical wire to the negative terminal of the battery and the other end to the graphite point of the other pencil, using the same twisting, wrapping motion.

6. Carefully place the other ends of the pencils into the salty water, letting the cardboard rest atop the glass. Observe the results.



### What Happened?

The salty water acts as a conductor called an electrolyte solution. Did you notice bubbles forming around the tips of the submerged pencils? This is the result of the hydrogen and oxygen atoms ionizing or breaking apart. The electricity from the battery flowed through the wires and the graphite in the pencils down into the saltwater. Hydrogen (H) atoms are positively charged (+) ions, so they will be attracted to the cathode, or positive, terminal of the battery. The oxygen (O) atoms are negatively charged (–) ions, so they will be attracted to the anode, or negative, terminal of the battery.

You just split water!

### Fast Facts

*Na* stands for *natrium*, which is the Latin word for sodium.

While you were ionizing water molecules, you were also breaking apart sodium chloride (NaCl) molecules. The positively charged sodium (Na) ions tagged along with the hydrogen to the battery's cathode terminal, and the negatively charged chloride (Cl) ions followed the oxygen to the battery's anode terminal.