

Splitting Water

Safety Precautions

- This activity **MUST** be done outside in a ventilated area.
- After getting wet, batteries used in this experiment cannot be used for other purposes.

Vocabulary

- chemical reaction - a process that involves rearranging a substance's molecules
- conductivity – the degree to which an object allows electricity to pass through it
- decomposition - breaking a molecule into smaller molecules or atoms
- electric current – flow of electric charge
- electrolysis - chemical decomposition produced by passing an electric current through a liquid or solution

Materials and Equipment

- 1 transparent plastic cup
- 1 9-volt battery
- table salt
- food coloring
- flashlight

Questions

1. Is there a simple and safe way to separate water molecules, H_2O , into hydrogen gas molecules, H_2 , and oxygen gas molecules, O_2 ?
2. Does adding salt speed up the *chemical reaction*? If yes, why?

Research

Electrolysis of water is the *decomposition* of water (H_2O) into hydrogen gas (H_2) and oxygen gas (O_2) when an *electric current* passes through the water.

This process can be used to make hydrogen fuel and breathable oxygen.

Adding salt increases the *conductivity* of the water.

Hypothesis

What is your hypothesis? Be sure to include your “best guess” answers to the 2 questions above.

- 1.
- 2.

Experiment

1. Fill the plastic cup with enough water so that when the battery is submerged, there will be a few inches of water above it.
2. Put a little food coloring in the water.
3. Place the 9-volt battery in the water, so that it is standing on the bottom of the cup.
4. Observe the bubbles near the top of the battery.
5. If the bubbles aren't visible, add a little salt to increase the chemical reaction rate and shine the flashlight from the side of the cup toward the top of the battery.



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Data and Observations

- What did you observe? Did you see bubbles near the top of the battery?

Analysis

1. Did the current in the battery decompose the water into hydrogen gas and oxygen gas?
2. Did adding salt speed up the chemical reaction? If yes, why?

Conclusions

A battery can be used to decompose water into hydrogen and oxygen molecules. Adding salt to the water speeds up the reaction.



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