



ELECTROLYSIS

JUSTIN TAYLOR

ENERGY LESSON

Time Frame:		Standards:	
45 – 60 minutes 6 th Grade		6.S.1.2.3 Use models to explain or demonstrate a concept. 6.S.1.8.1 Read, give, and execute technical instructions.	
Objectives:			
SWBAT to create a working model showing molecule of Hydrogen and Oxygen.			
Background Information:			
<p>Background Information</p> <p>When you add salt to the water, the salt ions (which are highly polar) help pull the water molecules apart into ions. Each part of the water molecule (H₂O) has a charge. The OH⁻ ion is 2 negative, and the H⁺ ion is positive. This solution in water forms an electrolyte, allowing current to flow when voltage is applied. The H⁺ ions, called cations, move toward the cathode (negative electrode), and the OH⁻ ions, called anions, move toward the anode (positive electrode). Bubbles of oxygen gas (O₂) form at the anode, and bubbles of hydrogen gas (H₂) form at the cathode. The bubbles are easily seen. Twice as much hydrogen gas is produced as oxygen gas.</p> <p>http://apps1.eere.energy.gov/education/lessonplans/pdfs/solar_electrolysisofwater.pdf</p>			
Materials:			
<ul style="list-style-type: none">• Battery source (9 volt)• Two regular number 2 pencils (Remove the eraser and metal end)• Salt• Thin Cardboard• Electrical Wire• Small Glass• Water			
Procedure:			

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1. Sharpen both pencils at both ends.
2. Cut the card board to fit over the glass.
3. Push the pencils into the cardboard. Make sure the pencils are about a inch apart. Also, the pencils should not touch the bottom of the glass.
4. Dissolve about a teaspoon of salt into warm water and let it sit for a while. Explain that the salt helps to conduct the electricity more effectively within the water.
5. With one piece of electrical wire, connect one piece of wire with the positive side of the battery and the graphite if the pencil sticking out of the cardboard. Do the same with the negative and other pencil.
6. Place the other ends of the pencils into the water and see what happens.

Assessment:

Are the students able to make a working model of electrolysis? Also, students are to complete the journal worksheet to explanation.

Additional Content:

Electrolysis of Water

compound - composed of two or more substances, ingredients, elements, or parts

electrolysis -chemical change, especially decomposition, produced in an electrolyte by an electric current.

hydrogen - a colorless, highly flammable gaseous element, the lightest of all gases and the most abundant element in the universe.

molecule - the smallest part of a substance that retains the chemical and physical properties of the substance and is composed of two or more atoms.

oxygen -an element that at standard temperature and pressure is colorless, tasteless, and odorless (required for nearly all combustion and in the cellular functioning of animals).



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High-energy Hydrogen I Student Journal

Electrolysis of Water

Name: _____

Date: _____

Electrolysis is a technique used by scientists to separate a compound or molecule into its component parts. By adding electricity to water and providing a path for the different particles to follow, water can be separated into hydrogen and oxygen.

In this experiment you will be taking a sample of salt water and adding a flow of electricity to it (the electrolysis). You will see the hydrogen and oxygen bubbling up in this experiment.

1. What is it that you are trying to accomplish in this experiment?

2. Write a hypothesis of what you think might happen during your experiment.

Assemble your electrolysis apparatus and observe what happens.

3. What happened when the electric current was passed through the salt water?

http://apps1.eere.energy.gov/education/lessonplans/pdfs/solar_electrolysisofwater.pdf

References:

Energy for Educators

Bringing Energy into the Classroom



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Related Reading

- *Hydrogen Power of the Future: New Ways of Turning Fuel Cells into Energy* by Chris Hayhurst (Rosen Publishing, 2003) This book discusses the pros and cons of using hydrogen power to help fight air pollution and meet our growing demand for electricity.
- *The Story of Hydrogen* by Mark Uehling and Frank Watts (Franklin Watts, 1995) Discusses the discovery, nature, behavior, and uses of the element hydrogen.
- *Henry Cavendish & The Discovery of Hydrogen* by Josepha Sherman (Mitchell Lane Publishers, 2005) The strange little man was unnaturally shy. He couldn't stand looking anyone in the face. He was unable to bear meeting more than one person at a time, and ran away if too many people came near him. When he had to go out, he sat in the shadows of his carriage so that no one could see him. He wore the same old-fashioned outfit day after day. And he never, ever spoke to a woman. And yet Henry Cavendish was also a brilliant man who made one of the most important discoveries of the nineteenth century—hydrogen, among other things.

Internet Sites http://www.gm.com/company/gmability/edu_k-12/5-8/games/more.html

General Motors. Fuel cell games—a matching game, sliding puzzle and crossword.

<http://library.thinkquest.org/11430/experimental/electrolysis.htm>

Thinkquest. Animation of water electrolysis. Lets you reverse polarity and test each gas with a splint.

http://apps1.eere.energy.gov/education/lessonplans/pdfs/solar_electrolysisofwater.pdf

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