

**Lesson 1: Making a Fuel Cell**

Fuel cells use a chemical reaction involving hydrogen and oxygen to create a gradient of electrons. The energy associated with these electrons (potential energy) can be converted to electrical energy. Can you determine the best combination of oxygen and hydrogen that will produce a fuel cell with the greatest voltage?

**Doing the Science**

1. Start the Fuel Cells Simulation by clicking on the “Sim” tab.
2. Use the materials on the top shelf to make one fuel cell.
3. Once your fuel cell is correctly built, click on the 100% H<sub>2</sub> Gas Flow button.
4. Next, click on the 5% O<sub>2</sub> Gas Flow button.
5. Record the multimeter’s voltage reading and the lamp’s brightness in Table 1 below.
6. Click on the various O<sub>2</sub> Gas Flow concentrations until you test and record all of the values for the 10%, 20%, and 100% O<sub>2</sub> Gas Flow concentrations.

**Table 1. Fuel Cell Voltage**

H <sub>2</sub> Gas Concentration (%)	O <sub>2</sub> Gas Concentration (%)	Voltage (volts)	Lamp Brightness
100	5		
100	10		
100	20		
100	100		

**Do You Understand?**

1. Which O<sub>2</sub> Gas Flow concentration resulted in the greatest voltage? How could you have determined this if you did not have a multimeter in the circuit to measure voltage?
  
  
  
  
  
  
  
  
  
  
2. Describe the relationship between the O<sub>2</sub> Gas Flow concentration and the fuel cell voltage.
  
  
  
  
  
  
  
  
  
  
3. What is the difference between an oxygen gas molecule and an oxygen atom?