

# Magnesium Battery

## Student Worksheet

Name \_\_\_\_\_

**Overview:** Magnesium is one of the most common elements in the Earth's crust, but you've probably never seen it this close! In part 1 you'll learn how to safely burn it. In part 2, you're ready to create your own electricity.

**What to Learn:** After today you'll know about the properties of the element magnesium, and how to use it and copper to make a chemical reaction that produces electricity.

## Materials

### Part I

- magnesium strip ([MSDS](#))
- ruler
- snips or scissors
- alcohol burner
- pliers
- matches with adult help
- tile or concrete surface (something non-flammable)
- gloves, goggles

### Part 2

- magnesium strip ([MSDS](#))
- test tube and rack
- light bulb (from a flashlight)
- 2 pieces of wire
- measuring cup of distilled water
- salt (sodium chloride) ([MSDS](#))
- copper wire (no insulation, solid core) ([MSDS](#))
- measuring spoon
- sodium hydrogen sulfate ( $\text{NaHSO}_4$ ) ([MSDS](#)) **Sodium hydrogen sulfate is very toxic. Respect it, handle it carefully and responsibly. Do not take it for granted.**
- gloves, goggles

## Lab Time

1. Put on gloves and goggles!
2. Measure a 2cm strip of magnesium and cut. Put the rest of the strip into the container, and place the container out of the way.
3. Place an alcohol burner on the tile or concrete surface. Light with adult help.
4. Grasp 2cm strip of magnesium with pliers and place into flame until it ignites. **Caution: Do NOT look directly at the white flame (which also contains UV), and do NOT inhale the smoke from this experiment!**
5. Observe! You should notice 2 things happening!

## Part 2

6. Fill the test tube about  $\frac{3}{4}$  full with distilled water
7. Measure one level spoonful of sodium hydrogen sulfate into the water. Be sure to cap the sodium hydrogen sulfate and put it out of the way.
8. Add 4 level spoonfuls of salt. Stir. Dissolve as much of the solids as possible, making a saturated solution.
9. Securely wrap one bare end of wire around the magnesium strip. Place to the side.
10. Take the second piece of wire, and securely wrap one end around copper wire. Make sure to have a good metal-to-metal connection with all wires.
11. Straighten wires, and place both the magnesium and copper strips into the test tube, making sure they do not touch one another.
12. Attach wires at opposite ends to the light bulb, with one contact on the bottom of the bulb and one contact on the side. Look carefully at filament and observe.

### **Magnesium Battery Data Table**

<b>Length of Mg Strip</b>	<b>How Long Did It Burn?</b> <i>(measure in seconds)</i>

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**Exercises** Answer the questions below:

1. Explain two things that happen when magnesium burns.
2. Why do people need to be extra careful when burning magnesium?
3. How did magnesium and copper produce an electrical current in the battery experiment?

## Exercises

1. Explain two things that happen when magnesium burns. (It combines with oxygen to produce magnesium oxide, and it combines with nitrogen to produce magnesium nitride.)
2. Why do people need to be extra careful when burning magnesium? (It can't be put out with a CO<sub>2</sub> fire extinguisher, the bright light is harmful to eyes; the light contains ultraviolet light which is dangerous to eyes; if it gets on the skin it will burn to it; it is not safe to inhale magnesium fumes.)
3. How did magnesium and copper produce an electrical current in the battery experiment? (The magnesium strip takes on a negative charge and the copper strip takes on a positive charge. A flow of electrons run through the wire from negative charge to positive charge, which lights up the bulb.)

**Closure:** Before moving on, ask your students if they have any recommendations or unanswered questions that they can work out on their own. Brainstorming extension ideas is a great way to add more science studies to your class time.