



Power Generator

Amount of time Demo takes: 10 minutes

Try this in the classroom!

Lesson's Big Idea

- Understand thermal energy and Seebeck Effect.
- Understand electromagnetic energy and Faraday's Law.
- Understand energy conversions.

Materials

- Crank AC generator
- 2 cups (small enough for the fan to stand in)
- Semiconductor based device (fan)
- Water (hot and cold)
- Bunsen burner (or any other way to heat water)
- Small pot
- **Need hot water!!**

SAFETY!

- Hot water may burn.
- **Turn off** bunsen- burner when not in use!

Background Information

- The Seebeck Effect is the conversion of water temperature difference into electricity.
- Faraday's Law is the formula of the production of electricity through changes in the magnetic environment of a wire coil. The bigger the area of the coiled wire or the more the wire is rotated creates more volts of electricity.

Instructional Procedure

1. Part A: Crank reel to light lightbulb.
2. Part B: Place each leg of the semiconductor fan into the cups of hot and

cold water.

- a. Make sure switch on the fan is turned on.
- b. Wait 1-2 minutes.
- c. Remove fan from water and let it continue to spin.
- d. Pour hot water back into pot.

Setup Instructions

1. Set-up bunsen-burner.
2. Heat up enough water in the pot to fill a cup about half way.
3. Fill one cup with the hot water and the other with cold water.

Tips & Tricks

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Assessment Questions

- How is electricity created with the electromagnet?
- What kind of energy is in the water? Is it the same type of energy turning the fan?
- How does the fan keep spinning after it is removed from the water?
- What kind of energy is used to turn the generator? What kind of energy is it converted into by the generator?

Careers & Real-World Applications

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Clean Up

- Dump out water.
- Dry off all wet items (fan, table, pot, etc.)

References

- Thermoelectric Effect: <http://www.youtube.com/watch?v=jlMERuu4liU>
- Faraday's Law: <http://hyperphysics.phy-astr.gsu.edu/hbase/electric/farlaw.html>

Related Next Generation Science Standards

- K-5
 - 2-PS1 Matter and its Interactions
 - 3-PS2 Motion and Stability: Forces and Interactions

- 4-PS3 Energy
 - 5-PS1 Matter and Its Interactions
- 6-8
 - MS-PS1 Matter and Its Interactions
 - MS-PS3 Energy
- 9-12
 - HS-PS3 Energy