615-4595 (15-130) Thermoelectricity Demo

The Thermoelectricity Demo is an excellent way to illustrate the Seebeck Effect. When a thermoelectric loop is fashioned from two dissimilar metals and they are connected together at two junctions, and a temperature gradient exists, a voltage or electromotive force (EMF) is induced which is enough to deflect a magnetic compass. Our device features an aluminum strip on the bottom with a bent copper strip on top. There is a depression underneath the copper loop for placement of a small magnetic compass. Our device features an attached handle for safety and ease of use.

Warranty and Parts:
We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear.

How to Teach with Thermoelectricity Demo:
Concepts Taught: Current; magnetic field; temperature gradient; voltage Curriculum Fit: Physics Sequence; Thermoelectric Effect Grades 6-8 and up.
Materials recommended but not included:
• Heat Gun
• Candle
• Bunsen Burner
• Beaker with cold water

Theory:
What is the Seebeck Effect?
What is the electromotive force (EMF)?
What is a magnetic field?
What is current?

Activities:
Investigation I: Seebeck Effect
Activity 1: Thermoelectric Effect
Note: The instructor should review all relevant safety protocols with students before beginning this experiment in the event that an open flame will be the heat source.

1. Hold the black handle of the thermoelectricity demo in one hand and place the small magnetic compass in the circular depression underneath the copper loop of the device. The orientation of the compass does not matter.
2. Heat the far end of the unit (the end that is away from the handle) with a heat source.
3. Once the end is hot, the student should observe the orientation of the compass needle. Another student should note it's orientation below (i.e., North, South, East ,West, etc). Compass Orientation = _____
4. While holding the thermoelectricity demo unit in the same orientation, the second student should pour cold water from a beaker onto the heated end. What happens to the compass needle? Record observations below.

_____
_____
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Questions:
1. Why must the two metals exhibit different voltages under the applied temperature gradient?

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2. If silver and gold were used as the two metals in the thermoelectric loop, what effect would be produced upon application of a heat source? Think about their placement in the Periodic Table.

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