

Light Bulb Comparison Lab

Note: This activity is part of a series of lessons called “Bust-A-Watt” that is available for checkout from Redwood Coast Energy Authority (RCEA) in Eureka. All materials and lesson plans are contained in the kit.

Overview: Students will be asked to determine which is the best light bulb, why, and by how much. They will compare incandescent, CFL and LED bulbs by measuring energy use, temperature change, and electricity costs. They will compare the different bulbs using percentages, such as 50% less energy consumption, 80% more heat loss, etc. They will then use their collected data to make claims about which light bulb is the best.

Objectives

- How to use rates and percents to compare energy use and different light sources.
- How energy is converted differently by different light bulbs
- The energy savings that can be achieved through the choice of light bulb.
- The energy efficiency of different light bulbs.

Materials

- 7 Kill-A-Watt electricity load meter and monitor
- 7 Thermometers, such as an infrared non-contact thermometer
- 7 60 watt incandescent light bulbs
- 7 13 watt CFL bulbs
- 7 light bulb docking stations or lamps
- 7 six-foot extension cords
- Lab sheets for each student

Teacher Preparation

- Assemble each docking station by inserting a CFL bulb into the socket. Plug a Kill-A-Watt™ Meter into the cord from the docking station and connect to the power strip or outlet. The Kill-A-Watt™ Meter will automatically turn on once current is running through it. Set the meter to watts by pressing the “watt” button until the screen displays “watts”.
- Provide a thermometer for each group
- Set up extension cords and power strips so stations can be used around the room.

Lesson Plan

1. Introduce Lesson

- Pass out the lab sheets and instructions and discuss the activity and procedure.
- Teach students how to use materials effectively and safely.
- Break students into 5-7 groups
- Assign student roles for group members
 - Time keeper
 - Thermometer reader
 - Kill-A-Watt™ reader
 - Recorder
 - Facilitator: switches light bulbs and makes sure materials are being used effectively.

2. Activity

- Students will record the kWh usage displayed on the meter and the temperature of the light bulb every 15 seconds for two minutes,
- Students will unplug the cord and change the light bulb safely and repeat the process with the LED and incandescent bulb.
- Students will then graph the data for the three bulbs on one graph and answer the questions on the conclusion sheet.