

Energetic Citizenship

Overview:

Did you know the average home emits twice as many greenhouse gases as the average car? Most house electricity comes from burning fossil fuels like coal and oil, which releases greenhouse gas emissions into our earth's atmosphere. We can reduce these emissions by using energy more efficiently – and save money in the process!

Objectives:

- Students will learn that using less energy can help the environment
- Students will learn the energy differences between compact fluorescent light bulbs and incandescent light bulbs.
- Students will measure the efficiency of fluorescent and incandescent light bulbs through heat given off by each.
- Students will explore ways to improve the energy efficiency of their houses and schools.

Materials:

- Two desk lamps (one with a compact fluorescent 20 watt bulb, the other with an incandescent 75 watt bulb)
- Two thermometers
- Two sheets of white paper
- Wattage Handout

Handouts:

- [Wattage handout](#)

Procedure:

1. Tell the students they will measure the energy output of fluorescent and incandescent light bulbs.

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2. Ask if they know the difference between the bulbs. Generally, fluorescent bulbs are filled with mercury gas that is carbon-expensive to recycle and coated inside with phosphor that emits light when excited. Incandescent bulbs are built with a round shape. And if you focus light to make it a reflector, the bulb can become rather hot.
3. Depending on the age and abilities of the students, this experiment can either be done in small groups of 5-6, or as a whole class. Make sure everyone can see the results.
4. Position the desk lamps about four inches above a sheet of white paper.
5. Place a thermometer on the paper beneath each bulb.
6. Switch on the lamps. After a few minutes, note the temperatures on the thermometers.
7. Ask the students which light bulb they think is more energy efficient and why.
8. Distribute the Wattage handout and have them complete the columns. Explain any necessary vocabulary.
9. When they've finished, have them research the cost of both bulbs locally.

McREL standards

Science

Standard 9. Understands the sources and properties of energy

Level IV Benchmark 3. Understands the relationship between heat and temperature (heat energy consists of the random motion and vibrations of atoms, molecules, and ions; the higher the temperature, the greater the atomic or molecular motion)

<http://www.mcrel.org/Standards-benchmarks/>