EXPERIMENT
DEMONSTRATING EFFICIENCY OF COMPACT FLOURESCENT LIGHT BULBS
COMPARED TO INCANDESCENT BULBS

In this experiment, teens will discuss what energy efficiency means, and use a CFL (Compact Fluorescent Light) and an incandescent light bulb, inserted into two side-by-side table lamps, to demonstrate/learn the difference in efficiency between them.

MATERIALS NEEDED:

- One incandescent bulb and one CFL bulb that produce equivalent lumens, e.g., a 60 watt incandescent bulb and a 13 watt CFL, or a 100 watt incandescent and a 26 watt CFL will generally produce the equivalent light levels (lumens). Choose an ENERGY STAR qualified CFL.
- Two table lamps that can support the wattage of the bulbs
- Two convenient sockets, or extension cords if necessary
- A table or platform to place the two lamps side-by-side

PROCEDURE:

- Have an adult place the incandescent bulb in one lamp, and the CFL bulb in the other lamp and turn them both on. Observe the light being produced by each. Notice the slight delay in the ignition of the gasses in the CFL's tube, compared to the almost instant lighting of the filament in the incandescent bulb.
- Have teens take turns holding their hands about 4-6 inches from each bulb, to feel the heat produced by each. The CFL will be much cooler than the incandescent bulb.
- Insert the different kinds of CFLs into the lamps, so that the teens can see what choices are available: "soft white", "daylight" and "cool white". Which light do they like best, and for what purpose?

EXPLAIN:

Incandescent bulbs work by heating a tungsten filament, or wire, until it glows. This is what produces the light you see. Unfortunately, 90% of the energy used to generate the light is wasted as heat. Due to their inefficient use of energy, incandescent bulbs will be banned by Congress, starting in 2012, with a complete phase out by 2014.

CFLs create a chemical reaction among the gasses located inside the glass tube, causing phosphorus to illuminate. They use 75% less energy for the same amount of light, and last 10 times longer (years).

Because there is a tiny bit of mercury in them, the EPA recommends that burnt out CFLs be returned to local recycling centers(Ikea Stores and others accept them) or household hazardous waste events that accept CFLs. If your local environmental agency allows you to put used or broken CFLs in the garbage, make sure to seal the bulb in two plastic bags before being placed in an outdoor trash can for pickup. Never send a fluorescent light bulb or any other mercury-containing product to an incinerator. (See www.earth911.org or www.gelighting.com/na/home_lighting/ask_us/faq_compact.htm)

Discussion:

- What was the light like given off by the incandescent bulb? The CFL?
- What was the heat given off by each bulb? Did one kind produce more heat than the other?
- Compare the wattage (energy amount) used by the CFL compared to the incandescent bulb of the same strength (lumens).