

Lights Light Up Your Life Data Sheet

NAME: _____

Purpose: Compare CFL to incandescent lightbulbs

Research: Read and record facts from outside experts about the differences between the two types of bulbs. Compare the bulbs in cost, light output, temperature, energy use, and value.

Form a hypothesis that you can test in the lab, comparing the two types of bulbs and determining one of the bulbs as a better choice for a particular reason.

- Which lightbulb will generate the most heat? The most light?
- Which lightbulb will use less energy? Last longer? Cost less to operate?

Materials:

- two light sockets, one incandescent lightbulb, one compact florescent lightbulb
- a light meter
- a yard/meter stick
- a calculator

Design an experiment to test your hypothesis. Record data collected. Use the following suggested lab activities, if applicable.

Screw an incandescent lightbulb into one of the light sockets, and screw a compact florescent lightbulb into the other light socket. **With the power off**, compare and contrast the two lightbulbs. How are they the same and how are they different?

Record your observations:

Place your sockets 24 inches (61 cm) apart. **With the power off**, place a thermometer five centimeters away from each lightbulb. Read and record the temperature of the air around the lightbulbs.



Incandescent _____ Fluorescent _____

Turn on the power to the lightbulbs. Describe each lightbulb again. Do not touch the lightbulbs. Record your observations:

Place a thermometer five centimeters from each lightbulb. Measure and record the temperature of the air around each lightbulb every minute for seven minutes.

Time (minutes)	Temperature around Incandescent lightbulb (in Fahrenheit or centigrade)	Temperature around Compact Fluorescent lightbulb (in Fahrenheit or centigrade)
0 (from step 2, above)		
1		
2		
3		
4		
5		
6		
7		

Plot the data from the table above on graph paper. Place *time* on the x-axis and *temperature* on the y-axis. Write TWO observations below.



Using a light meter, measure the light given off by each type of lightbulb. Record the level of emitted light in 1-foot (30cm) intervals, from 1 foot (30 cm) to 12 feet (3.6 m). Record the data on the table below.

Distance from lightbulb	Incandescent bulb level	Compact Fluorescent bulb level
1 foot (30 cm)		
2 feet (60 cm)		
3 feet (91 cm)		
4 feet (1.2 m)		
5 feet (1.5 m)		
6 feet (1.8 m)		
7 feet (2.1 m)		
8 feet (2.4 m)		
9 feet (2.7 m)		
10 feet (3.0 m)		
11 feet (3.4 m)		
12 feet (3.6 m)		

Plot the data from the table above on graph paper. Place *distance* on the x-axis and *light level* on the y-axis. Compare your two graphs. Write TWO observations below.



Record the price of each lightbulb below.

Incandescent _____ Fluorescent _____

Determine the amount of electrical energy (kilowatt-hours) used by each lightbulb in one hour. Multiply the lightbulb's power rating (Watts) by .001 (or divide by 1,000). A power rating is printed on the top or stem of the bulb. Record the kilowatt-hours below.

Incandescent _____ Fluorescent _____

Figure out the amount of energy each of the lightbulbs would consume if they were left on for 10 hours. Use the kilowatt-hours from above in this equation to figure it out: kilowatt-hours x number of hours = amount of energy used.

Incandescent _____ Fluorescent _____

Figure out how much the amount of electricity from costs determined above. Use the price per kilowatt-hour your teacher obtained or use \$0.07 per kilowatt-hour. What is the daily cost (10 hours) to operate each lightbulb?

Incandescent _____ Fluorescent _____

Answer the questions below:

1. Which lightbulb generated the most heat? _____
2. Which lightbulb generated the most light? _____
3. Which lightbulb used the most energy? _____
4. Which lightbulb costs less to operate? _____
5. Which lightbulb costs more to operate? _____
6. How much energy and money can you save each year by replacing one incandescent lightbulb with one compact fluorescent light bulb? _____
7. How long would it take for energy savings from the fluorescent light bulb to cover the additional cost of the bulb? (You will need to know the cost of each lightbulb.)

8. After this lab, which light bulb will you choose to have in your house and why?



9. In your opinion, should the government pass a law requiring the use of compact fluorescent lightbulbs? Why or why not?

Organize your notes and write a conclusion and recommendation. How does this support or disprove your hypothesis?

