

# BRIGHT THINKING



Learn about the differences between incandescent and compact fluorescent light bulbs and energy efficiency.

Grade Levels: 2-3  
Time: 20-30 minutes

## INTRODUCTION:

One of the most common forms of energy use in our homes is lighting. Until recently, most light bulbs were incandescent. These work by passing electricity through a metal filament in a sealed glass bulb. The filament heats up and glows, creating light but also a lot of heat. Compact fluorescent light bulbs (CFLs) work by passing electricity through a gas called phosphors inside a sealed glass bulb. The phosphors glow, creating light but very little heat.

Creating the same amount of useful work (light output here) with less energy input is a demonstration of energy efficiency. A CFL that uses only 16 watts of energy will produce as much light as an incandescent bulb needing 60 watts of energy. This means that a CFL is almost four times as efficient as an incandescent bulb.

Taking steps to be more energy efficient helps us make wise use of the resources we have to generate electricity. It also saves money. The relative efficiency difference between CFLs and incandescent bulbs is demonstrated in the relative temperatures of the two types of bulbs in a similar application. This lesson will help students learn about the differences between the two bulb types and observe differences in their efficiency for lighting.



## INSTRUCTIONS:

1. Give each group a lamp with a CFL.
2. Plug in and turn on the lamp.
3. Describe the brightness of the light bulb.
4. Place a thermometer next to the light bulb. Record the temperature.
5. Turn off and unplug the lamp. Allow the light bulb to cool.
6. When the light bulb is cool, replace the CFL with the incandescent.
7. Repeat steps 2-5 for the incandescent bulb.

## LESSON STANDARDS:

- Discover electricity is a form of energy. 2-3 PS3A
- List several properties of an object. 2-3 PS2A
- Use observations and evidence to develop explanations. 2-3 INQF
- Use a thermometer to observe and make measurements. 2-3 INQD

## MATERIALS:

- Lamp for each group
- Incandescent light bulb and CFL bulb with the same lumen/light output
- Thermometer

8. Review the questions at the end of the student worksheet.
9. Demonstrate for the students how to calculate the cost of the two bulbs.
  - a.  $\text{Electricity used (kWh)} = \text{hours of use} \times \text{wattage of bulb} \div 1000$
  - b.  $\text{Cost} = \text{kWh} \times \text{electric rate charged per kWh}$ . Avista customers in Washington are charged \$0.0789 per kWh as of August 2012.
10. Give the students a few examples to try.

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## Did you know?

- Light bulbs were patented in 1880 by Thomas Edison.
- CFLs use less energy than incandescent light bulbs and last 10 times longer.
- The average household can save 75% of the energy used for lighting in a year by switching to CFLs.



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**STUDENT WORKSHEET:**

	Brightness	Temp. °F
Incandescent light bulb	BRIGHT / DIM	
CFL light bulb	BRIGHT / DIM	

**QUESTIONS:**

Which light bulb is brighter? \_\_\_\_\_

Which light bulb has a higher temperature? \_\_\_\_\_

Why do you think it has a higher temperature? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

What difference does it make for a light bulb to have a higher temperature in your house?

\_\_\_\_\_  
\_\_\_\_\_