Light Bulb Investigation 1: Looking at Light Bulbs

Name: _____

Objective

Students will compare and contrast incandescent and LED light bulbs.

Materials

- LED light bulb-provided
- Incandescent light bulb
- Watt Meter
- Infared Thermometer
- Stopwatch
- Light Bulb apparatus
- Safety equipment for handing hot materials

Part 1: Observations from LED Lamp Packaging

Look carefully at the LED lamp packaging and answer the following questions.

1. What is the wattage of the bulb? _____
2. What is the watt equivalent of the bulb? _____
3. To help you understand watt equivalence better, look at the picture below and explain what you think watt equivalent means. *Hint: what type of bulb do you think the LED is being compared to?*

	Incandescent Bulb	CFL Bulb	LED Bulb
			
Wattage	40 W	9 W	7 W
Lumens	550 lumens	550 lumens	700 lumens
Lumens/Watt (Efficacy)	14 lm/W	61 lm/W	100 lm/W

_____

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4. The average life of the bulb is 25,000 hours. Calculate the following:
    a. How many days will it last? _____
    b. How many years will it last? _____
    c. How many minutes will it last? _____

5. What type of light appearance does this bulb have? Explain what you observed on the packaging to come to this conclusion.

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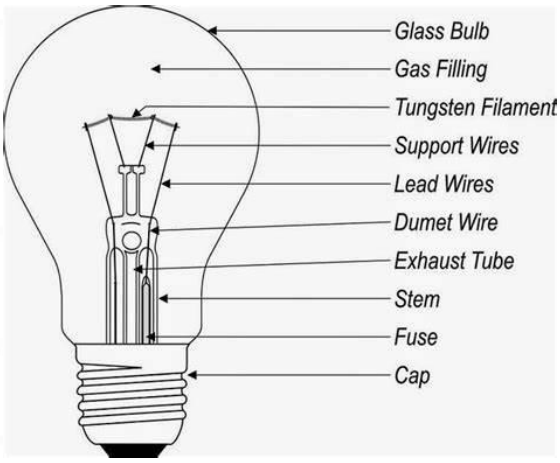
Part 2: Comparing Light Bulbs



Take light bulbs out of the packaging and make the following observations:

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1. Bulb structure: what are some major differences between the two light bulbs that you observed?

   _____
   _____
   _____
   _____

2. Plastic vs glass: The old style incandescent light bulb is glass while the LED is plastic. Which material do you think is better and why?

   _____
   _____
   _____

3. Incandescent light bulbs were banned in the United States in 2023. Looking at the picture and facts below, why do you think this happened?

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   _____
   _____
   _____

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- **Energy efficiency:** LED bulbs use up to 90% less energy than traditional incandescent bulbs.
- **Longer lifespan:** LED bulbs last up to 25 times longer than incandescent bulbs.
- **Cooler operation**: LEDs remain cool to the touch, while incandescent bulbs get hot.
- **Directional light**: LEDs emit light in a specific direction, using energy more efficiently.
- **Environmental impact**: Fewer replacements and less waste make LEDs a greener choice.

Now put both light bulbs in a lamp.

4. What do you observe about the brightness?
   _____
   _____
   _____
5. What do you observe about the temperature?
   _____
   _____
   _____

Conclusion: What light bulb design do you think is better for the environment and why?

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