



Curiosity Guide #604

Electric Lights

Accompanies Curious Crew, Season 6, Episode 4 (#604)

Plasma Flicker

Investigation #8

Description

How many batteries will get the light-up job done?

Materials

- Plasma ball
- Fluorescent bulb

Procedure

- 1) Plug in the plasma ball and turn it on.
- 2) Slowly bring the bulb near the plasma ball.
- 3) What do you notice?
- 4) Circle your hand to form a ring around the center of the tube.
- 5) What do you notice?

My Results

Explanation

The plasma ball has gases inside the globe. When the high electrode in the globe is electrified, it ionizes the gas and makes plasma. The plasma filaments are visible until the plasma hits the glass, but the current continues beyond the plasma ball. A fluorescent bulb is filled with mercury and argon gas. That energy continues into the fluorescent bulb. As electricity enters the bulb, the electrons collide with the mercury gas particles and gets them moving more rapidly. The mercury particles emit ultraviolet light. That energy transfers to the inner phosphor coating of the bulb, where the energy is absorbed and then emitted as light that we can see. The transfer from ultraviolet to visible light is called **fluorescence**. The part of the bulb closest to the ball will glow the most but will be dark where your hand handles the bulb and closer to you. Fluorescent bulbs do not give off as much heat as incandescent bulbs and can use as much as 75% less energy.

Investigate further. Did you know about 5 to 10% of the energy used in your house comes from the lights? It's true, and for big companies, light can make up 20 to 30% of the company's energy. That means that almost a quarter of the energy used in the United States comes from lighting. A great way to use less energy is to choose more efficient light bulbs that require less energy to work. This is because more of the electricity is transferred into light rather than heat. A second way to help the environment is to be sure to turn the lights off when you're done. Great job!

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