

STEM *Sims*<sup>TM</sup>

# Bright Ideas



# Bright Ideas

**Do you need an idea for a scientific study?  
Try out one of our ideas or make one of your own.**

**Start learning right now about the impact of light bulbs on the environment. Take the following brief quiz to see how much you already know about light bulbs. See the bottom of page 4 to check your answers.**

1. What carcinogenic (cancer-causing) material is released by compact fluorescent lamp (CFL) light bulbs when the glass is broken?
  - a. Cadmium
  - b. Chromium
  - c. Lead
  - d. Mercury
2. Carbon filament incandescent light bulbs were invented by:
  - a. Benjamin Franklin in 1789.
  - b. Humphry Davy in 1800.
  - c. Thomas Edison in 1879.
  - d. Oleg Losev in 1927.
3. The longest-lasting light bulb manufactured by the Shelby Electric Company is known as:
  - a. the Centennial Light.
  - b. the Everlasting Electric Bulb.
  - c. Old Sparky.
  - d. Incandescent Infinity.
4. The world's brightest light is in:
  - a. Paris, France.
  - b. Las Vegas, Nevada.
  - c. Tokyo, Japan.
  - d. London, England.
5. How much did one string of electrical Christmas lights cost in 1900?
  - a. 50 cents (~\$14 by today's standards)
  - b. \$6 (~\$169 by today's standards)
  - c. \$12 (~\$334 by today's standards)
  - d. \$24 (~\$677 by today's standards)



## The King of Energy-Efficient Bulbs

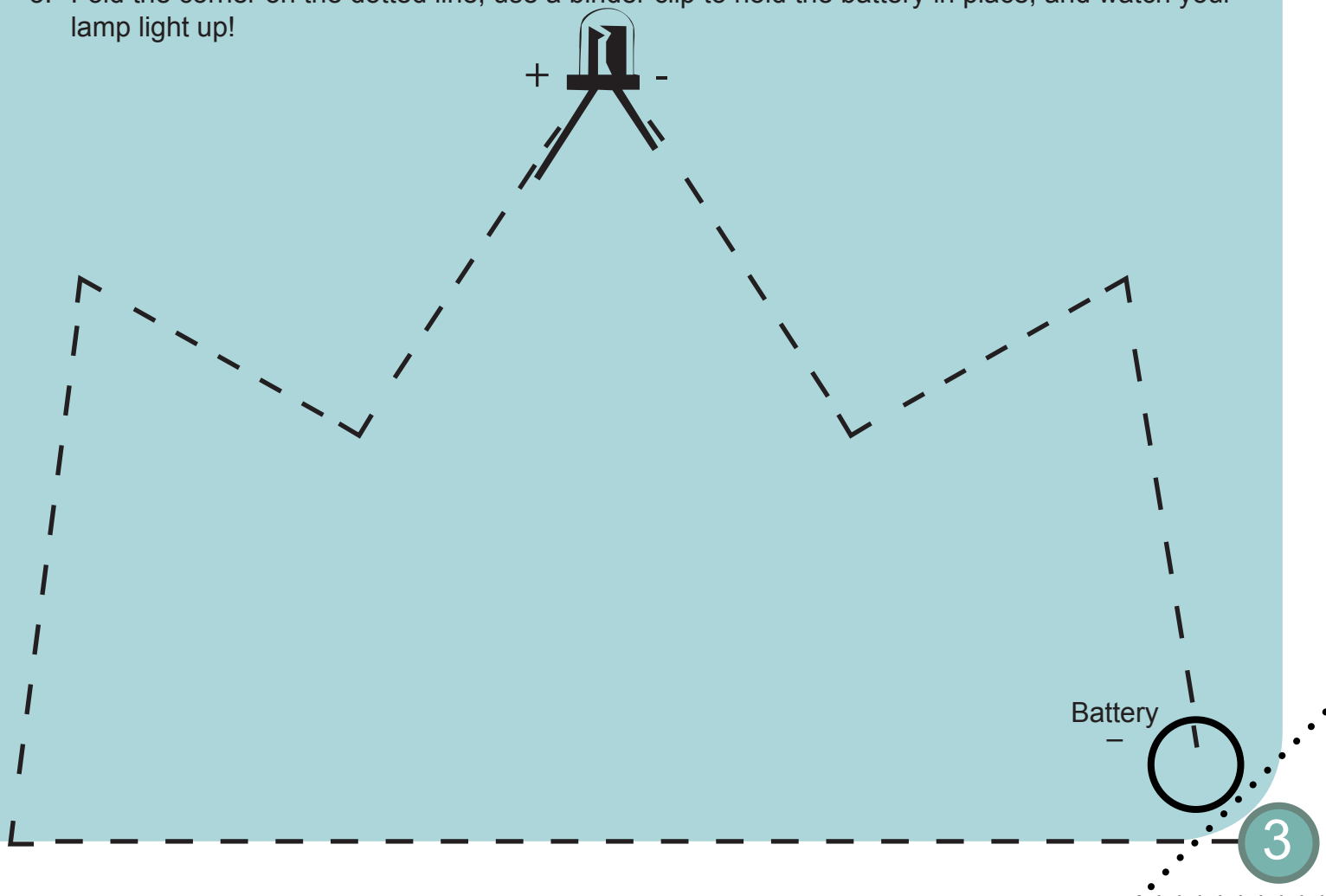
Currently one of the biggest disadvantages of LED light bulbs is the expense. This is because it requires multiple smaller light emitting diodes (LEDs) to make up one normal size light bulb that fits in typical sockets for lamps, ceiling light fixtures, etc. However, the cost of making your own paper lamp is actually quite low! Adult supervision required.

### Supplies Needed:

- 1 3V (volt) coin cell battery (which you can often find in the batteries section of your local pharmacy store or electronics store)
- 1 LED (your local electronics supply store will often sell these in multiple colors, red, orange, green, yellow, white, purple, so pick your favorite!)
- Self-adhesive copper tape (You can often find copper tape at your local arts and crafts store in the jewelry section or at the hardware store in the gardening section)
- a binder clip

### Instructions:

1. Place the copper tape along the dotted lines. (The two pieces of tape should not touch at the top or bottom.)
1. Place the LED on the marked space with the in correct positive/negative orientation and tape the leads down.
2. Place the battery on the marked space with the negative side down, positive side up.
3. Fold the corner on the dotted line, use a binder clip to hold the battery in place, and watch your lamp light up!

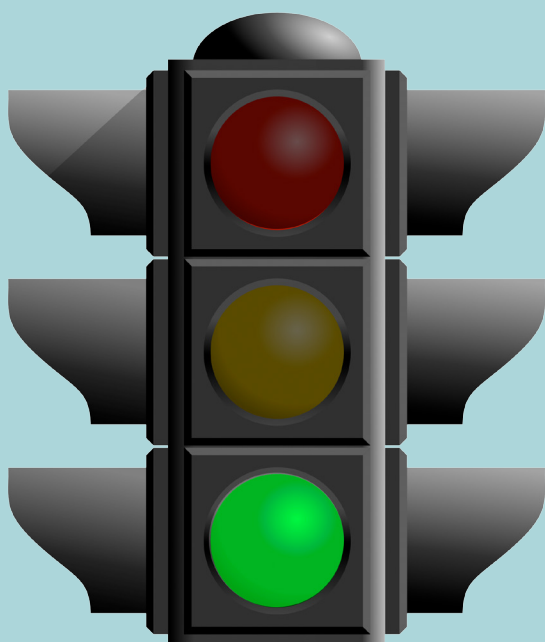


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## Getting the “Green” Light

Picking the best option for light bulbs in your home is not a simple task; there are many factors that you must consider before purchasing, such as initial cost, energy efficiency, and environmental impact. The most common types of light bulbs all have pros and cons in these areas.

Incandescent light bulbs, which have not changed much since they were first invented, are incredibly cheap. However, they are largely inefficient and they will cause you to have a much higher electrical bill. They also give off a lot of excess heat, which could also negatively impact your energy costs since your air-conditioning unit must work harder to compensate for the heat.



Compact fluorescent lamp (CFL) light bulbs are more expensive than incandescent bulbs, but because they are so energy efficient, they will likely save you money in the long run. Unfortunately, CFL bulbs are produced with carcinogens, meaning that if the glass breaks, cancer-causing toxins will be released into your home. Also, the bulbs require special disposal. Another downside is that they do not turn on automatically, but rather, heat and light up over a period of seconds.

Light-emitting diode (LED) light bulbs are relatively new to the market and are currently very expensive. However, they last much longer than incandescents or CFL bulbs and are by far the most energy efficient option available. They cast off almost no excess heat whatsoever. While they are sturdier and less toxic, some users complain that the light cast by LEDs is too unidirectional, meaning that the light does not spread and brighten up a room as well as the light cast by incandescent bulbs.

Please visit our site for more helpful information:

**[STEMsims.com](http://STEMsims.com)**

Answers: Page 2 Answers: 1) d. 2) d. 3) a. 4) b. 5) c.

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