DeSTEMber

CIRCUIT CARDS

Electrical engineering encouragement! Learn how electricity moves through a circuit while designing an LED greeting card.

MATERIALS:

- Cardstock
- Conductive tape (~6 inches)
- 5mm LED
- 3V coin cell battery
- Markers
- Scissors
- Tape

TEKS:

SCI 4/5.4 A: The student is expected to explain how scientific discoveries and innovative solutions to problems impact science and society.

SCI 4.8 C: The student is expected to demonstrate and describe how electrical energy travels in a closed path that can produce light and thermal energy.

SCI 5.8 B: The student is expected to demonstrate that electrical energy in complete circuits can be transformed into motion, light, sound, or thermal energy and identify the requirements for a functioning electrical circuit.

HOW TO:

See pages 2 & 3 for pictures of each step!

1. Cut two pieces of conductive tape, each three inches long.
2. Fold a blank piece of cardstock into the shape of a card, creating a crease down the middle.
3. Open the card. Near the top left edge on the inside, stick the two pieces of conductive tape parallel to each other, about ½ inch apart. Remove the backing from each piece of tape as you apply it.
4. Carefully poke the metal legs of the LED through the cardstock, between the two pieces of conductive tape and approximately two inches from the left edge of the paper.

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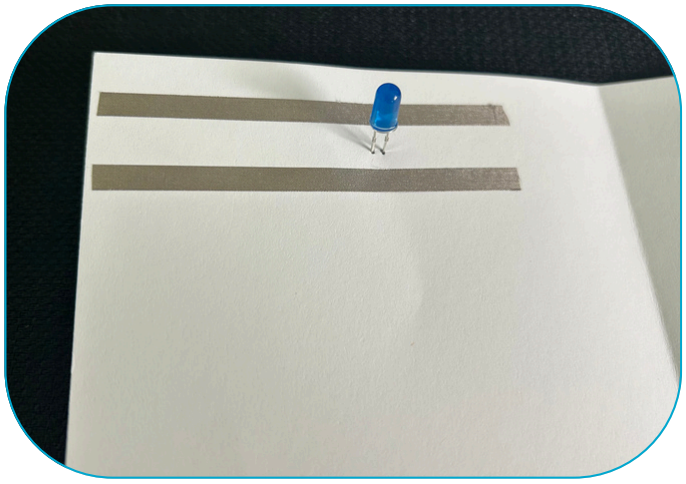
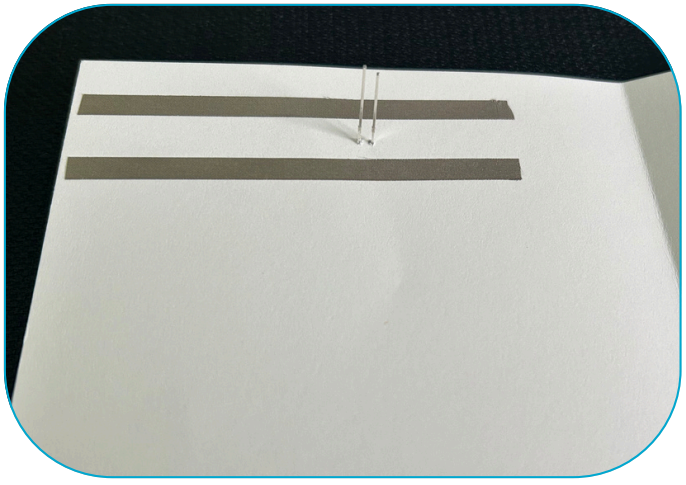
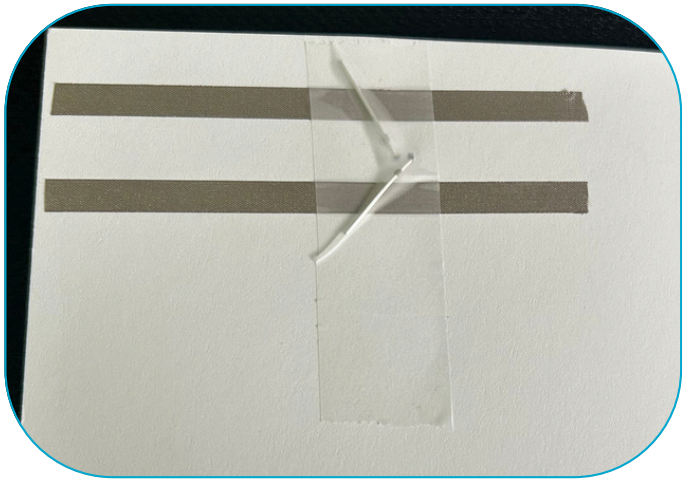
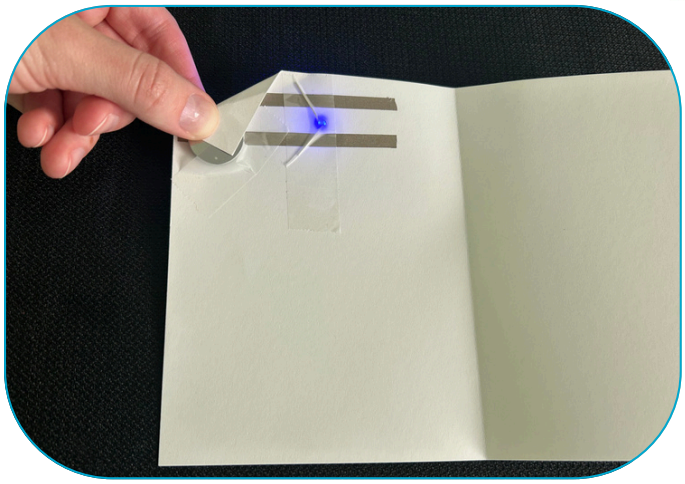
5. Remove the LED. Insert the metal legs of the LED through the holes from the front of the card, so that the light part of the LED stays on the front. The legs should go through to the inside of the card.
6. Look carefully at the LED legs and note which one is longer. Bend the legs apart so they are flat, making sure the longer leg touches the top piece of tape and the shorter leg touches the bottom piece of tape.
7. Use clear tape to secure the LED legs in place.
8. Place the battery on the left side of the card, with the positive (+) side facing up. The battery should only touch the bottom piece of tape.
9. Secure the battery with clear tape, leaving a bit of the top edge of the battery uncovered so it's exposed.
10. To complete the circuit and light up the LED, fold the top left corner of the card over so that the top piece of conductive tape makes contact with the exposed top edge of the battery. Your LED should now light up.
11. Use markers to decorate the front of the circuit card, write an encouraging message inside, and give it to a friend or family member!









STEM EXPLANATION:

What caused the LED in your card to illuminate? A circuit! A **circuit** is a path that electricity travels through to make things work, like lights, toys, or computers. When the path is complete, electricity can flow from a power source, through a conductor, to something like a light bulb, making it light up. In the circuit card you just created, the coin cell battery was the power source, the conductive tape was the conductor, and you connected them to make the LED illuminate!

Circuits are all around us—they power everything that needs electricity to work. Electrical engineers are circuit-building experts! They design all types and sizes of circuits, from those powering small smartphones to giant refrigerators–or rocketships–and ensure they work safely and efficiently.

CAREER: ELECTRICAL ENGINEER

Electrical engineers design and build the systems that make lights, computers, and other electronics do fun and useful things!

MEET AISHA LAWREY!

Aisha is an electrical engineer and STEM advocate! Motivated by a high school teacher who introduced her to engineering, Aisha has dedicated her career to solving problems through math and science, while encouraging more women and minorities to enter STEM careers. She has over 20 years of experience working for companies, a university, and the government, and Aisha currently lives in Maryland with her husband and 12-year-old twins.

Learn more about Aisha!

RESOURCES

https://www.sciencebuddies.org/stem-activities/paper-circuit
www.ifthencollection.org/