

5. Place the LED in the middle of the clothespin, with one leg on each side. Bend the legs apart to avoid contact, then secure them with electrical tape to prevent a short circuit.
6. Run the wires along each side of the clothespin, wrapping them neatly. Wrap the negative wire around one clamp side and the positive wire around the other clamp side.
7. Use electrical tape to secure the wires to the clothespin, leaving the stripped ends exposed inside the clamp.
8. Place the battery in the clamp to light the LED, ensuring the positive wire touches the positive battery side and the negative wire touches the negative side. If it doesn't light up, flip the battery or check for circuit issues. Remove the battery to turn it off.
9. Wrap pipe cleaners around the clothespin to create antlers, face, and body. Avoid twisting them with the stripped wires to keep the circuit working.
10. Add googly eyes above the LED to complete the face. Insert the battery into the clamp, ensuring it touches the stripped wires, and watch your reindeer light up!

STEM EXPLANATION:

A **circuit** is a path for electrical current to pass through. The components of the circuit in this activity include a battery, wires, and LED light. Chemical energy from the battery transforms into electrical energy to travel through the wires to the LED. Once this energy reaches the LED, it causes the LED to light up. When the circuit is incomplete, or open, the wires are not connected to the battery and therefore there is no flow of electricity. To make the LED light up, the battery must be connected to the wires. This makes a closed circuit through which the electric current can pass.

CAREER: ELECTRICAL ENGINEER

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



MEET JESSICA ESQUIVEL!

Jessica Esquivel is a particle physicist at Fermilab, where she studies tiny particles called muons to uncover the mysteries of the universe. She holds a Ph.D. in physics and a bachelor's degree in electrical engineering, making her one of the few Black women in the U.S. to achieve this distinction. Jessica is passionate about increasing diversity in STEM and inspires young scientists by sharing her journey and showing that physics is for everyone!



Learn more about Jessica!

RESOURCES

<http://www.steampoweredfamily.com/activities/circuit-bugs/>
www.ifthencollection.org/