



Light in the Window

Teaches the basics of copper tape circuits with switches.

Project Type: Intro Technology

Group/Individual: Individual

Lesson Plan Audience: Maker Mentor

Time: 45min - 1.5hr

Hard Skills: circuit building, intro to conductive materials, narrative development

Soft Skills: Resilience and patience, Problem Solving, Literacy,

Ideal # of Participants: 1 - 15

Age Group: 6 +

Library Resources: "The House in the Night" by Susan Marie Swanson, illustrated by Beth Krommes

Ideas for Taking it Further: This lesson plan is for a 2D light up drawing, some participants may want to take it into the 3D realm. This can be done easily with a shoebox or other small box. Or participants could use black scratch off paper to make illustrations that mimic Beth Krommes'.

Difficulties/Tips: Copper tape circuits work best when the tape is stuck down to a surface well. Fewer folds and turns with the tape also helps with conductivity. Be sure to work with high quality copper tape that is at least ¼inch wide.



Materials:

LED lights (at least 1 per participant)	Drawing materials
Circuit template attached to this lesson plan	Old keys
Copper tape	String
Coin cell battery	Tacs
8x10 piece of cardboard, oak tag, or thick paper	

Steps:

1. Read "House in the Night," by Susan Marie Swanson.
2. Tell the Makers they will be making their own "home full of light." Instruct the children to use the drawing materials available to draw a home in the night. They may want to use black paper for the night sky or other collage materials. Tell the children to think about where they would like the light to be. The drawings can be done directly on oak tag or heavy paper or made on a regular sheet of paper and then glued to a piece of cardboard.
3. Once the Makers have finished the drawings of their home instruct them to make two holes, a cm or less apart, with the tac where they want their light to be.
4. Have the Makers cut out the circuit template and glue it to the back of the oak tag or cardboard. The diagram labeled LED on the template should line up with the holes made for the light.
5. Once the template is glued in place hand out the lights and batteries. Have the Makers tinker with the light and battery to discover how it works. Make sure they understand that one side of the battery is positive and one is negative and that the same is true for the LED light.
6. Have the Makers poke the legs of the LED lights through the holes in their drawing. Once the leg are through mark the positive side of the light by bending it a little. Then separate and bend the legs so that the copper tape can be placed on top of them.
7. Following the template stick the tape over the legs of the LED around to the battery. Teach the Makers to fold the copper tape when turning a corner. Make sure Makers are leaving a break for the switch. The copper tape should go under the battery on the negative side and over it on the positive. You may want to use a piece of masking tape to secure the battery in place.
8. Hand out a key or other piece of conductive material (penny, piece of copper tape...) to every Maker. Let them experiment with completing the circuit with their switch. Does the light go on? This may take some trouble shooting.
9. Once the circuit works you may use the string to tie the key to the finished piece of artwork. When the maker wants to turn their light on they simply complete the circuit with the key.



