

Robot Pop-up Card Directions

The Robot Pop-up Card Kit contains everything you need to make one robot pop-up card for a fun activity that also teaches how to build a circuit.

Included with the kit are extra stickers and plenty of copper tape to build the Robot Pop-up and even make a creation of your own. If you have never built a circuit or worked with copper tape before, this activity is a great place to start.

Time to complete: Approximately 40 minutes

Kit Contents

- One card
- One envelope
- One robot cutout
- Five gears
- Three stars
- Six feet (1.8 m) of ¼ inch (6.4 cm) copper tape
- Six Chibitronic Circuit Stickers (two each in red, blue, and yellow)
- One piece of rectangular cardstock to use for a switch
- One 3v coin cell battery
- One spiral paperclip
- Glue dots



Tools you will need (not included)

- Scissors
- Tape measure or ruler
- Pen or pencil
- A tool with a smooth, flat edge (i.e. a letter opener, a butter knife, etc.)

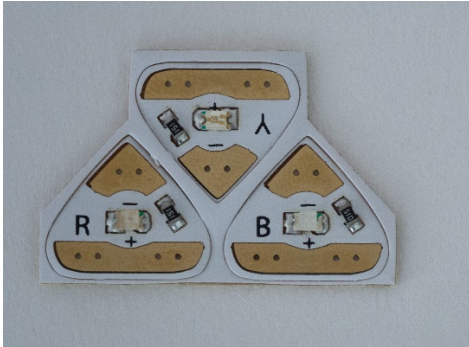
IMPORTANT: Please do the [circuit tutorial](#) first if you have never built a circuit!

Directions

Step 1: Get familiar with Chibitronic Circuit Stickers

Chibitronic stickers are polarized so one side needs a positive connection and the other needs a negative connection. Chibitronic stickers have the positive charge on the broad side of the sticker.

Note the gold strips on the lights. The lights' undersides have the same strips. These are the conductive surfaces that you need to ensure are in contact with the copper tape. The adhesive on the stickers is conductive so it helps ensure a consistent connection. It is also important to make sure that the stickers are in firm contact with the copper tape.



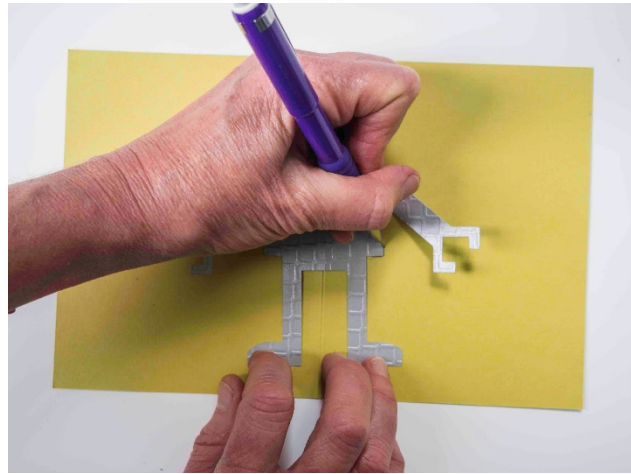
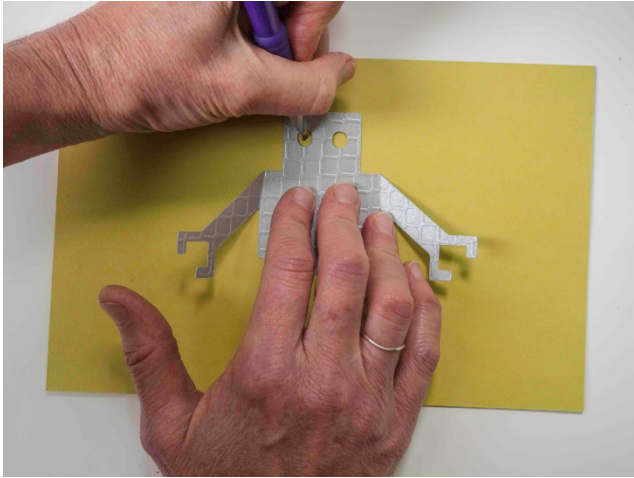
Step 2: Set up the circuitry layout:

Before doing anything else, you will first mark the location of the robot and its eyes. This ensures that the copper tape is properly placed so that all connections can be made, and the robot is in the correct position to pop up when the card is opened.

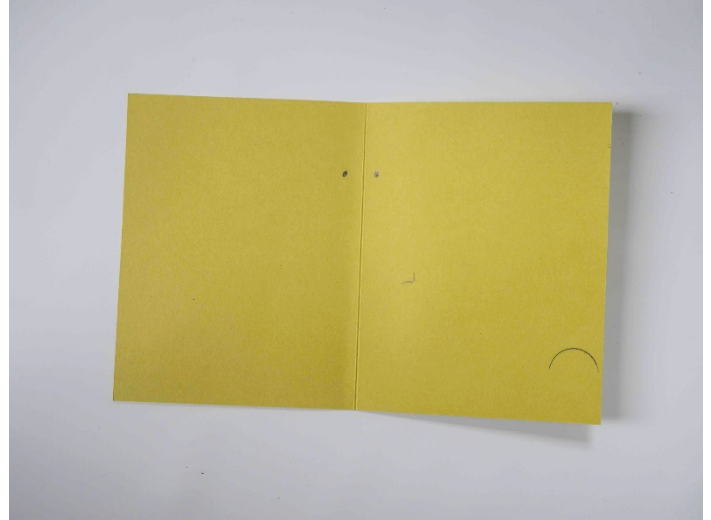
- To do this, first fold the robot along the fold lines. Note that I have the front with diamonds recessed and the cross-hatched lines raised, but you choose which surface you prefer. The arms fold the *opposite direction of the body fold*.
- Place the robot on the card so that the body fold line is aligned with the card fold.



- Using a pen or pencil, mark the center of the eyes and the bottom right corner of the robot body for placement. The lights have polarity, so make sure that the positive and negative sides of the lights match the positive and negative sides of the battery. For more on polarity, see the [electricity tutorial](#).

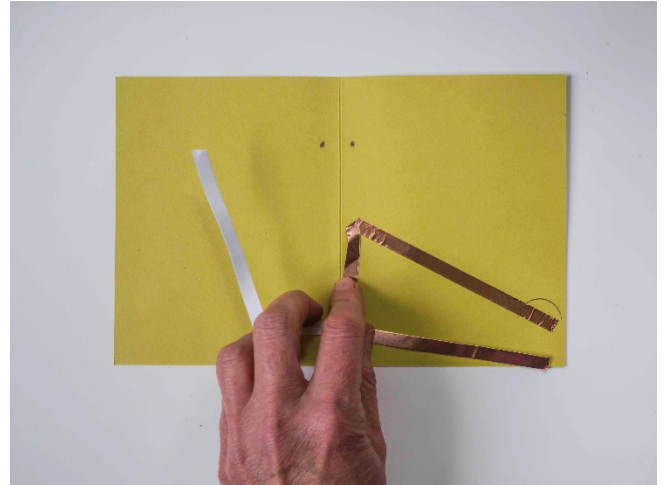
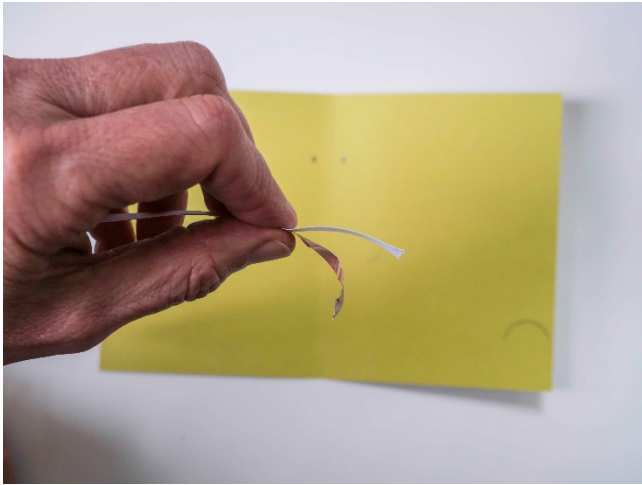


- Place the battery in the lower right corner of the card and trace around it to mark the placement so you know where to lay the copper tape.

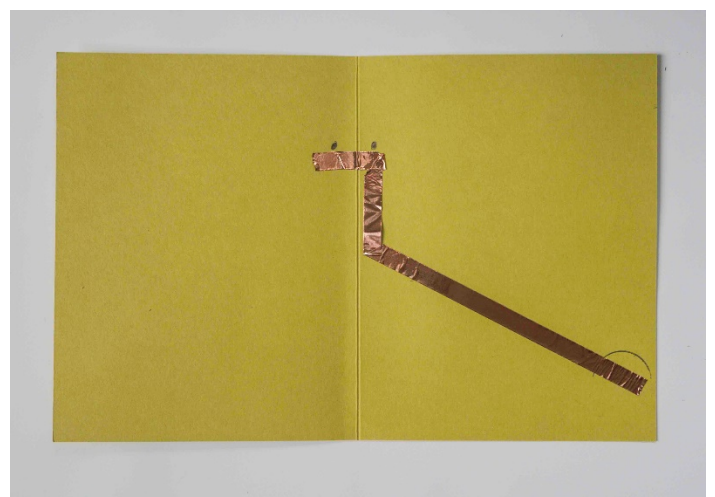
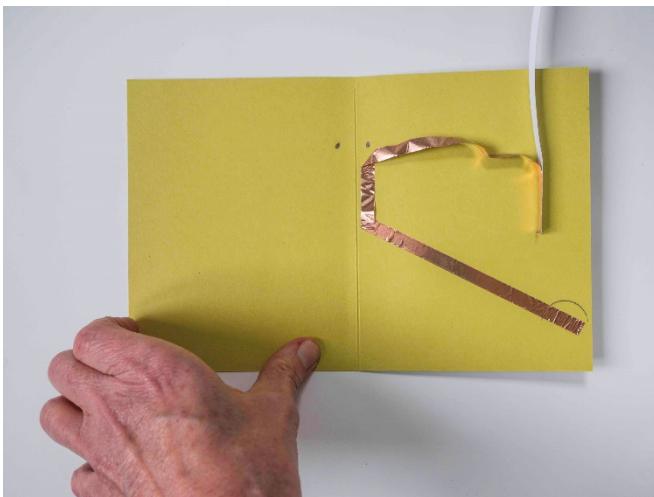


Step 3: Place the first piece of copper tape

- Cut seven inches (18 cm) of copper tape. Peel the adhesive backing off of one inch of tape and stick it to the card over the spot where the battery will go. Take care to angle it toward the right corner of the robot body that you marked. Continue laying down the copper tape until it is directly below the right eye mark.
- Fold the tape back on itself vertically toward the bottom of the card, then fold it up toward the top of the card to create a corner angled straight to the right eye.

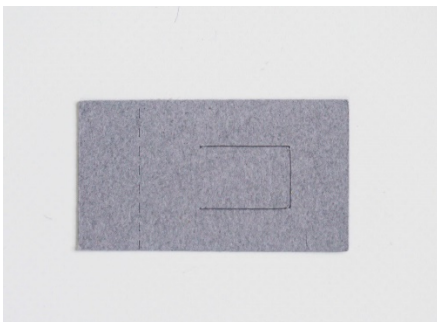


- Stick the tape down until about 1/8" below the right eye mark. It needs to be close enough to ensure that the conductive surface of the light will touch the copper.
- Fold the tape toward the left and place it horizontally until just past the left eye. Cut off any remaining tape.



Step 4: Place the second piece of copper tape and add the switch

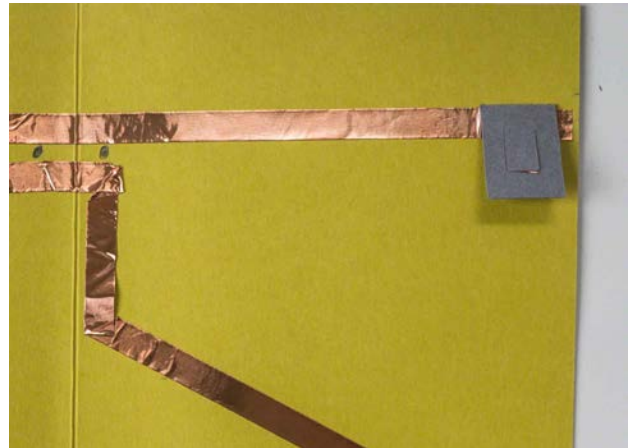
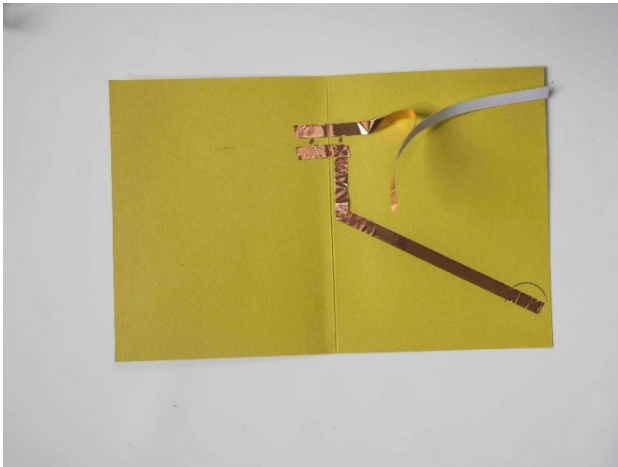
- The switch to turn the lights on and off is built out of the rectangular piece of gray cardstock. Note the perforation marks on it.



- To turn it into a switch, attach a piece of tape on the tab that is in the middle of the switch, extending it about 1/8 inch (.3 cm) over the top fold.



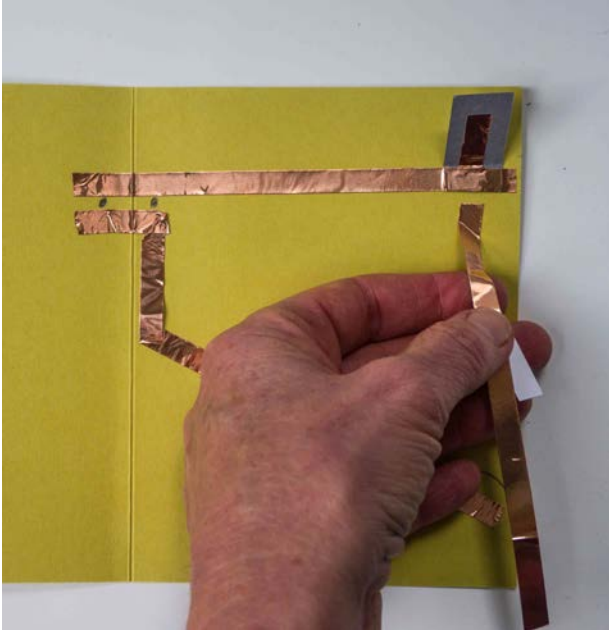
- Cut another piece of copper tape that is the length from the left eye to the right side of the card, about five inches (12.7 cm).
- Adhere the tape horizontally starting from directly above the left eye. Stop about one inch from the end to add the switch.



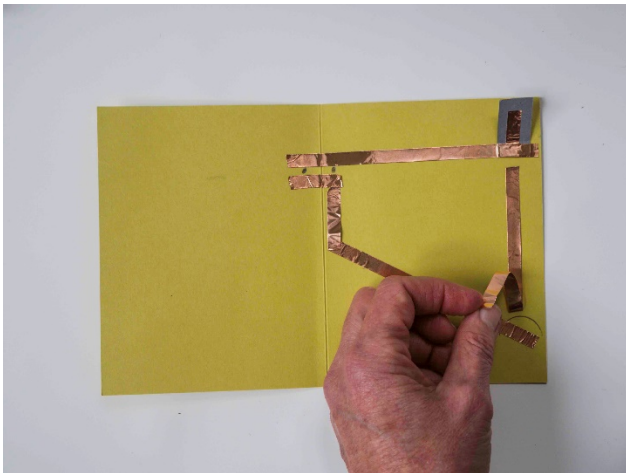
Step 5: Place the final piece of copper tape and secure the switch

The last piece of tape runs vertically from the switch to the battery. At the battery end, you will make a tab to place over the battery.

- Measure from the horizontal piece of tape to the bottom of the card. Add one inch (2.54 cm), and then cut a piece of copper tape to that length.
- Start placing the copper tape vertically starting about 1/8 inch (3.175 mm) *below* the horizontal tape, lined up with the vertical tab on the switch. Continue until just above the mark for the battery.



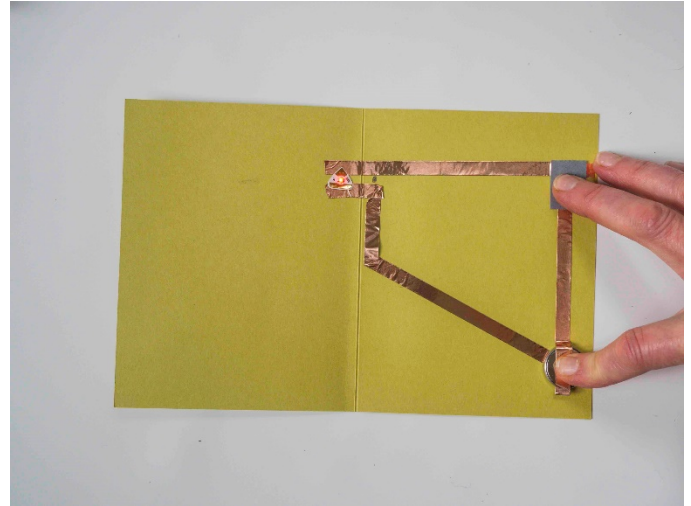
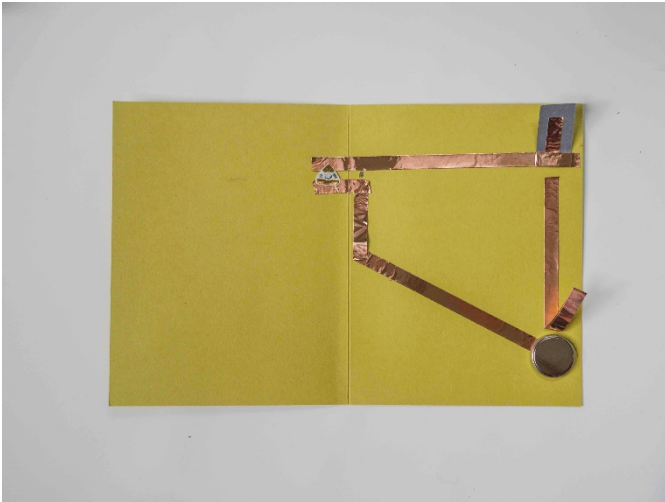
- Create a tab with the remainder of the tape by folding the end back and pressing the adhesive surfaces together.



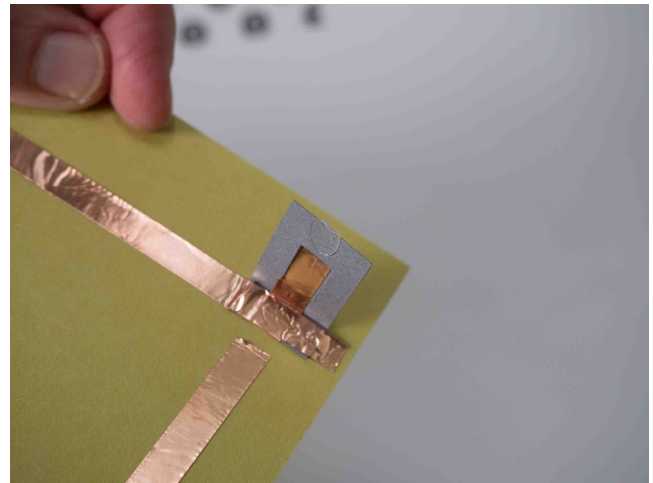
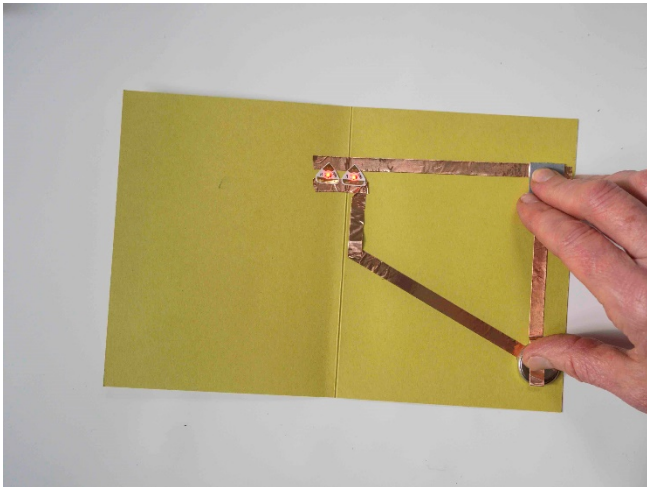
Step 6: Attach the Chibitronic Stickers and test the connection

- Place a Chibitronic sticker over one of the eye marks, with the positive side on the bottom strip of copper tape.

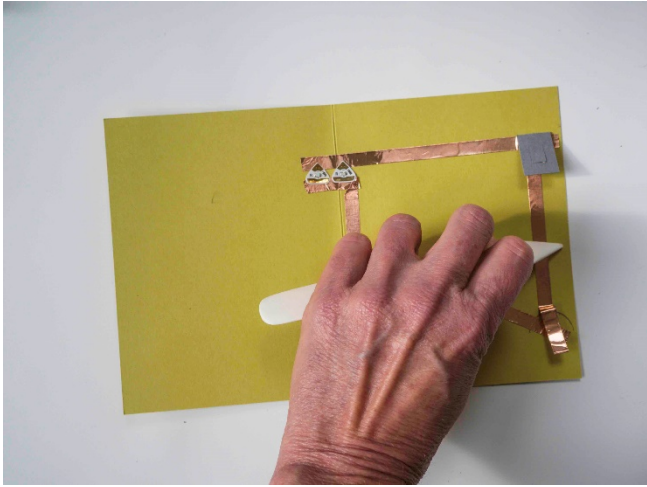
- Place the battery over the battery mark, positive side down.
- Place the tab you made with the end of the tape over the battery and hold it down while simultaneously pressing the switch.



- Does the light work? If so, go ahead and repeat the steps to connect the second eye. Test to be sure the connection is good.
- Use a glue dot to secure the bottom of the switch to the vertical piece of copper tape.



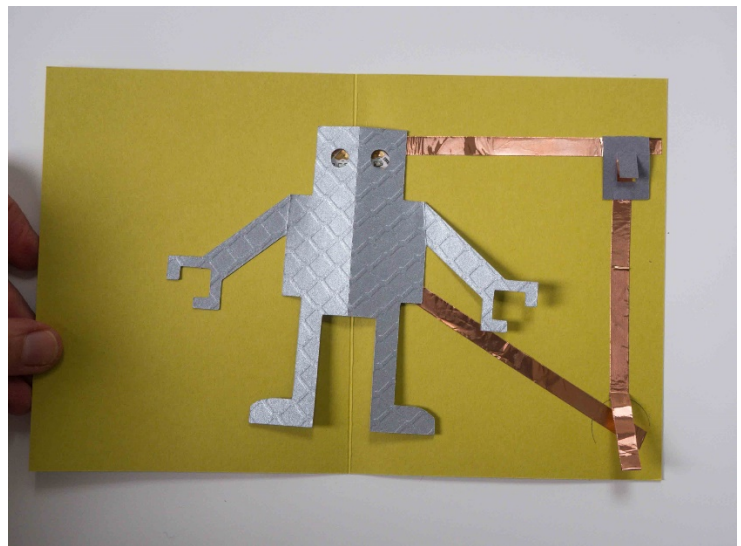
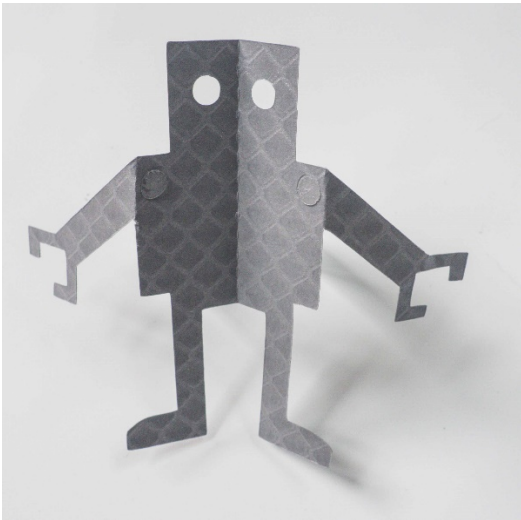
- Press any wrinkles out of the copper tape using the the tool you've chosen with a smooth flat edge.

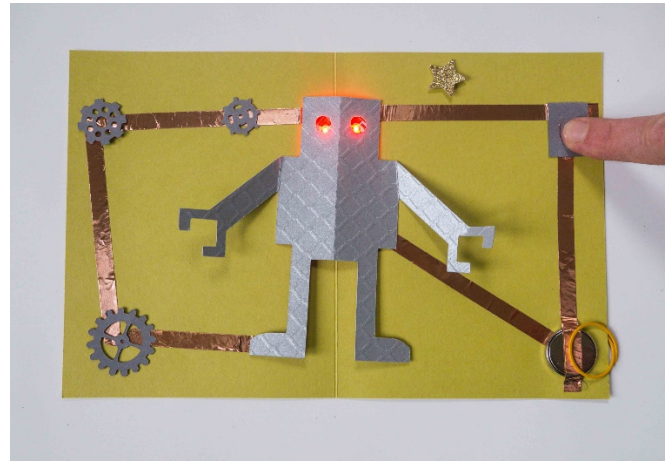
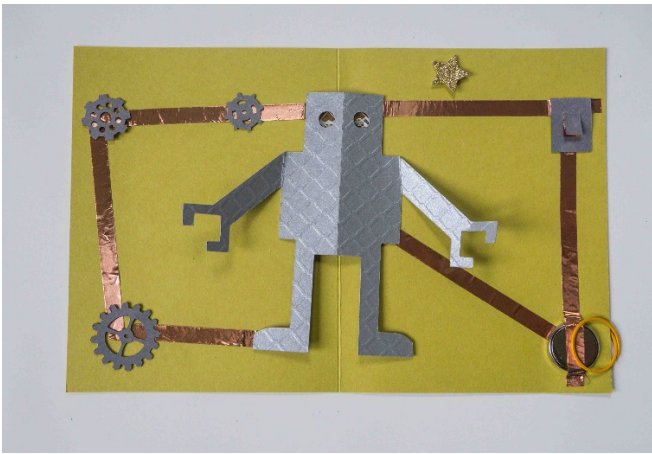


- If the light is not working, then check the troubleshooting guide at the end of this document for help.

Step 7: Decorate the Card

- Place glue dots on the shoulders of the robot. Place the robot flat on the card so the lights show through the eyeholes, then press on the glue dots to hold the robot in place.
- Use the spiral paper clip to hold the battery in place.
- Decorate the card with the gears, stars, and remaining copper tape, taking care to ensure that the tape does not touch the circuit.





Having trouble with getting your LED circuit to work?

Try the following:

- Make sure the positive side of the light is connected to the copper tape that is touching the positive side of the battery.
- Check to see if the Chibitronic stickers are in firm contact with the copper tape.
- Make sure the positive side of the battery is touching the copper tape that connects to the positive side of the Chibitronic stickers, and the negative side of the battery is connected to the copper tape that connects to the negative side of the stickers.
- Does the copper tape have any rips that are breaking the connection?
- Check to see if there are any places where the positive side of the tape touches the negative side without going through a sticker. (This would be a short circuit.)
- Make sure the conductive edges of the lights are overlapping the copper tape enough to make a solid connection.
- Firmly press around the edges of the lights and anywhere the copper tape overlaps to make sure the connection is good.
- If all else checks out, then try a new 3V coin cell battery.