"Circuit-Tree" the Singing Tree

Make a singing Christmas tree from scratch using a micro:bit and our Crazy Circuits Bit Board!

Written By: Natasha Dzurny



INTRODUCTION

Make a singing Christmas tree from scratch using a micro:bit and our Crazy Circuits Bit Board!

TOOLS:

- Computer (1)
- Hot Glue Gun (1)
- Utility Knife (1)
- Acrylic Paint (1)
- Duct Tape (1)

PARTS:

- Crazy Circuits Bit Board (1)
- micro:bit (2)
- 2 AAA Battery Holder (1)
- Crazy Circuits Screw Terminal Chip (1)
- Maker Tape (1)
- Brick Compatible 270 Degree Servo (3)
- Extra Large Googly Eyes (1)
- Felt (1)
- Cardboard (1)
- Pipe Cleaners (1)
- Evergreen Pipe Cleaners (1)

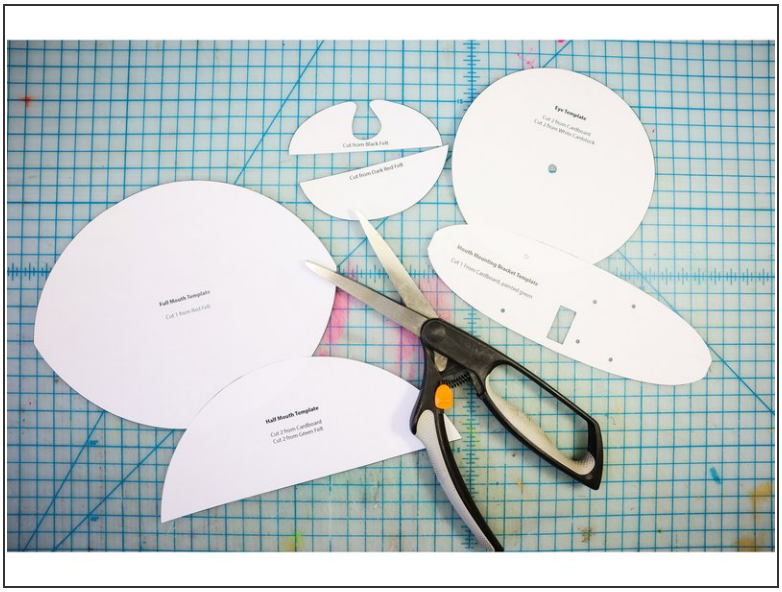
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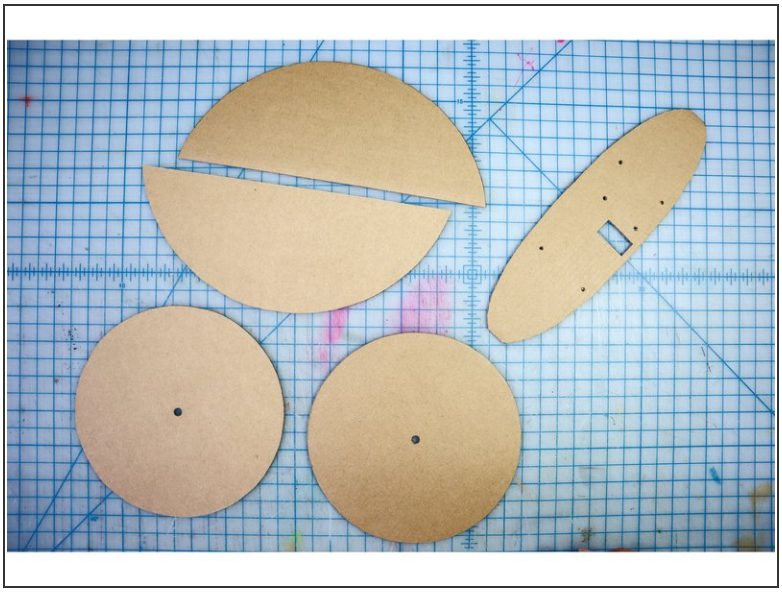
Step 1 — "Circuit-Tree" the Singing Tree



- Gather materials.

Step 2 — Cut out the template and cardboard



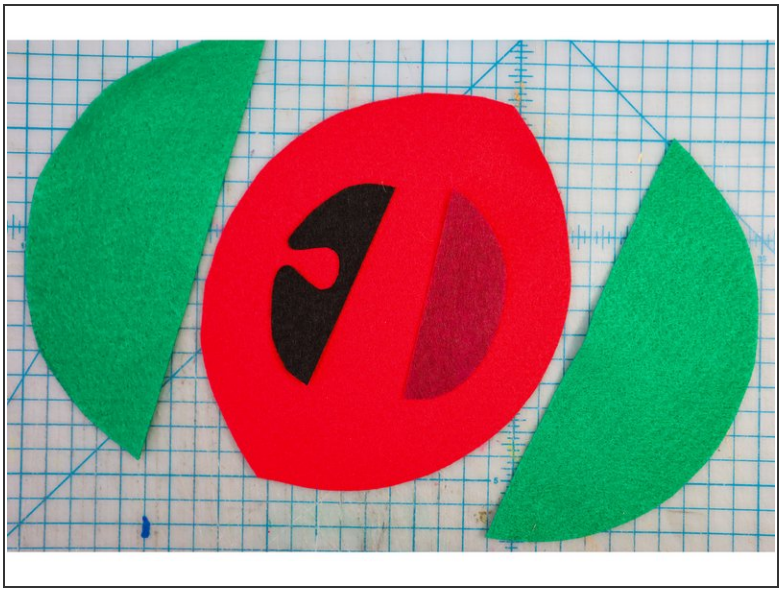


- Print and cut out the paper templates.
- Cut out each template according to the instructions written on it. Some templates will be cut from multiple materials.
- Start by cutting out all of the cardboard pieces. *The eye circle is set for a 6-inch googly eye. If your googly eyes are a different size, make this piece match the size of your eyes.

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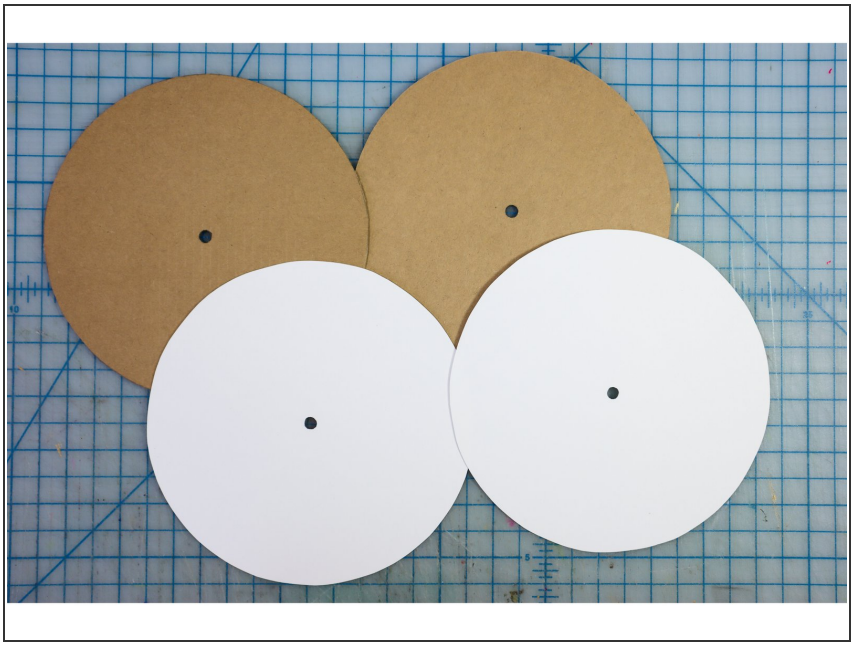
Step 3 — Cut out the felt pieces





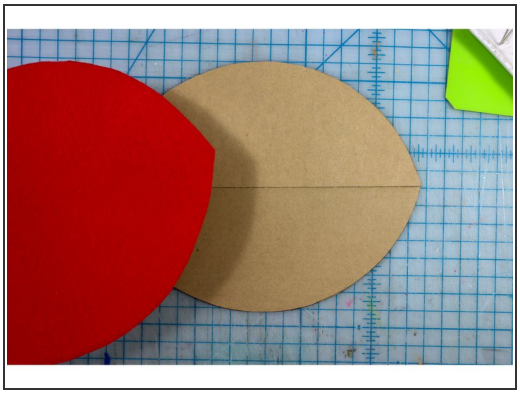
- Cut out the felt pieces as shown.

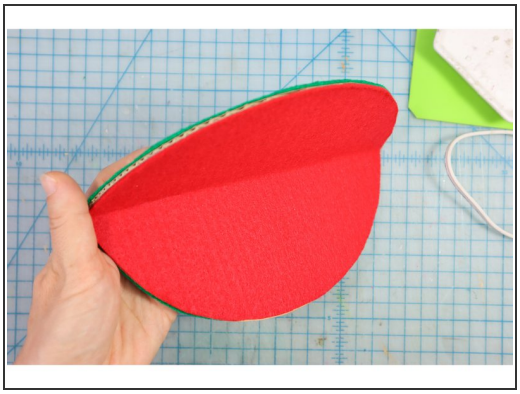
Step 4 — Cut out the white circles

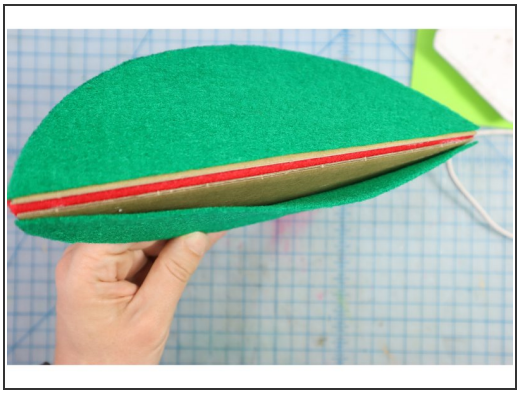


- Cut out the circles from white cardstock. If you don't have white cardstock, you could paint the cardboard circles white or reuse the googly eye circles.

Step 5 — Glue the mouth together



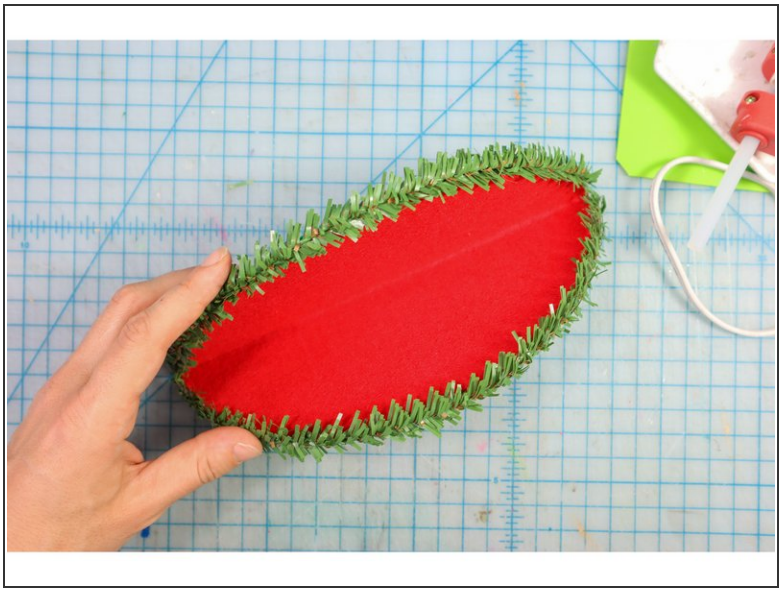




- Place the cardboard mouth pieces together as shown, and glue the red felt piece on top of it.
- Glue the green felt pieces to the other side of the cardboard. One of the green pieces should be glued down completely. The other should only be glued around the round edge, creating a "pocket" to insert the popsicle stick into later.

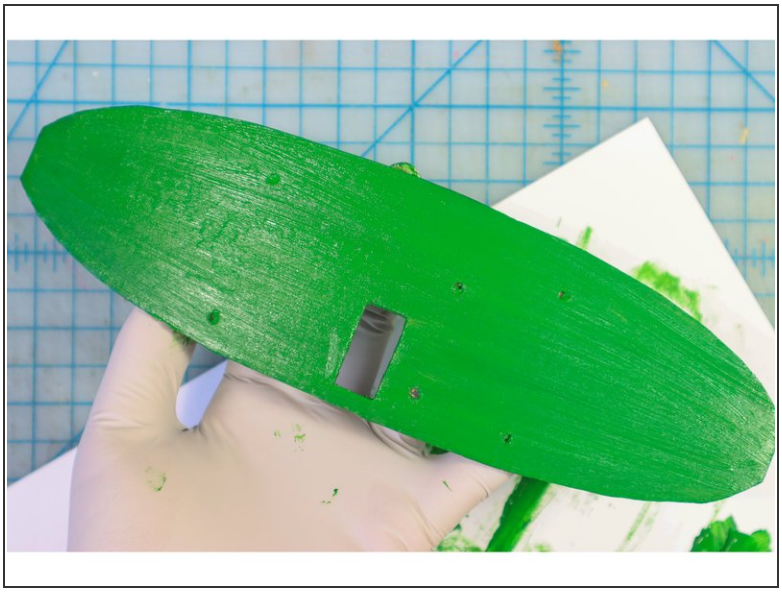
Step 6 — Add the edges

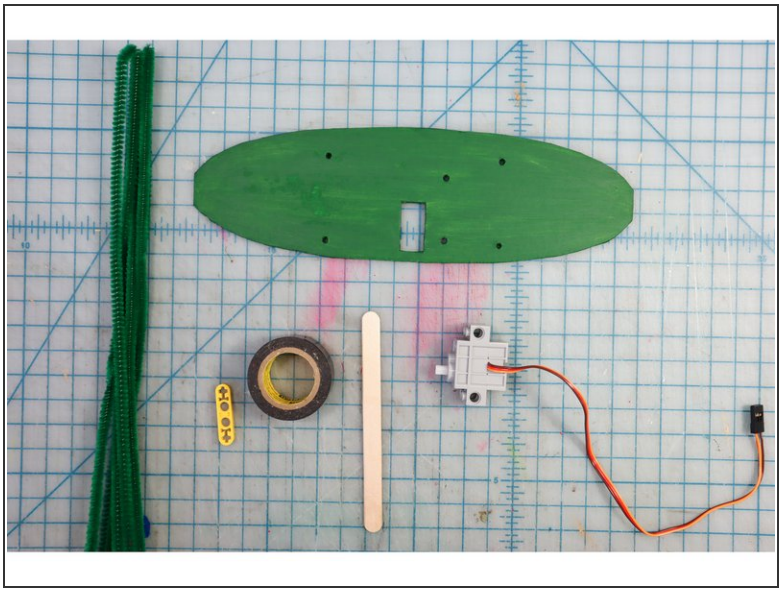




- Glue evergreen pipe cleaners or green garland to the edges of the lips as shown.

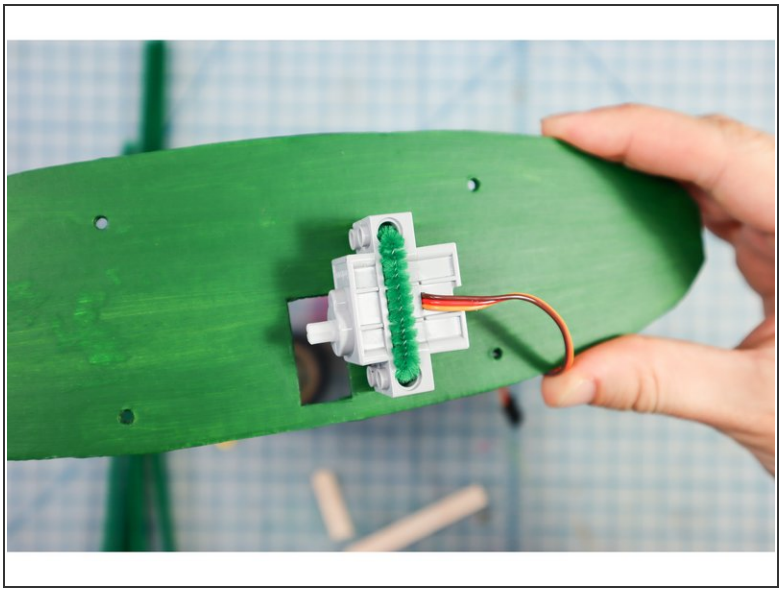
Step 7 — Paint the backplate

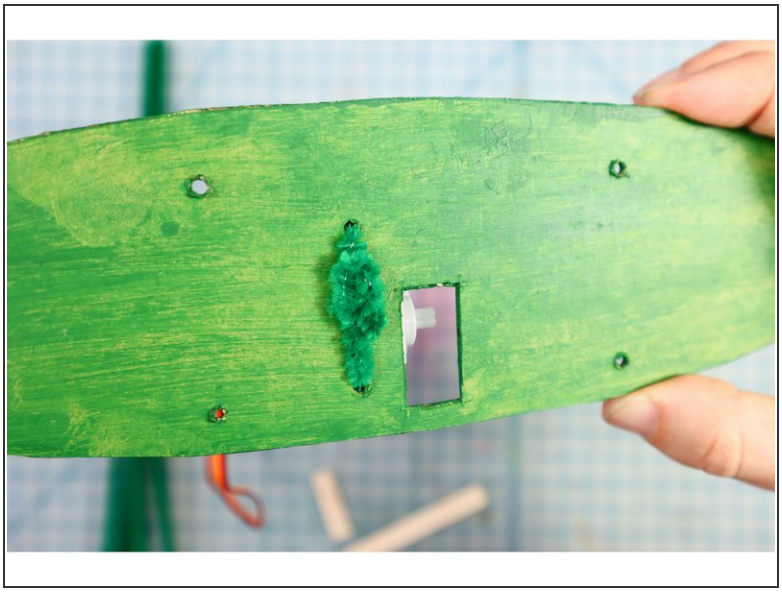




- Paint the backplate green to make it blend into the green branches.

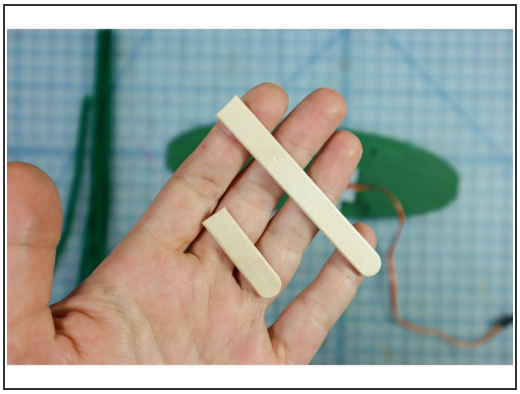
Step 8 — Attach the Motor

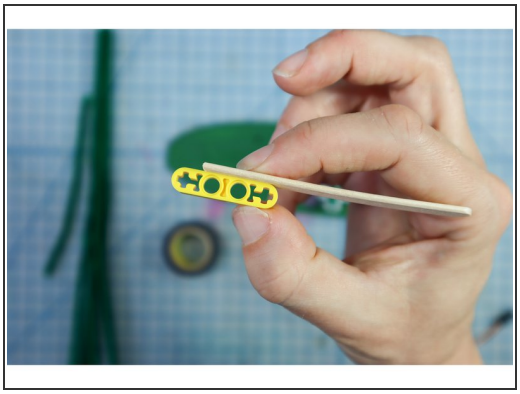


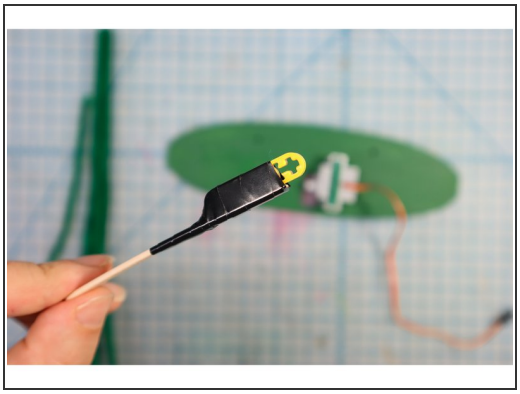


- Use a pipe cleaner to attach the motor to the backplate as shown.

Step 9 — Connect the popsicle stick

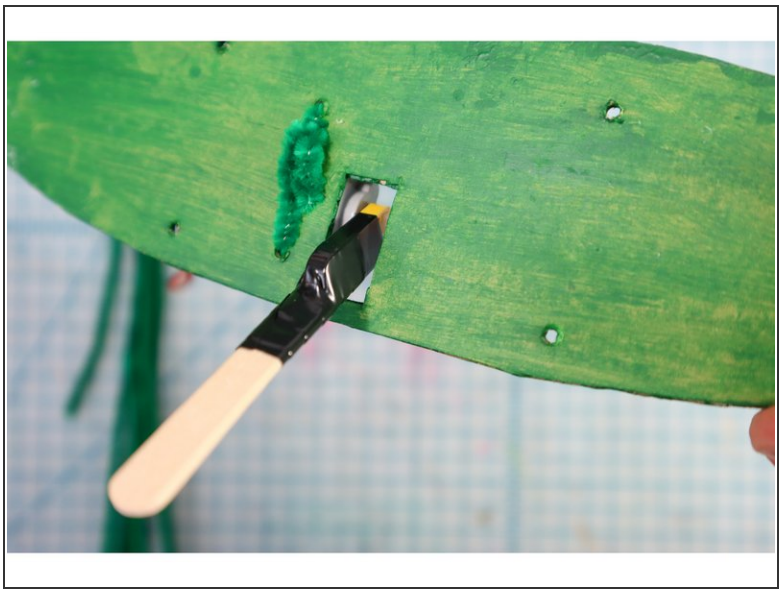


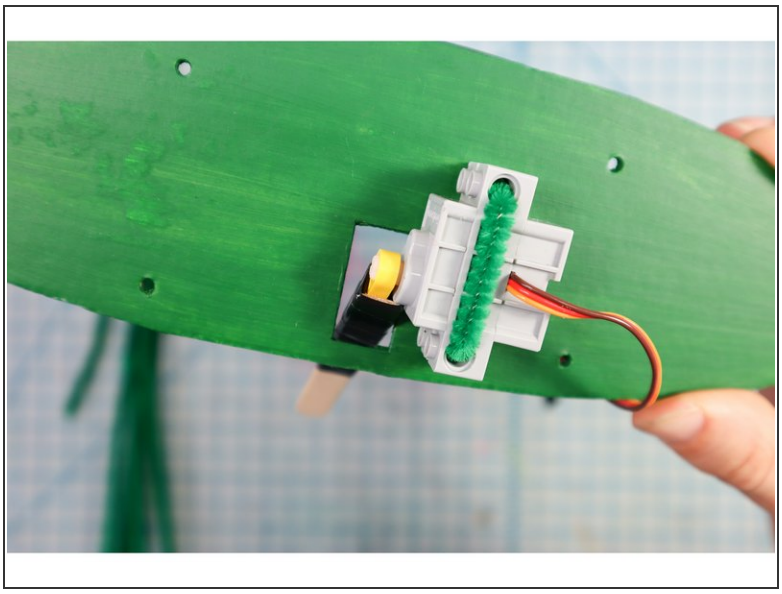




- Trim the popsicle stick so that it is 3 inches long.
- Use electrical tape to attach it to the LEGO, making sure not to cover the "+" at the end, as shown.

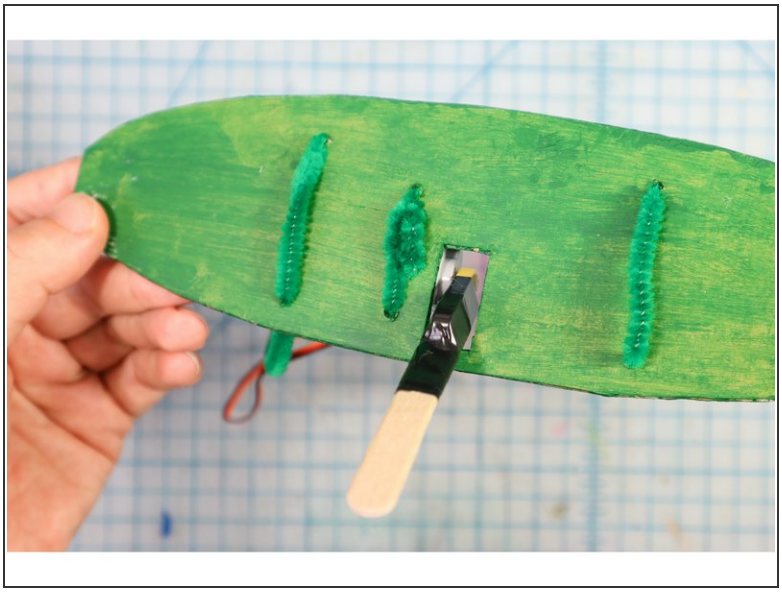
Step 10 — Connect the stick to the motor

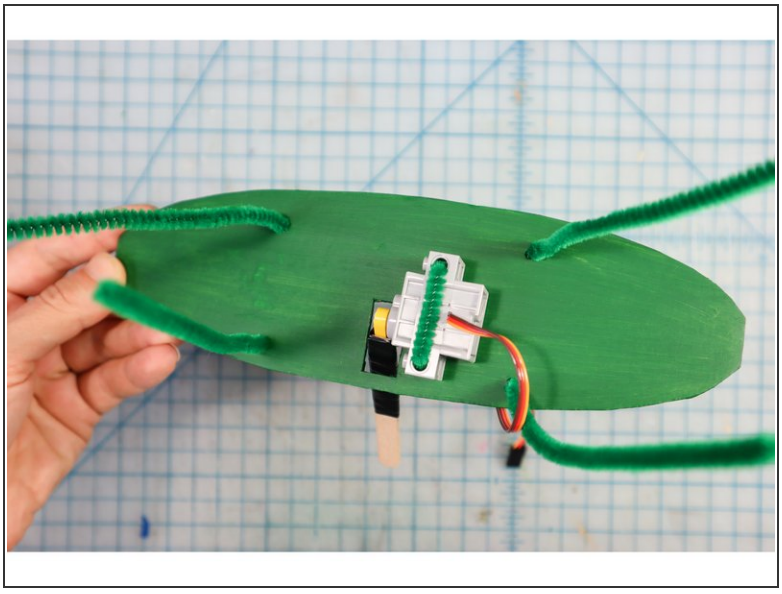




- Connect the stick to the motor, placing it through the hole as shown.

Step 11 — Add pipe cleaners

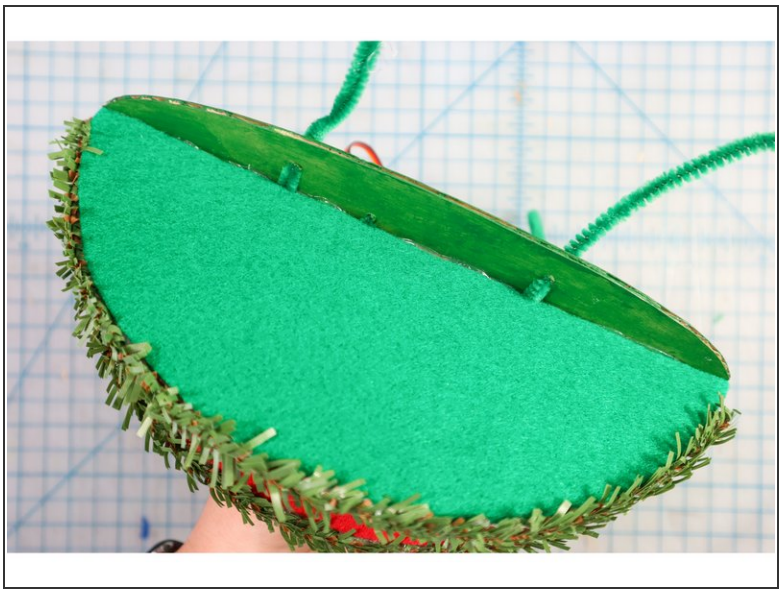


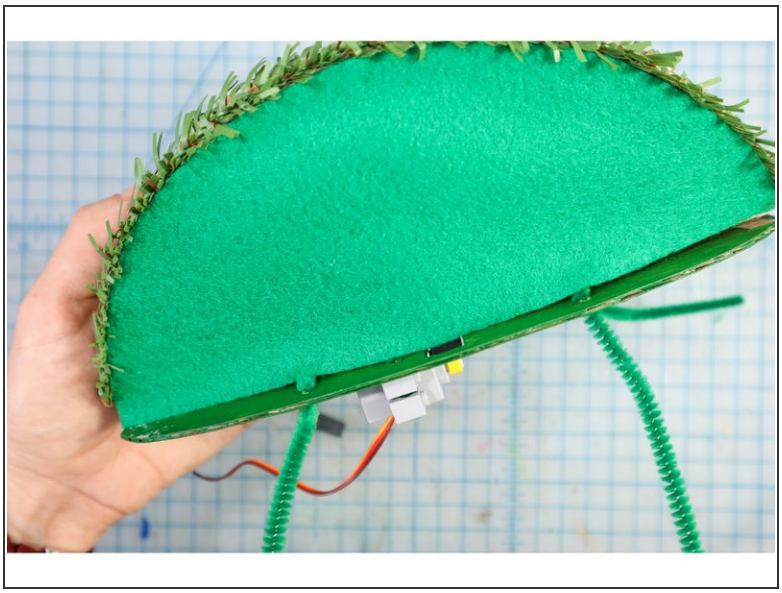


- Add pipe cleaners through the remaining holes as shown. These will be used like giant "twist ties" to tie the backplate to the trunk of the tree.

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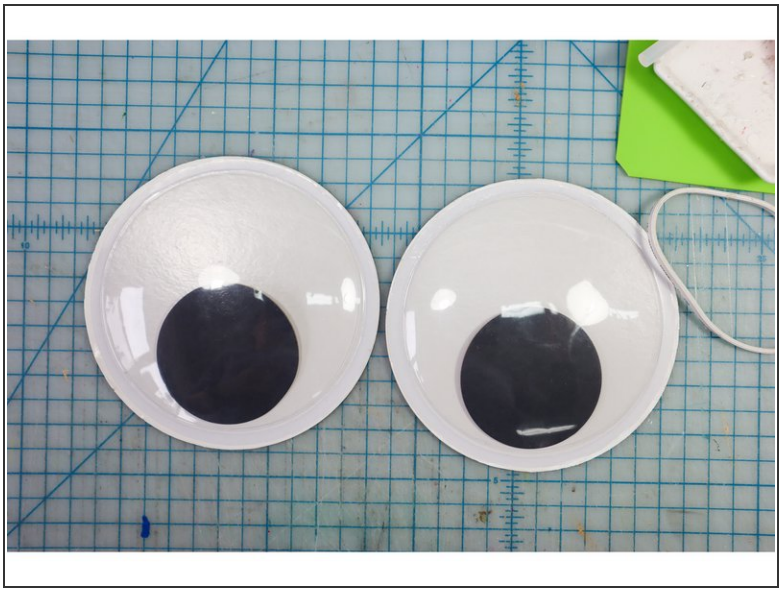
Step 12 — Glue the mouth to the backplate

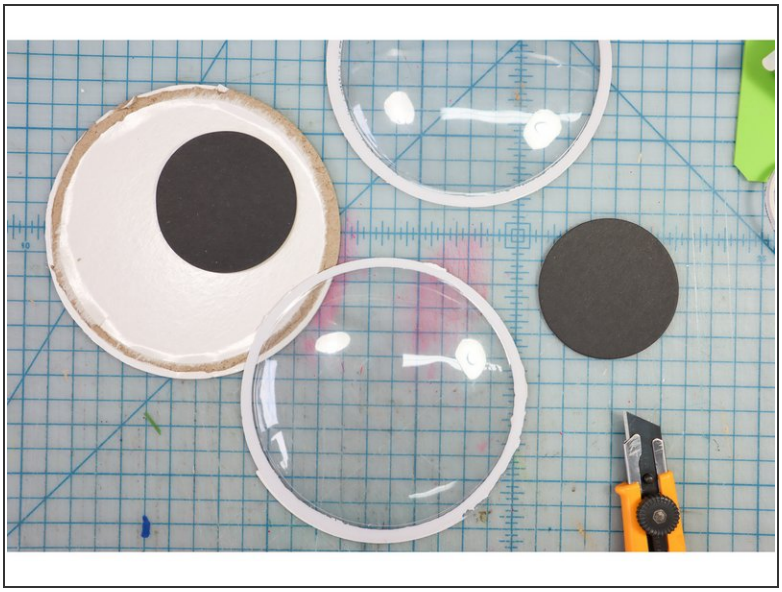




- Slip the pocket in the mouth over the popsicle stick and center it on the backplate.
- Apply hot glue to the joint at the top of the mouth only (so that the bottom is free to move up and down), and glue it to the backplate at 90 degrees.

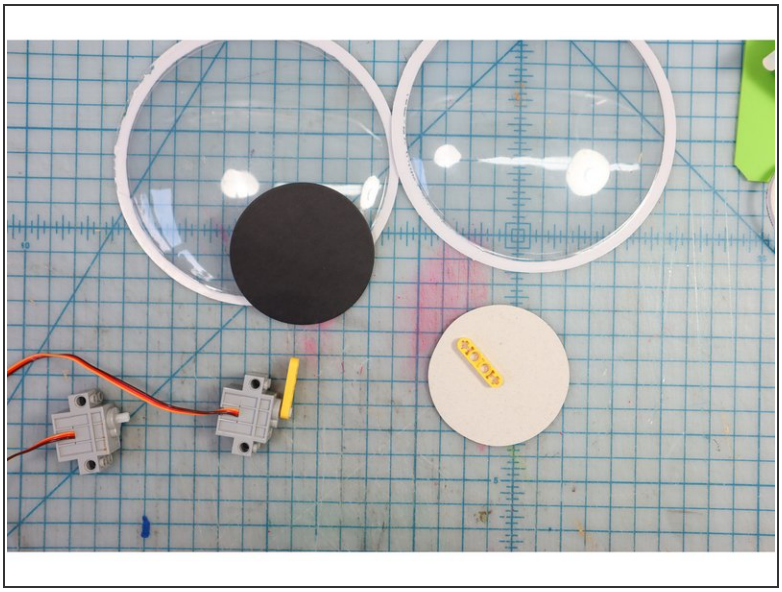
Step 13 — Disassemble the Googly Eyes

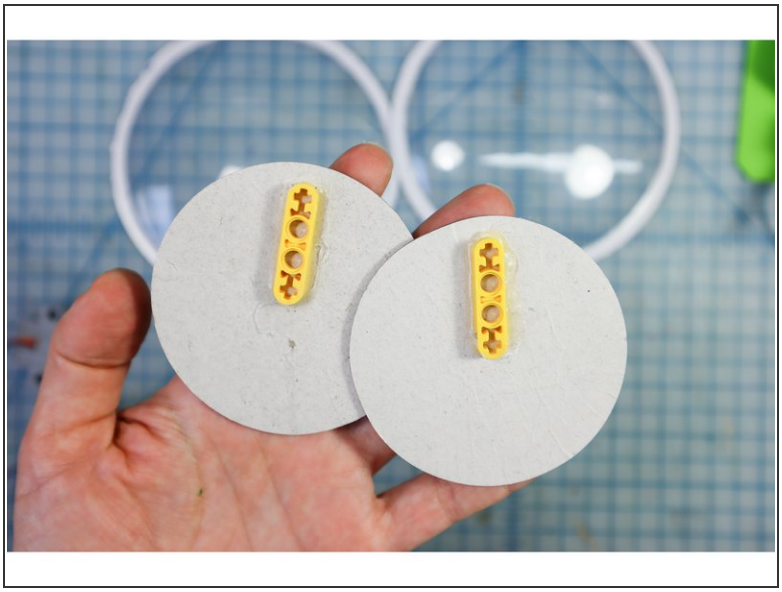




- Use a box cutter to carefully remove the plastic from the back of the googly eyes.

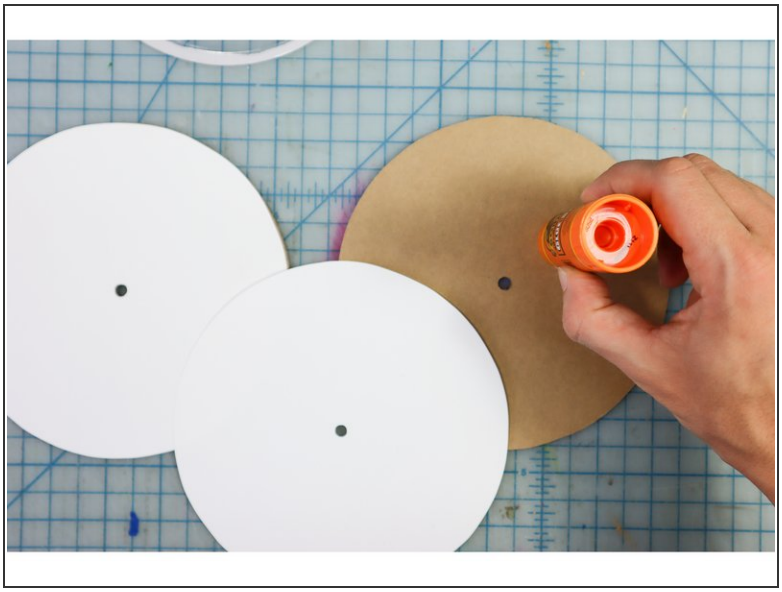
Step 14 — Glue the motor heads

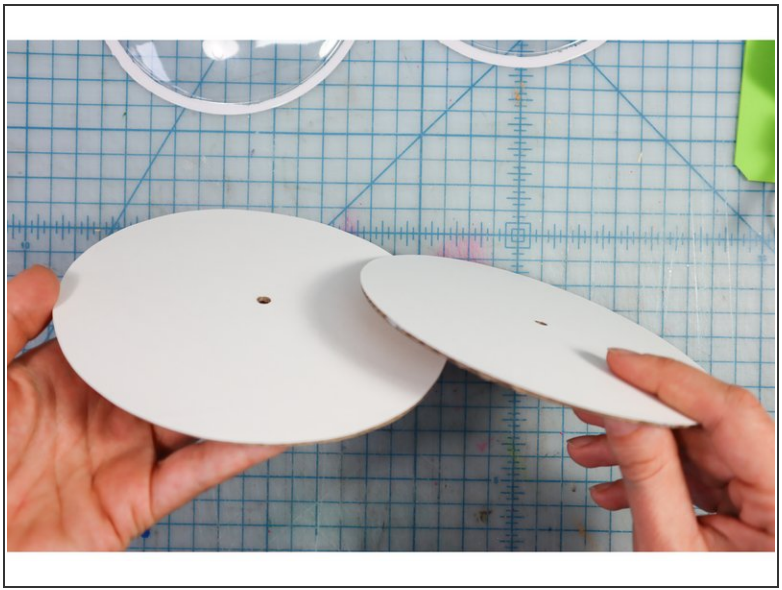




- Reuse the googly eye pupils, and glue the motorheads to the back, positioning the "+" a bit away from the edge.

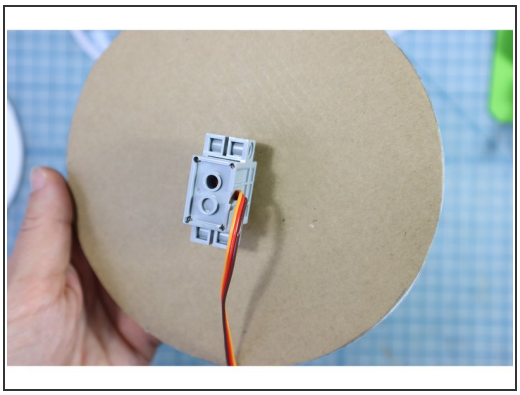
Step 15 — Glue the Eyes

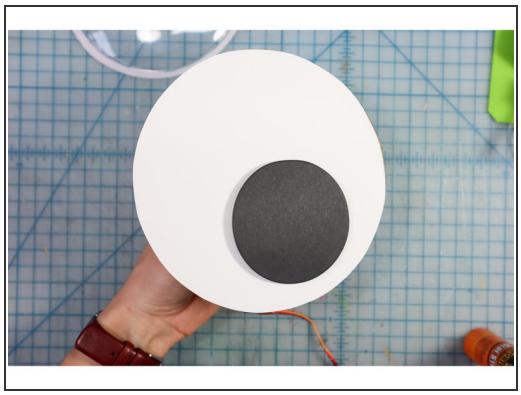




- Glue the white cardstock circles to the cardboard circles with a glue stick.

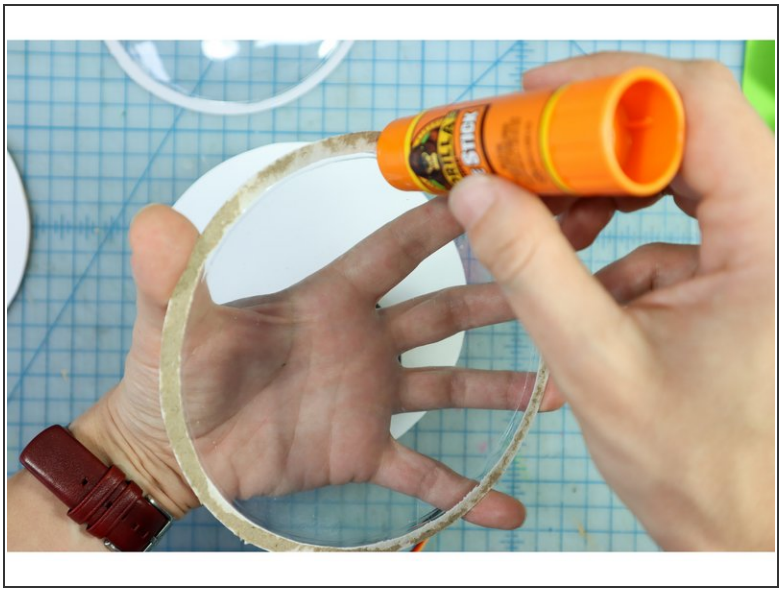
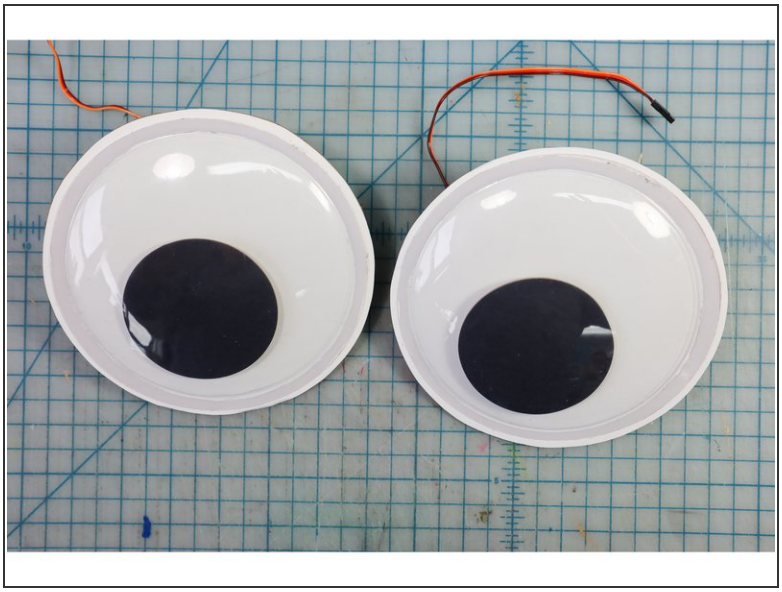
Step 16 — Attach the motor





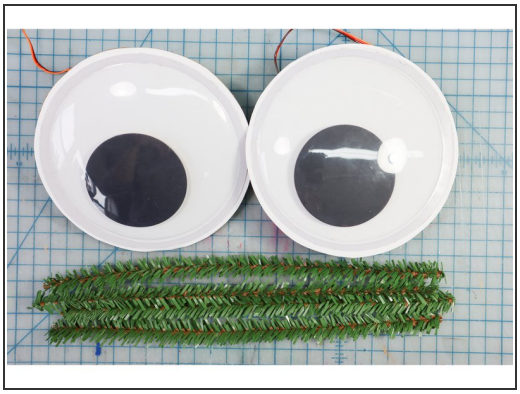
- Place the motor through the hole from the back and attach the pupil on top as shown.

Step 17 — Reattach the plastic

- Glue the plastic domes in place with a glue stick.

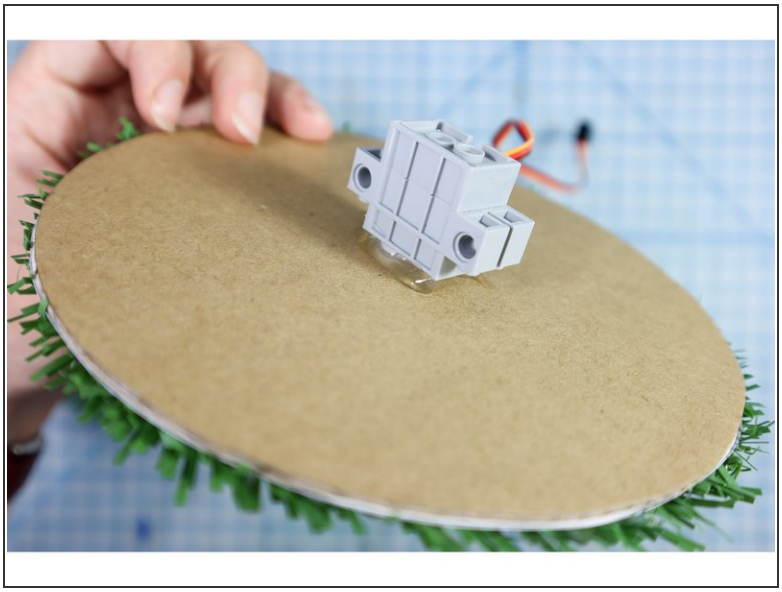
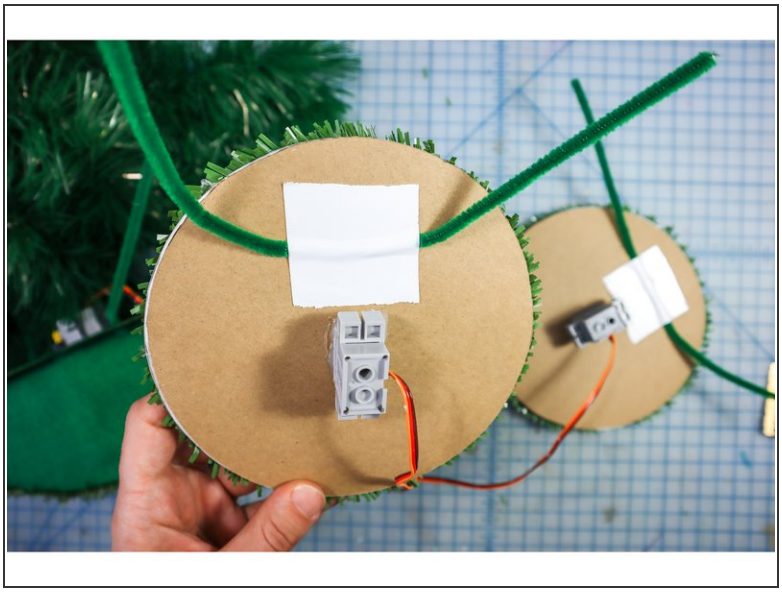
Step 18 — Line the eyes





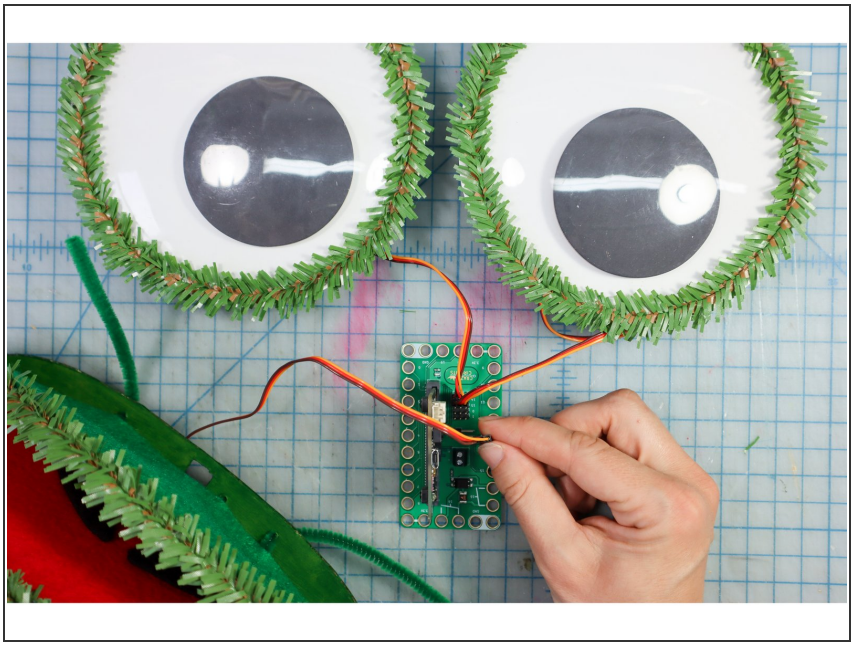
- Glue evergreen pipe cleaners around the eyes as shown.

Step 19 — Prepare the eyes for placement

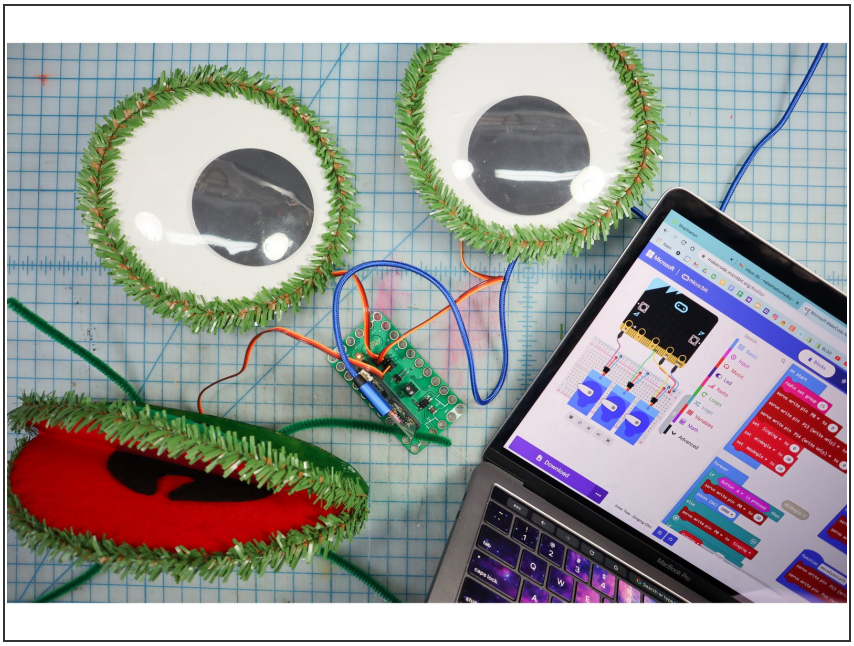
- Use hot-glue to secure the motor to the back of the eye.
- Use duck tape to tape a pipe cleaner to the back of the eyes as shown. This will allow you to attach the eyes to the branches of the tree.

Step 20 — Connect the Circuit



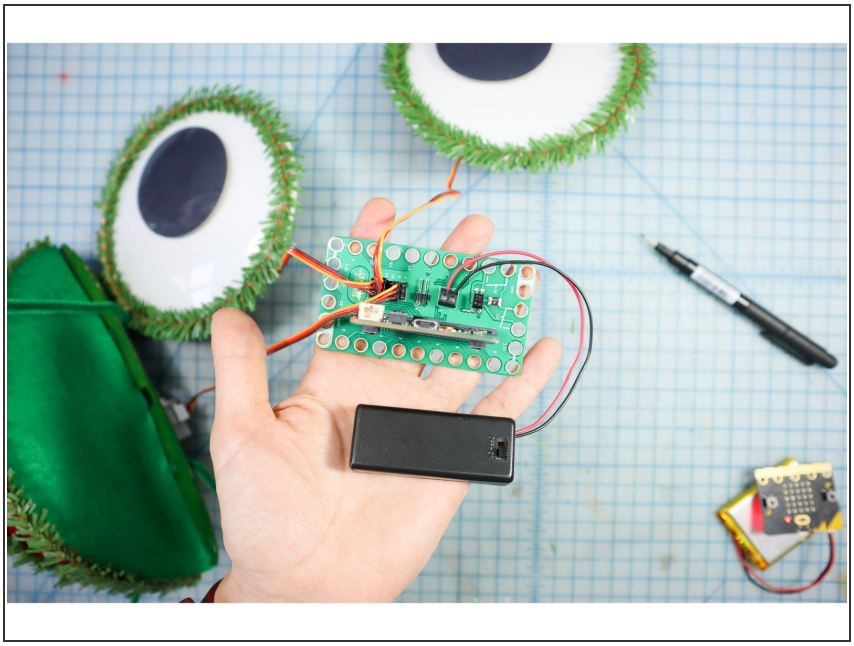
- Connect the servo motors in the eyes to Pin 13 and Pin 14 using the pins on the back of the bit board. The brown wire is ground (-).
- Connect the servo motor in the mouth to Pin 0. The brown wire is ground (-).

Step 21 — Download the "Inner Tree Code"



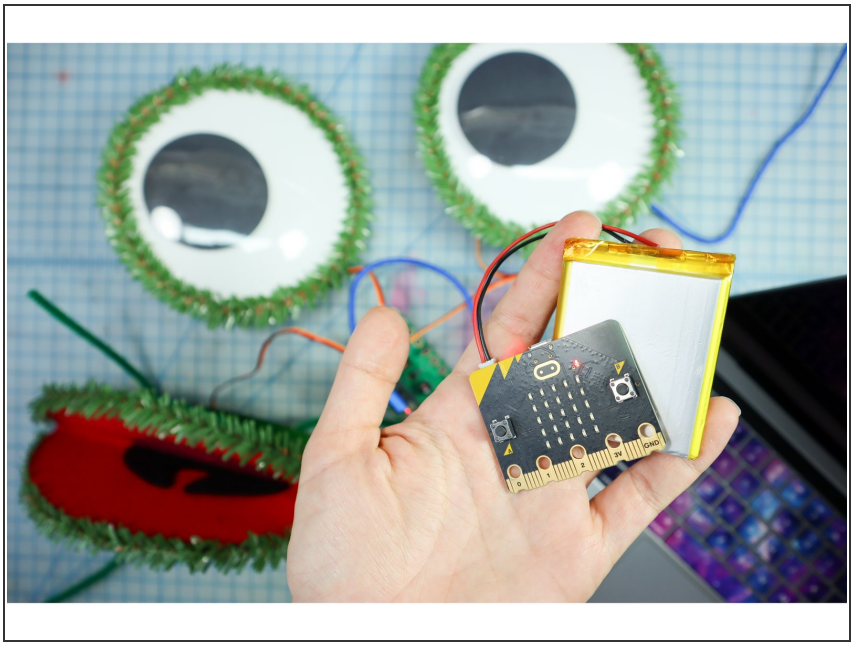
- Insert the micro:bit into the bit board.
- Download this code to the micro:bit.

Step 22 — Add a Battery Pack



- Add a battery pack to the inner tree circuit to make it portable.

Step 23 — Download the mic code, add batteries



- Download the "Mic for Tree" code to a second micro:bit, found here.
- Use the second micro:bit as a microphone to make the tree's mouth move from afar. Plug in a battery to make it portable.

Step 24 — It's tree time!

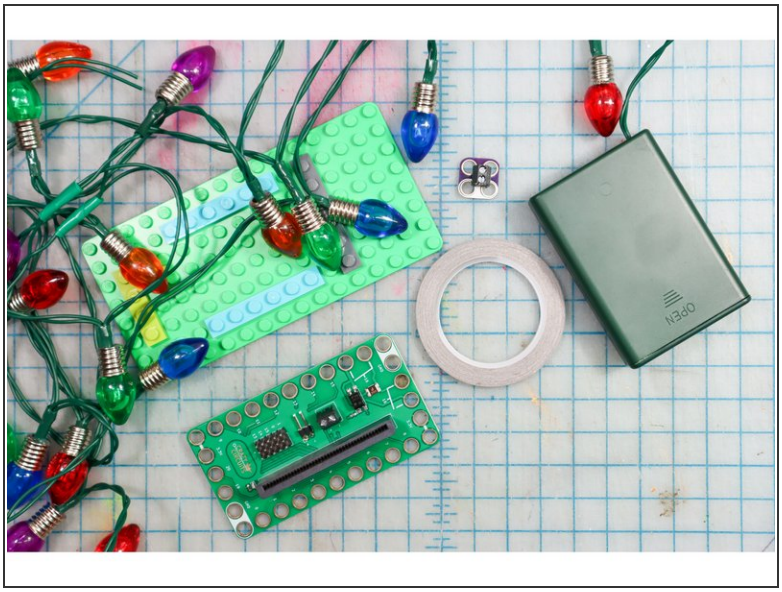


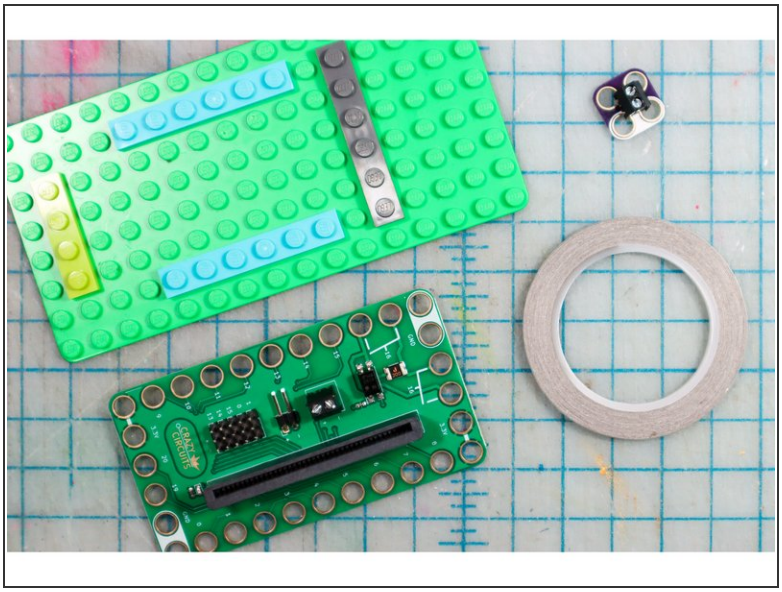




- Use the pipe cleaners to attach the eyes and mouth to a Christmas tree. We used a [3-ft artificial tree.]
- Reassemble the circuit on the tree, then stuff it inside the branches so that you can't see it.
- You may wish to change the angles of the eyes in the code so that the tree looks wherever YOU want!

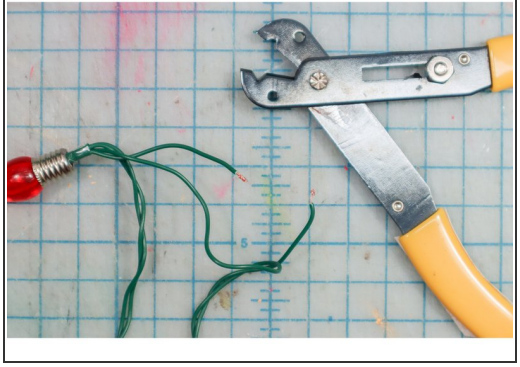
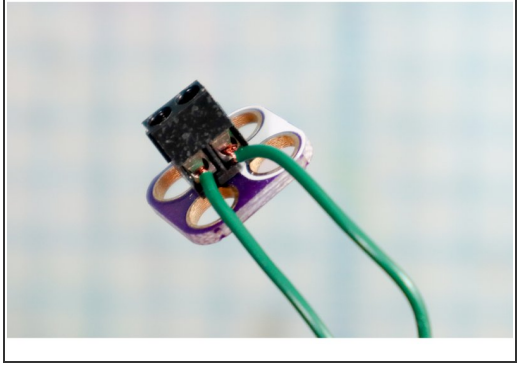
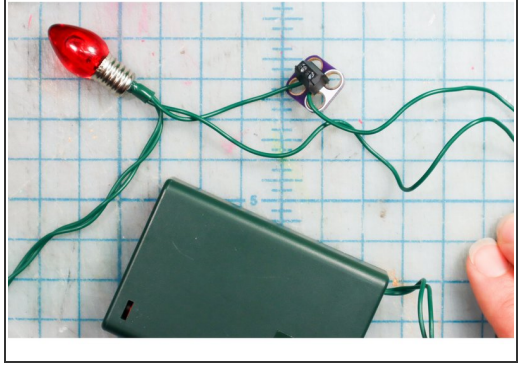
Step 25 — Optional: Add Lights!





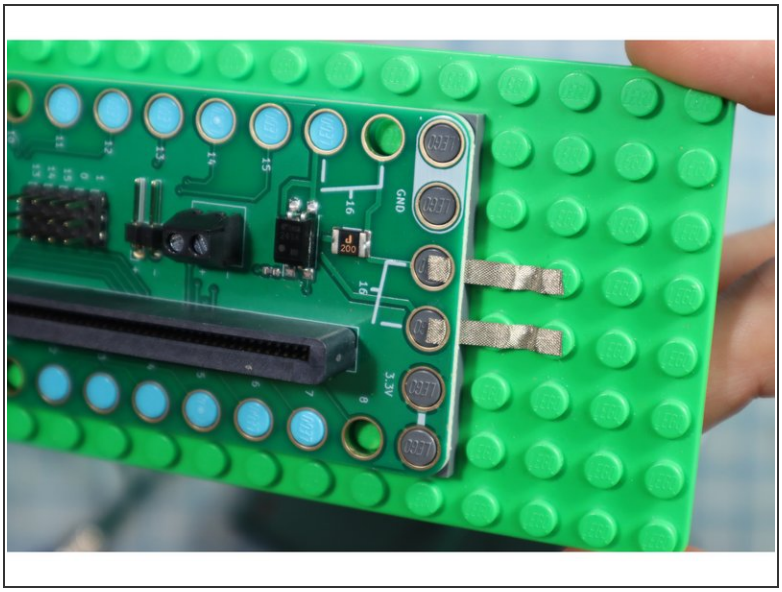
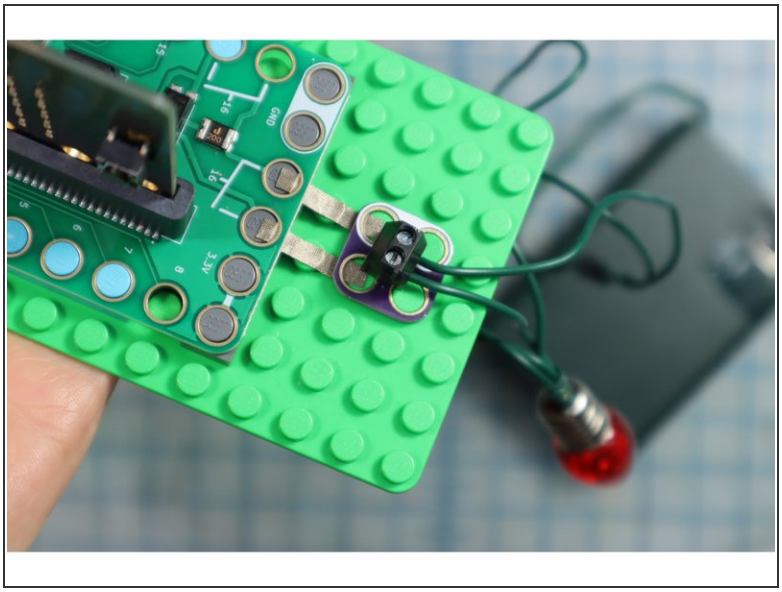
- Find a set of battery-powered Christmas lights.

Step 26 — Cut one of the wires

- Cut one of the wires coming out of the battery pack and strip the ends.
- Insert the ends into a Crazy Circuits Screw Terminal Chip.

Step 27 — Add Maker Tape

- Connect two pieces of Maker Tape to Pin 16.
- Place the Screw Terminal Chip over the Maker Tape as shown.

Step 28 — Place the lights on the tree





- Place the lights on the tree, and reassemble the circuit.
- Add a Santa hat!

Step 29 — Sing with the tree!



- Sing into the second micro:bit like a diva and make the tree sing!