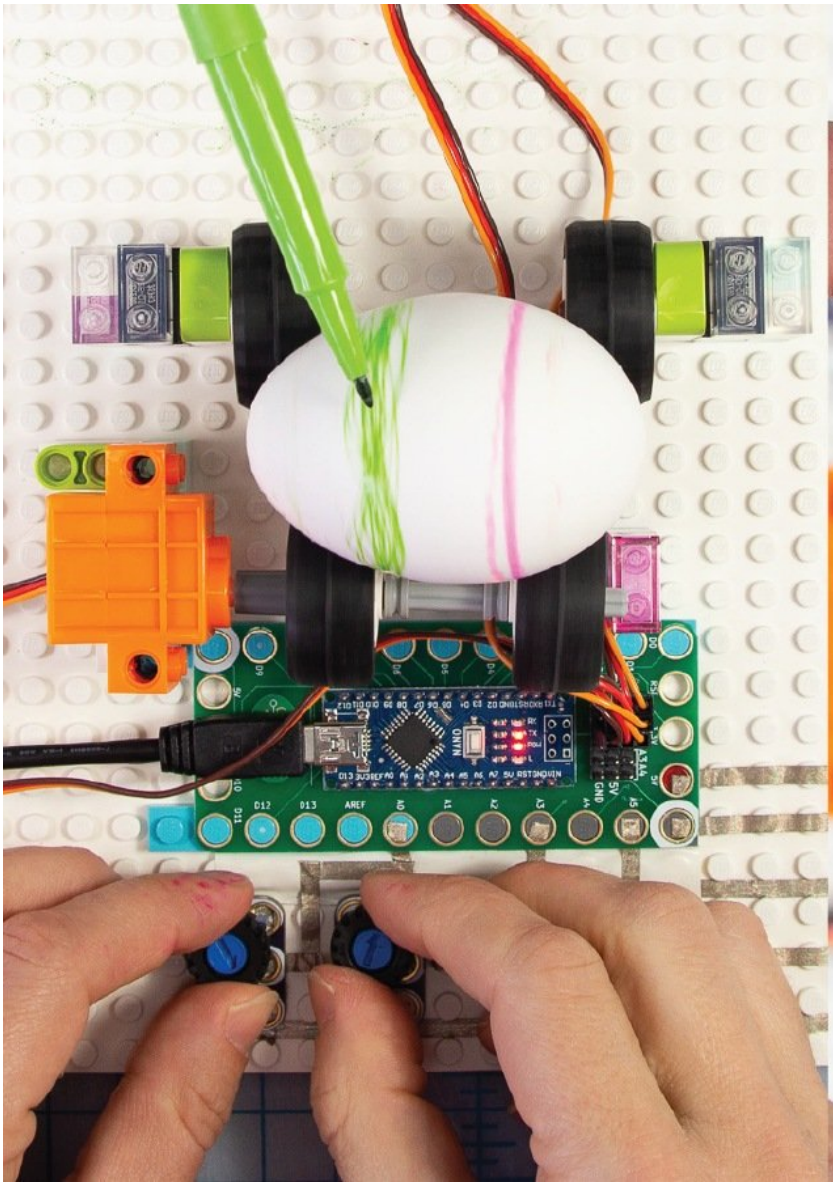
"L-egg-o" Egg Decorating Robot

Let's make this DIY Robot Egg Decorator with LEGO and Crazy Circuits.

Written By: Natasha Dzurny





INTRODUCTION

Easter is almost here and that means it's time to decorate some eggs! You could just dunk your eggs in coloring, but that's not nearly as fun as making a robot that can do the decorating for you. :)

So let's make this DIY Robot Egg Decorator with LEGO and Crazy Circuits.

There are two versions of this project. Build the egg spinner and hand-hold your marker, or create a robot arm to hold the marker for you. Your choice! If you don't want to build the arm, I've indicated steps that you can skip throughout the tutorial.

PARTS:

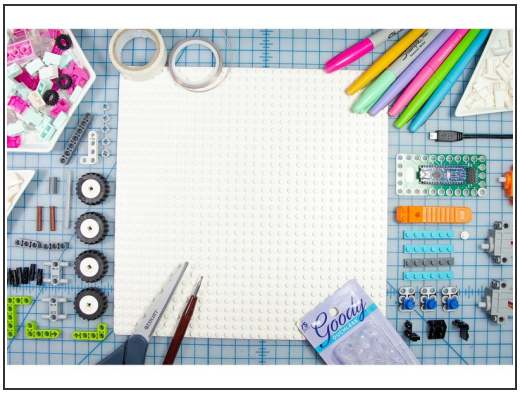
- Crazy Circuits Robotics Board (1)
- LEGO Bricks (1)

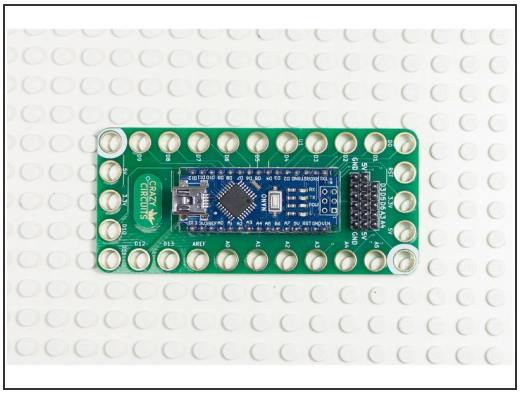
Misc.

- Brick Compatible 360 Degree Servo (1)
- Brick Compatible 270 Degree Servo (2)
- Crazy Circuits Potentiometer Chip (3)
- Maker Tape (1)

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Step 1 — "L-egg-o" Egg Decorating Robot

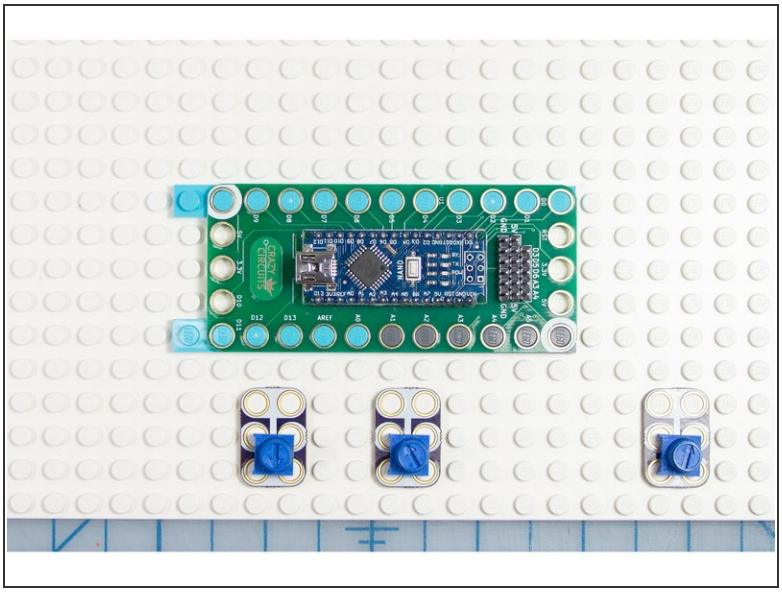


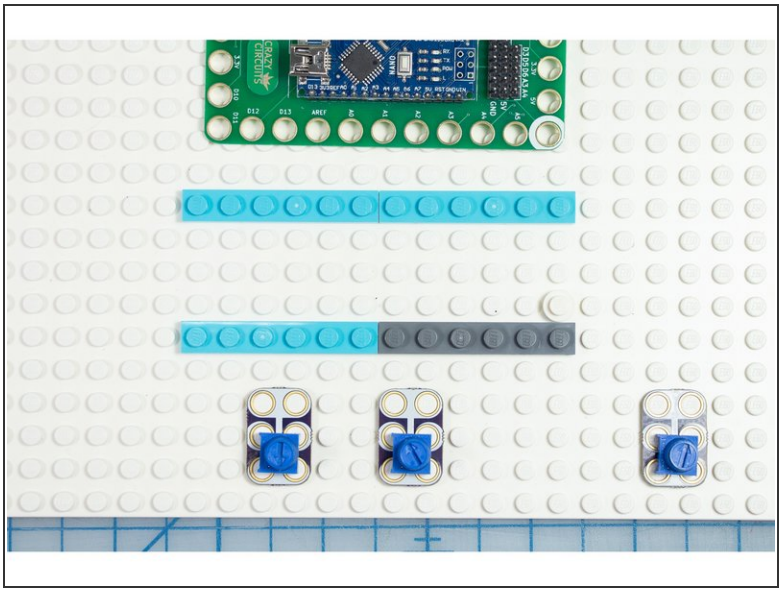




- Gather Materials.
- If you're new to the LEGO Technic line, get this LEGO kit. All the Technic parts that you will need are in it!

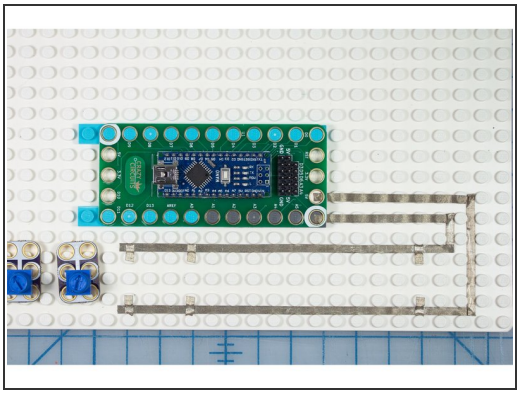
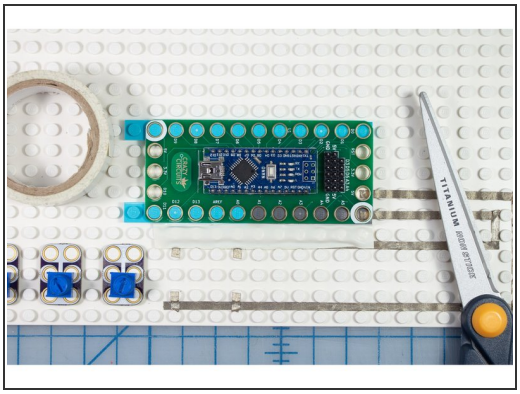
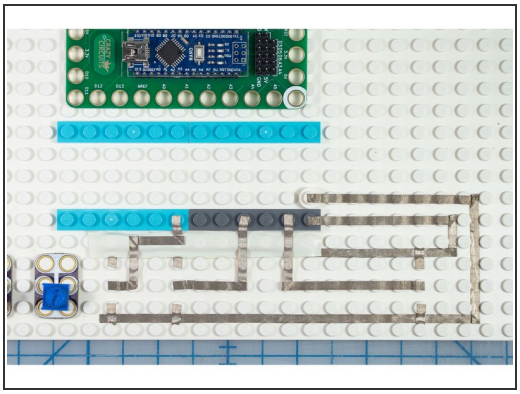
Step 2 — Place the Crazy Circuits Robotics Board





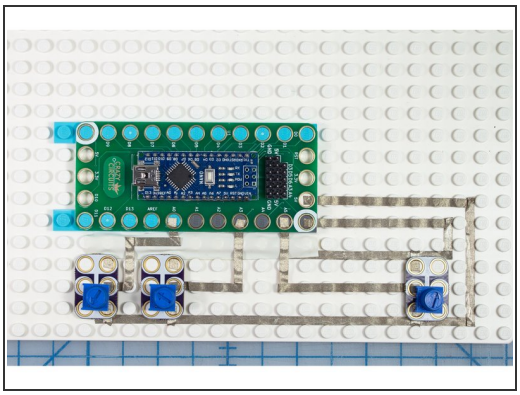
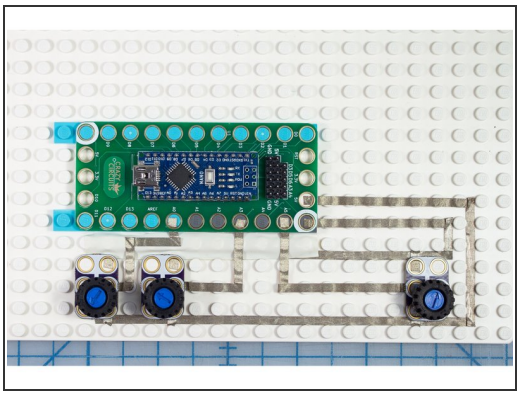
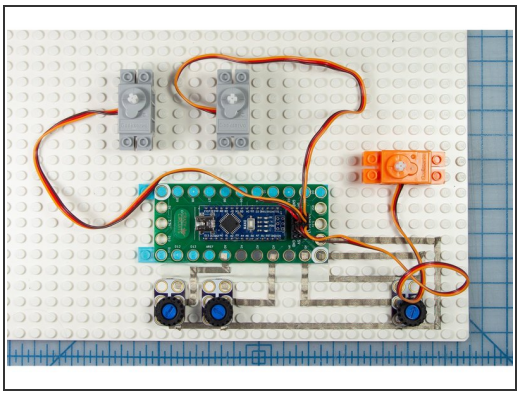
- Choose a spot for the Crazy Circuits Robotics Board and the potentiometers. Add LEGO "rails" where the holes in the board are so that it fits over them.

Step 3 — Add Maker Tape

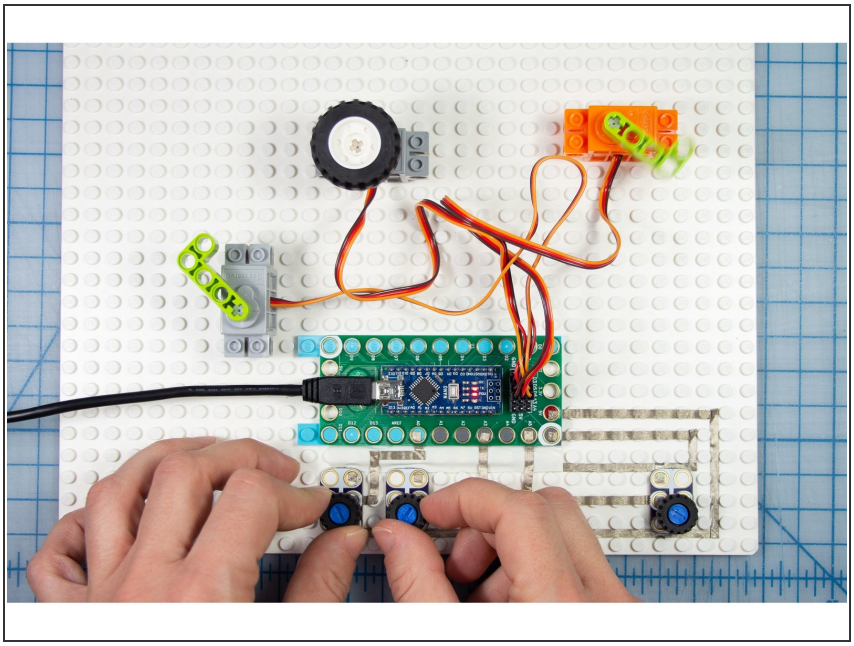
- In this circuit, the first two potentiometers (or "pots" for short) will control the marker's position. The third pot will control the speed of the egg's rotation. Position the potentiometers where you'd like them on the LEGO base. The pots controlling the marker position should be near each other and the speed control can be off to one side a bit.
- Use the photos above as a map and add the maker tape as shown. Connect all three pots to +5V and Ground. Connect the left pot to A0 and middle pot to A3 - these motors will move the marker. Connect the right pot to A5 - this will be the speed control (Simple Version: If you are not making the marker arm, only connect one potentiometer to A5)
  - ⓘ Tip: Use the space between the LEGO pegs to run the Maker Tape - a small stick is helpful to guide the tape in place - Where the maker tape needs to cross, use the top of the LEGO pegs to hold it over the other piece, or use electrical tape between them

Step 4 — Add Crazy Circuits Components and Motors

- Place the Crazy Circuits components in place on top of the Maker Tape. We found some small LEGO tires that fit right over the pot knobs making them easier to turn!
- Connect the grey servos to D3 and D5 to control the marker.
- Connect the orange servo to D6 to control the spin of the egg.
- The dark brown wires should be closest to the center of the Crazy Circuits Board.

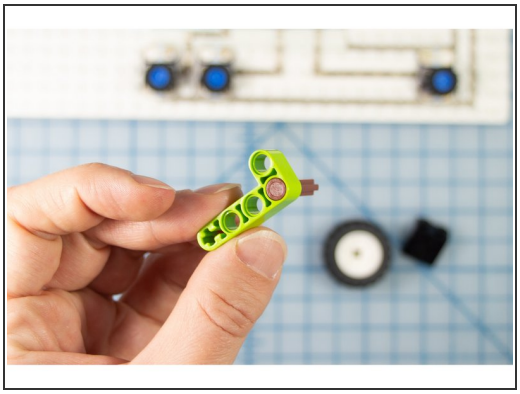
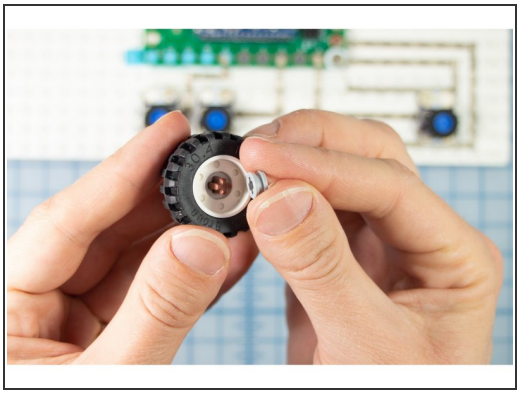
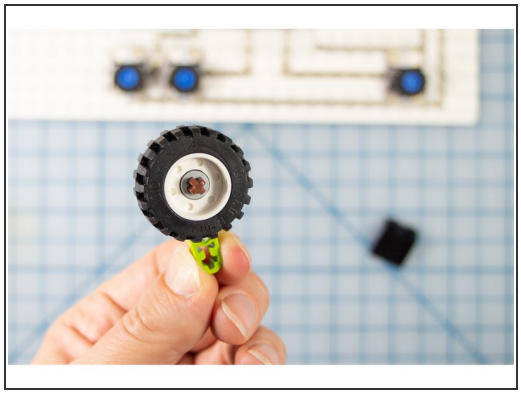
Step 5



- If this is your first time using the Crazy Circuits Robotics Board, review this setup guide.
- Download, or copy and paste this code into the Arduino IDE. Upload the code to your Crazy Circuits board

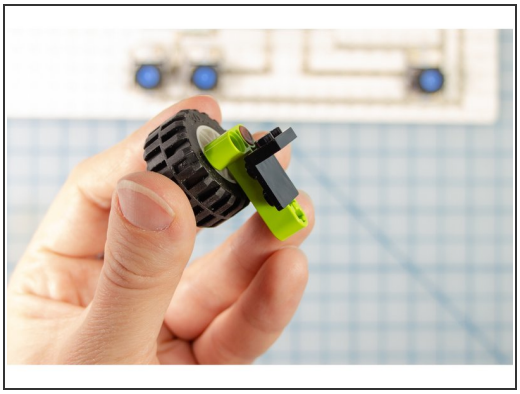
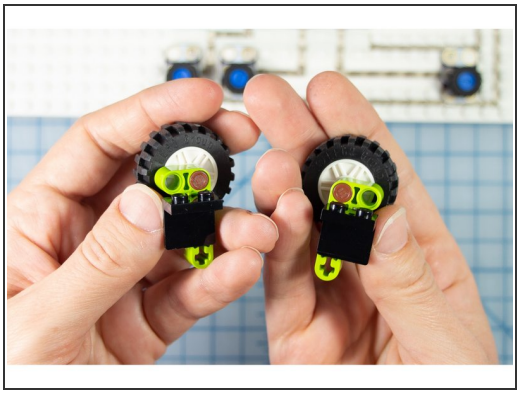
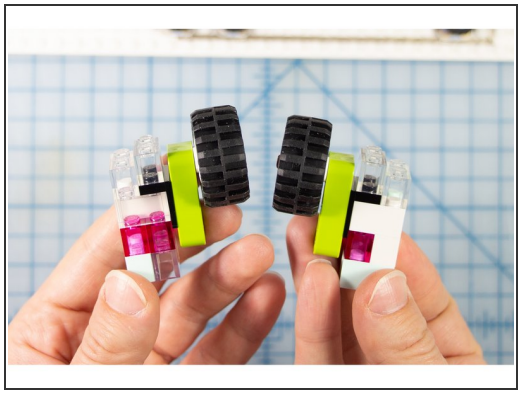
- The motor shafts fit perfectly into the LEGO Technic pieces. To test the motors, add a wheel or Technic piece to each motor shaft so that the rotation is easier to see. Move the pots back and forth to check that the code is working.

Step 6 — Build the Wheel Supports

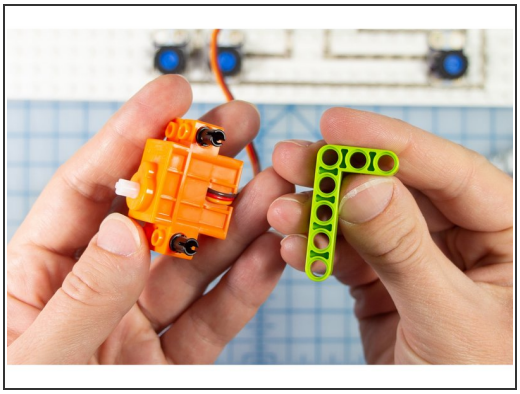
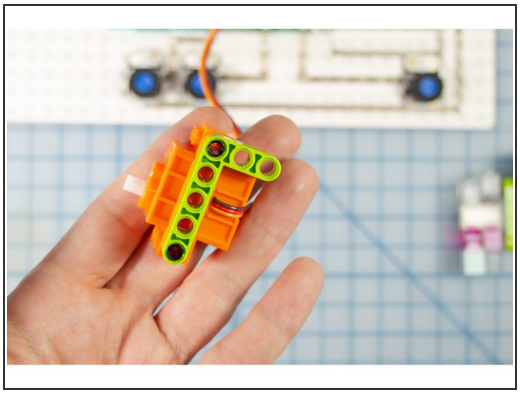
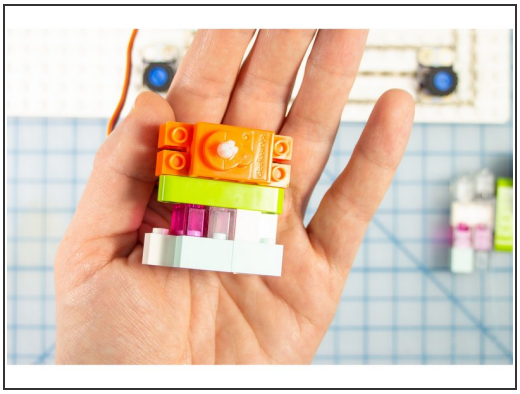
- Insert the axle with end stop piece through a hole in a Technic beam or bent beam piece.
- Insert a wheel onto the axle, and cap it with a bushing.

Step 7 — Build the Support Tower

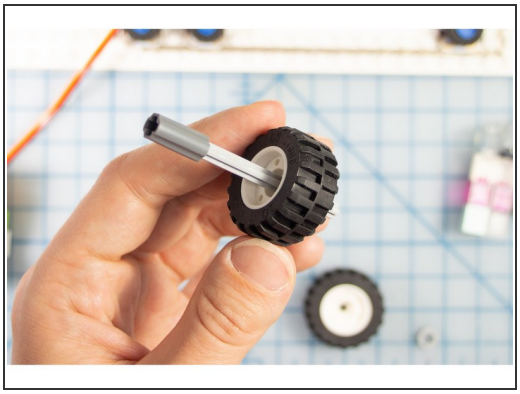
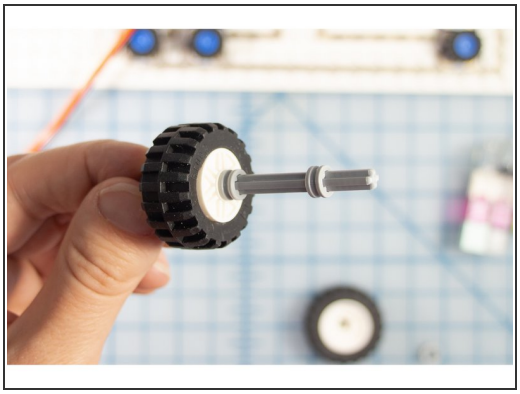
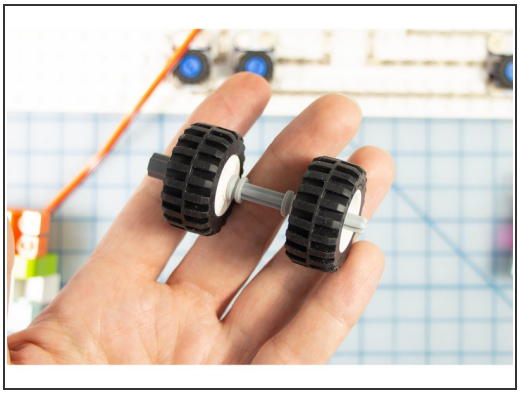
- Connect the Technic piece to a LEGO piece that has studs on the side and create a tower under it.
- Repeat these steps to make a second tower that is a mirror image of the first.

Step 8 — Mount the Drive Motor

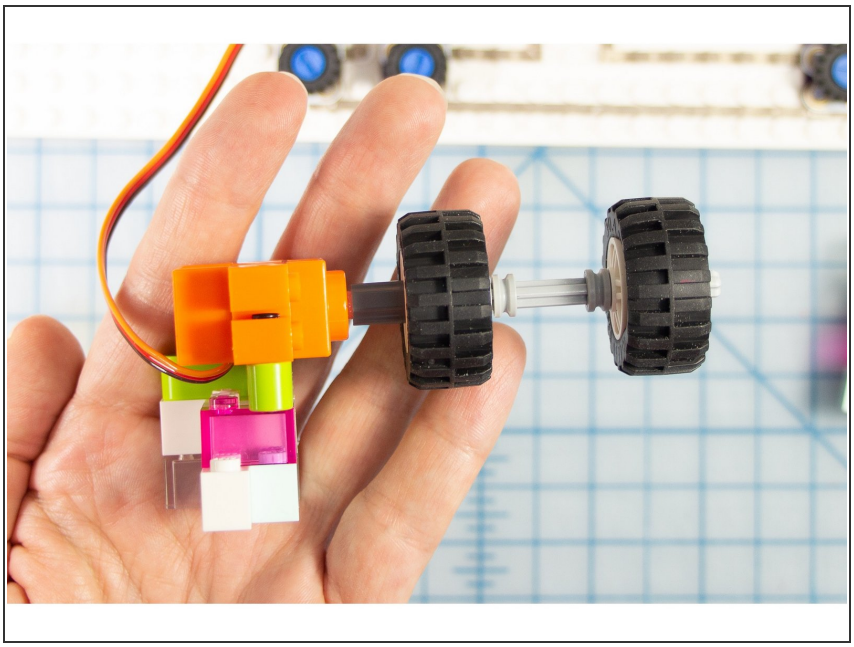
- Connect the drive motor to the beam piece with two Technic pins.
- Stack a tower of bricks and connect the beam to the top of it.

Step 9 — Make the Drive Wheels

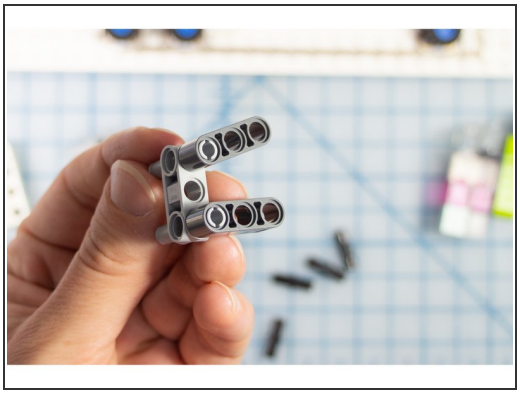
- Connect an axle to the axle connector piece.
- Use 3 bushings to keep two wheels in place, about 1 inch apart.
- Make sure the axle sticks out beyond the wheel a tiny bit as shown.

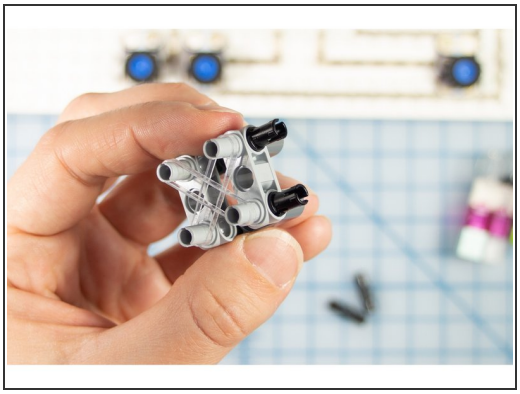
Step 10 — Connect the Wheels and Motor

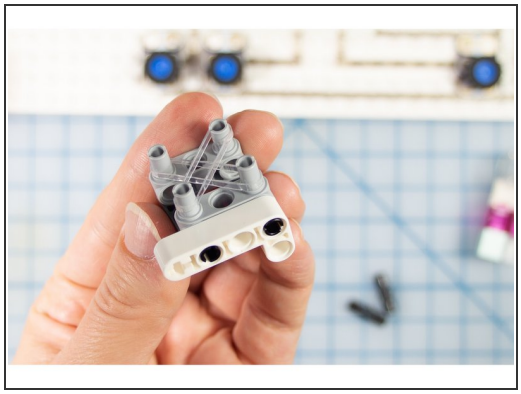


- Attach the wheels to the orange motor.

Step 11 — Make the Pen Holder

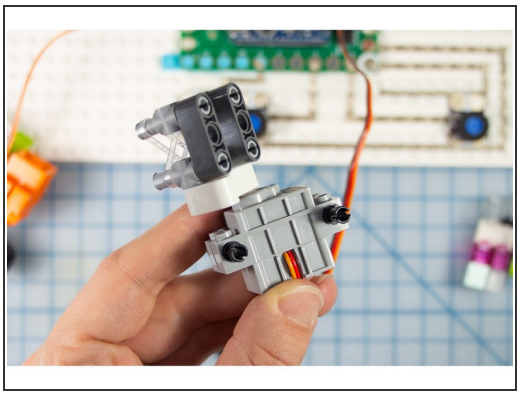
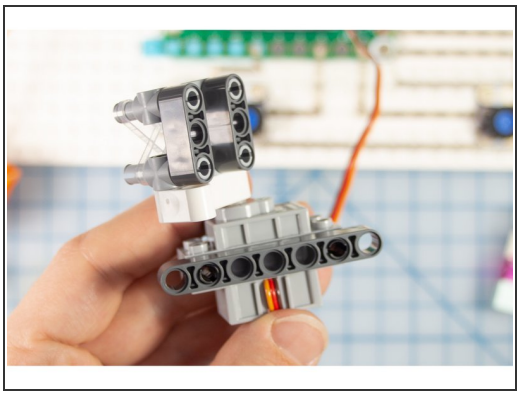
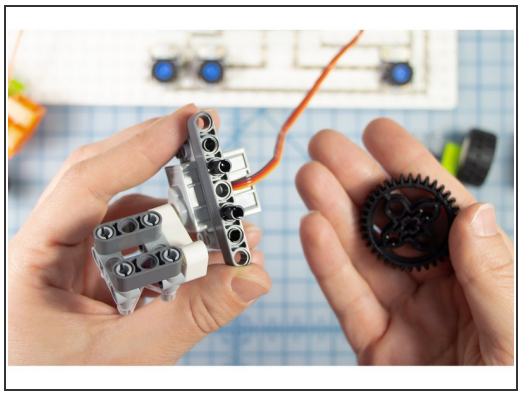






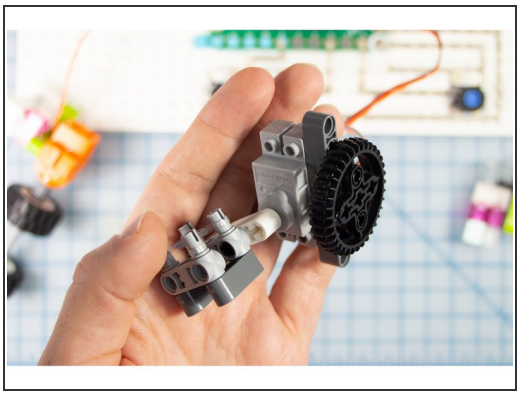
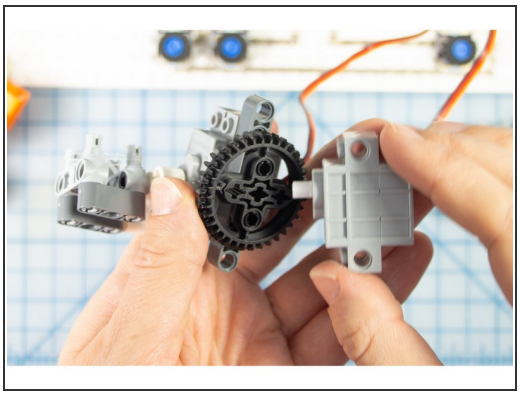
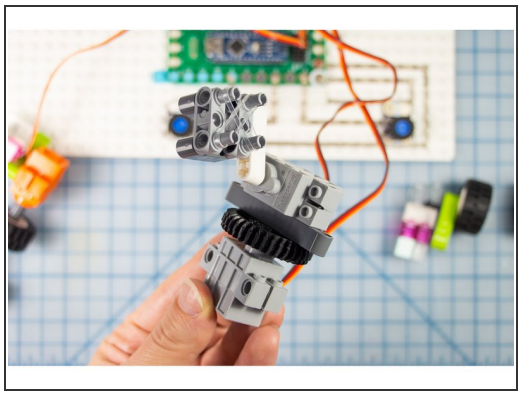
- **Simple Version:** Skip this step.
- Make a box using the LEGO cross and beam pieces as shown.
  - ⓘ Optional: Add two small elastic bands (we used tiny hair ties) crossing the center of the box. This will help if you want to hold a smaller-barreled pen in place.
- Use two pins to connect it to a Technic beam with a "+" on the end, and attach it to the grey motor that is connected to D5.

Step 12 — Connect the Gear

- **Simple Version:** Skip this step.
- Add two pins to connect the beam piece to the side of the motor that has the pen holder.
- Add two more pins to connect the gear. Place the motor head of the second motor inside the gear.

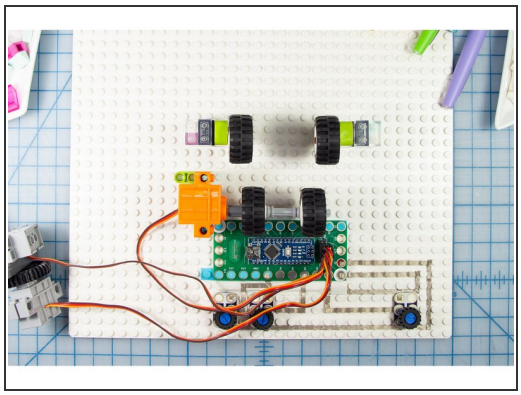
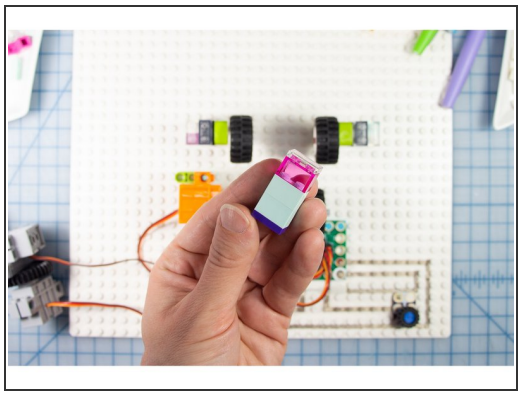
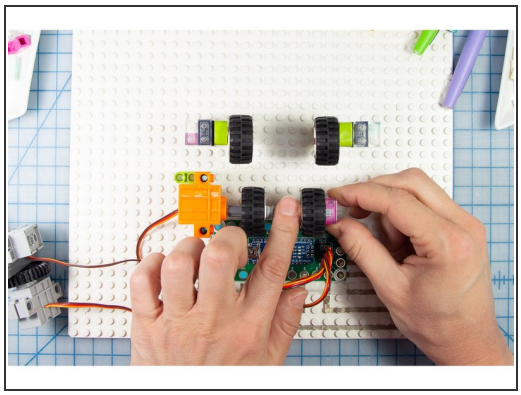
Step 13 — Connect the Second Motor

- **Simple Version:** Skip this step.
- Place the motor head of the second motor inside the gear.

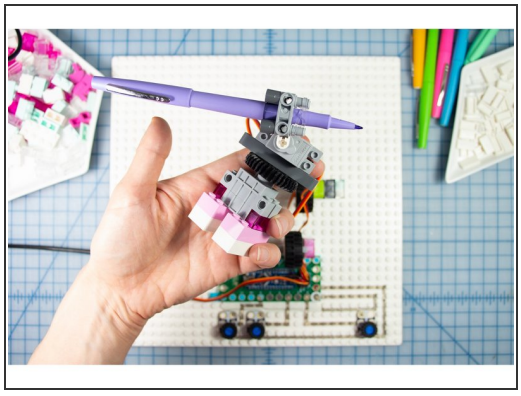
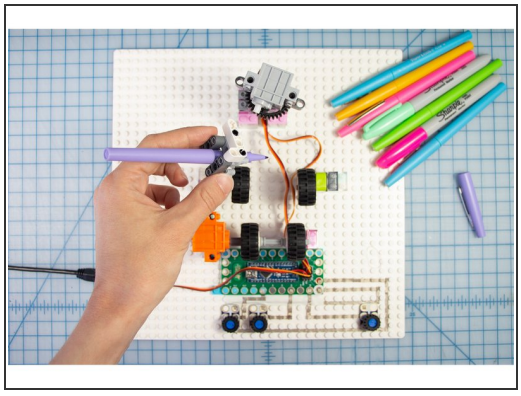
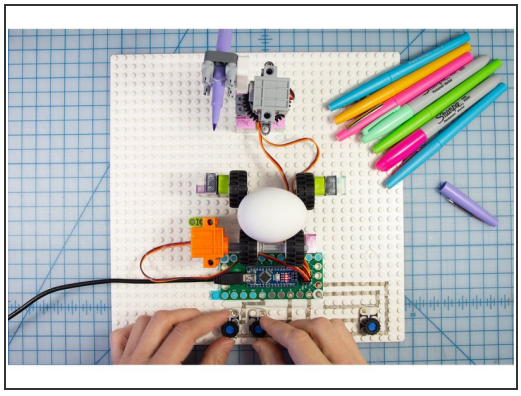
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Step 14 — Assemble the Egg Cradle

- Place the drive motor tower on the LEGO base.
- Place the wheel towers on the LEGO base, slightly wider apart than the two drive wheels as shown.
- Make a small tower of bricks tall enough to fit right under the exposed axle across from the motor, and snap it in place. This will give the structure a bit more strength to hold the weight of the egg.

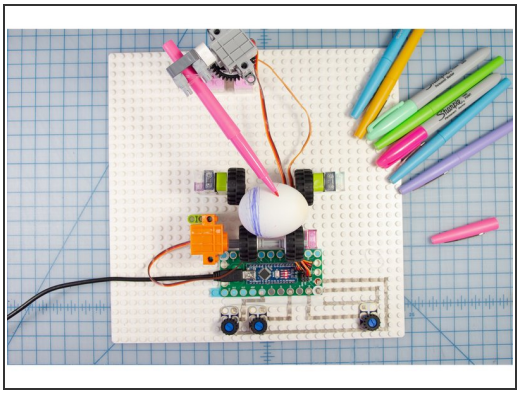
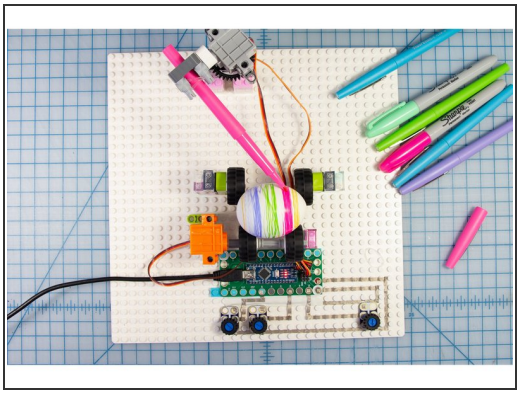
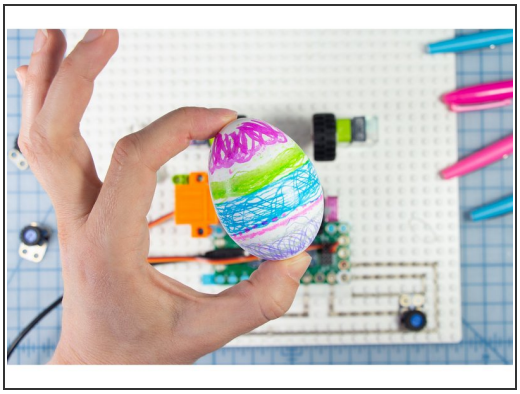
Step 15 — Place the Pen Arm

- **Simple Version:** Skip this step.
- Build up a small tower under the two grey motors to make the pen's angle easier to reach the egg.
  - The location of this tower may change depending on the length and size of each pen that you use, so choosing larger bricks that are easy to move is a good idea.
  - Attach the pen holder tower to the LEGO base so that the pen can reach the egg.

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Step 16 — Decorate Your Egg!

- Place an egg in the egg cradle.
- Use the drive motor potentiometer to start the egg spinning and change the speed if you like!
- Control the position of the pen with the other two potentiometers.
- **Simple Version:** Start the egg spinning with the potentiometer then handhold the pens against the egg to make cool designs.

Step 17 — Happy Easter



- Have a wonderful Easter!