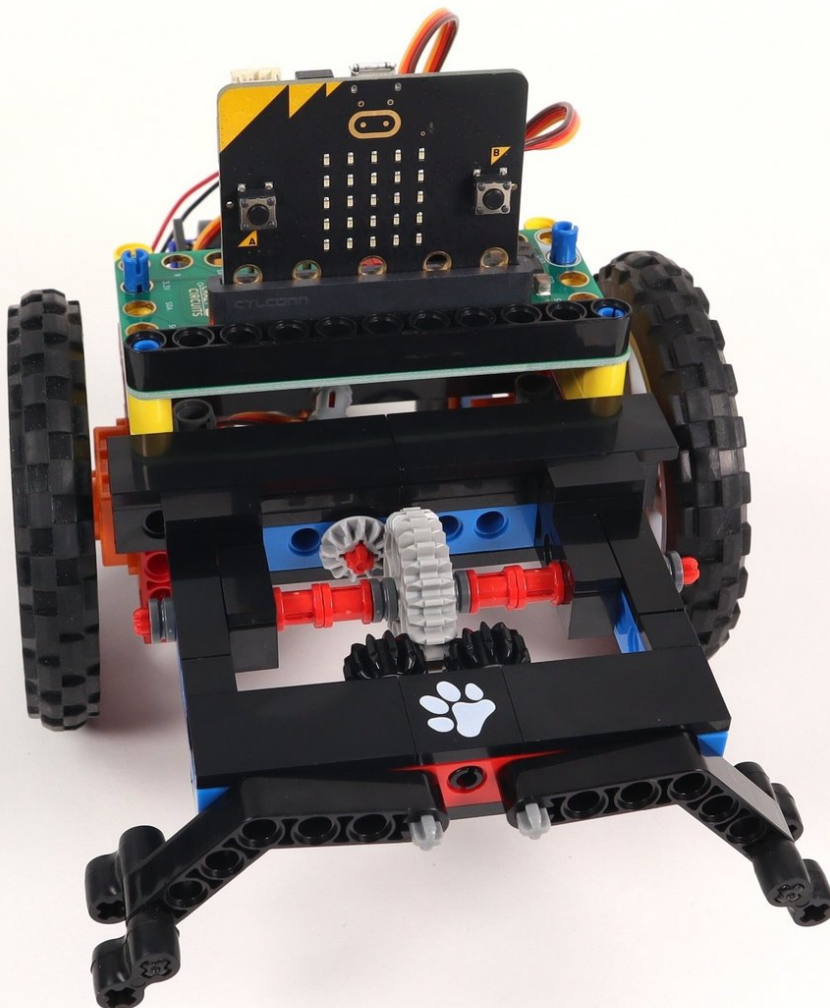




Rover Claw

Step-by-step assembly instructions for the optional Rover Claw attachment.

Written By: Andy Wallus



INTRODUCTION

If you've built our [Rover Main Body](#) this is a great accessory. A slightly more advanced built Claw than can attach to the front of the Rover and take your Rover to new exciting levels.



TOOLS:

- [Computer](#) (1)



PARTS:

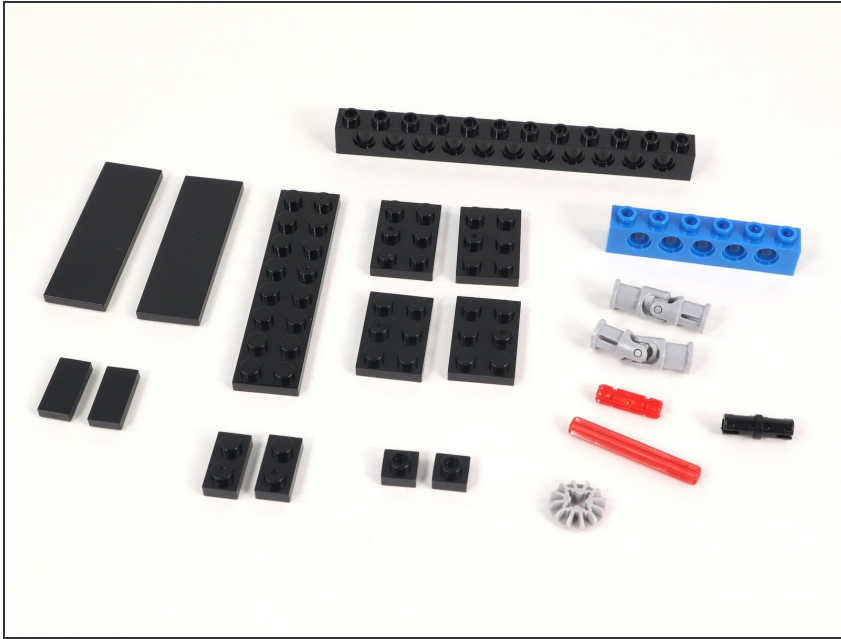
- [Bit Board Rover Kit](#) (1)

Step 1 — The Claw Parts



- ① The Claw is an optional, more advanced attachment to the Bit Board Rover. If you haven't built the [Gripper](#), [Lifter](#) or [Sweeper](#) yet those are great attachments that are an easier build and a good starting point.
- To build the Claw, you will need the bag of parts pictured, the gray 270° servo from the Rover kit and a completed Bit Board Rover.
- ① The Claw is included in the [Bit Board Rover kits](#) as of February 2026. If you have an older kit and would like to purchase the parts to build The Claw you can purchase that here: [The Claw](#).
- ① The Claw bag has three individual bags inside. They are not organized in a specific way. Just open all three and jump in!

Step 2 — Section 1 - Gather Parts



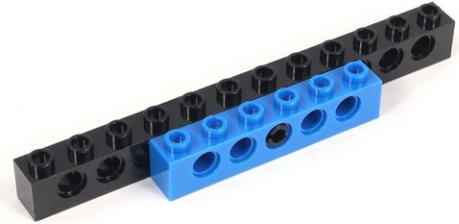
- The main build is broken down into three sections. These are the parts you will need for **Section 1**.

Step 3 — Section 1 - Add Pin to Brick with Holes



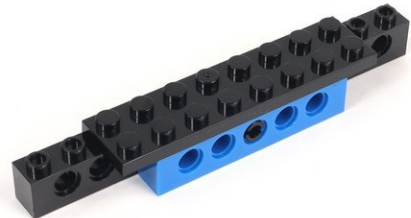
- Add a **black pin** to the center hole of the **1x12 brick with holes**.

Step 4 — Section 1 - Add Brick with Holes



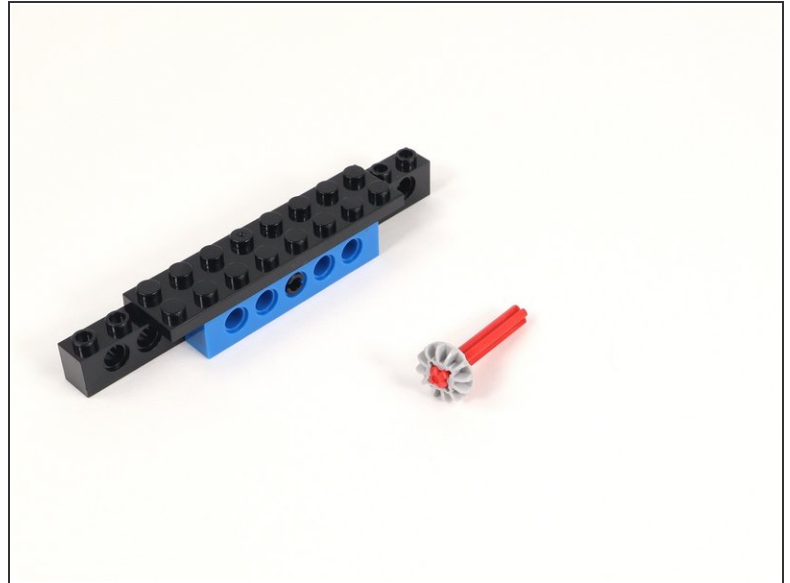
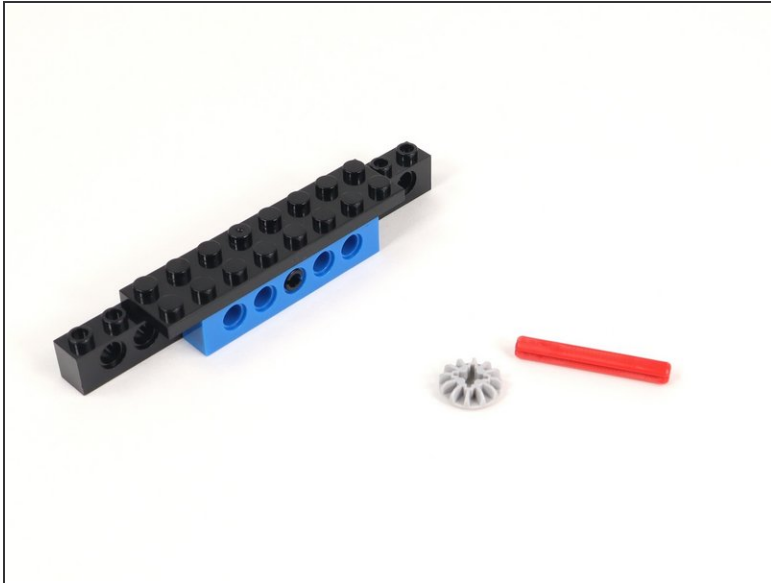
- Connect the black pin through the middle hole of a **1x6 brick with holes**.

Step 5 — Section 1 - Add Plate



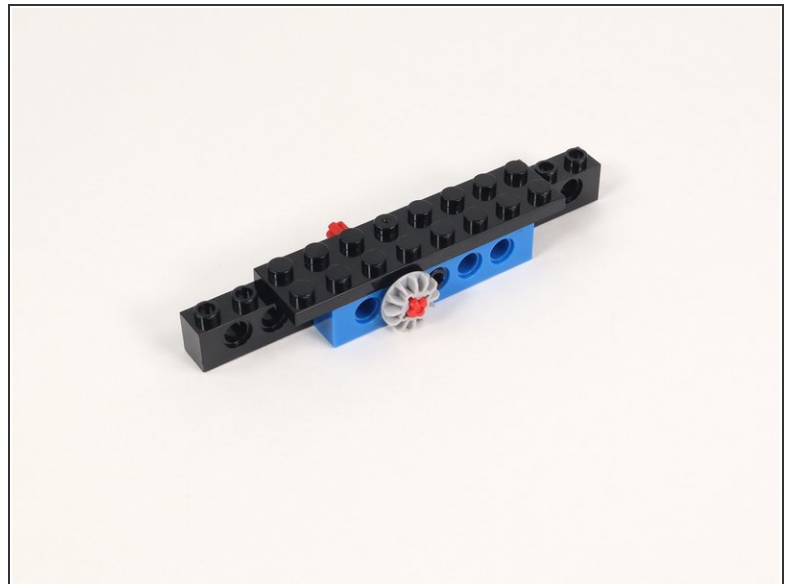
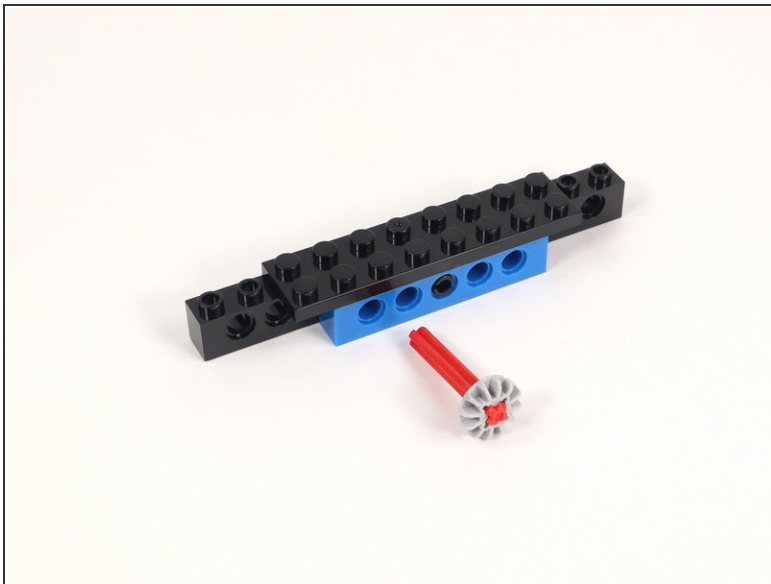
- Attach a **2x8 plate** on top of section 1 in the center, leaving 2 studs on either side open.

Step 6 — Section 1 - Connect Gear and Axle



- Connect the **small gray gear** to the end of the **4 stud long red axle**.
- ⓘ The gear only has teeth on one side. Make sure the teeth are facing outward towards the end of the axle.

Step 7 — Section 1 - Insert Axle



- **Insert the axle** into the hole to the left of the hole with the black pin.

Step 8 — Section 1 - Add Universal Joint



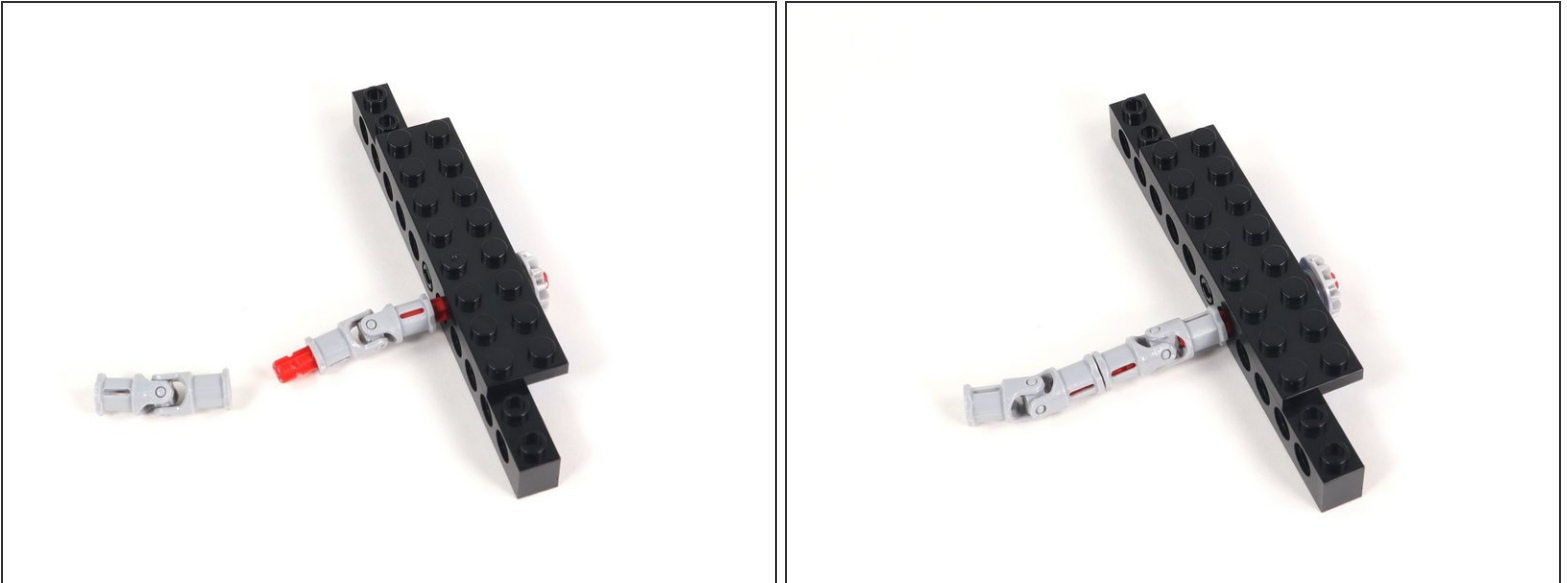
- Connect one end of a **universal joint** onto the end of the axle opposite the gear.

Step 9 — Section 1 - Add Axle



- Insert a **2-stud long axle** into the other end of the universal joint.

Step 10 — Section 1 - Add Universal Joint



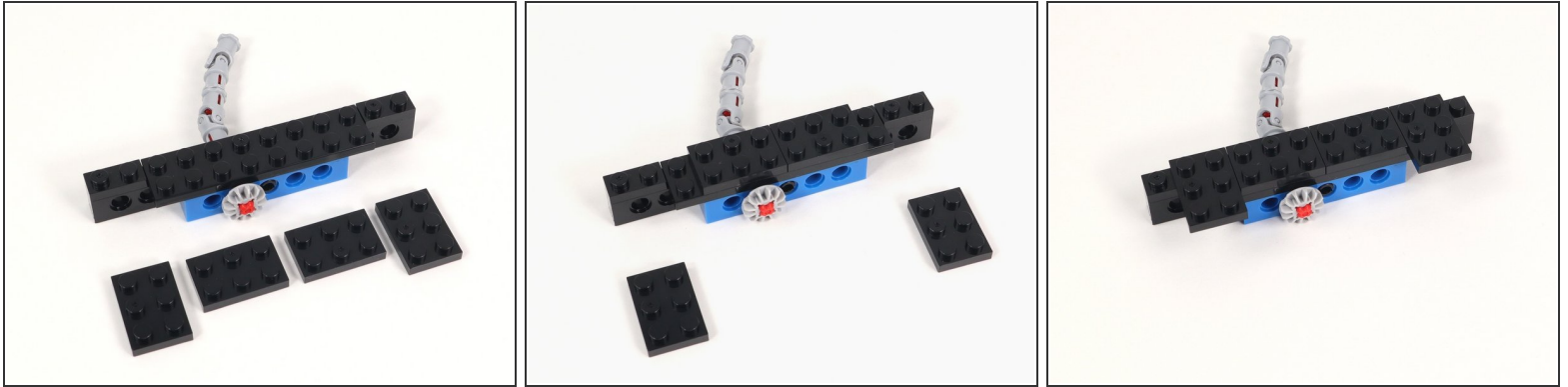
- Connect a second **universal joint** to the other end of the axle.

Step 11 — Section 1 - Add Plates



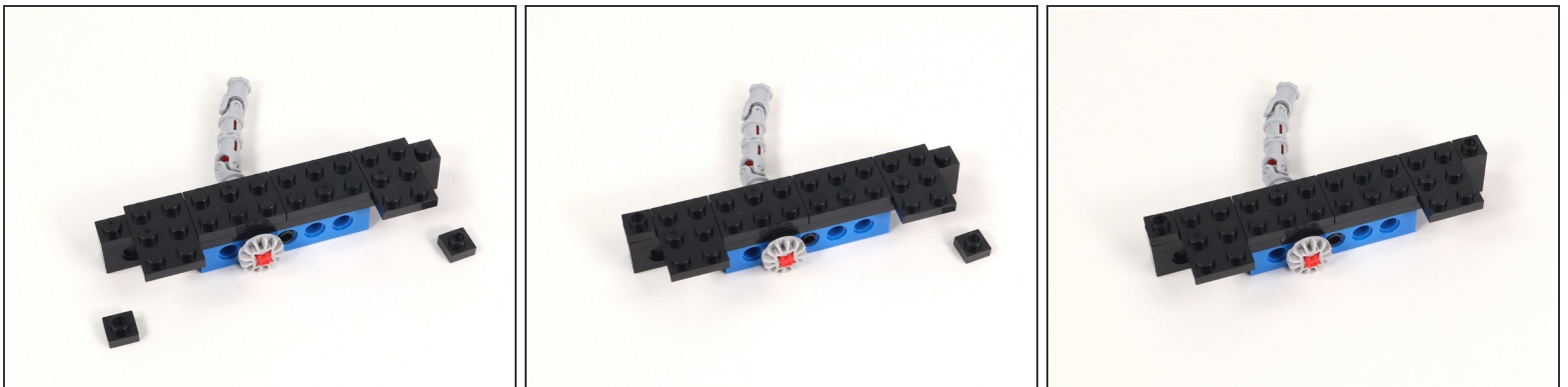
- Add **1x2 plates** to each end of the 1x12 brick with holes.

Step 12 — Section 1 - Add More Plates



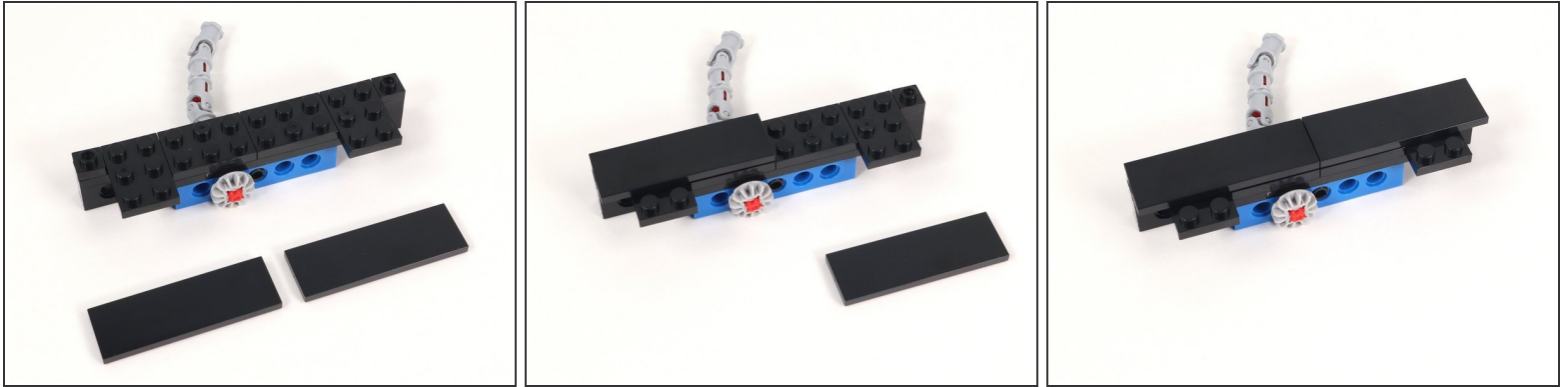
- ❗ In this step you will add 4 2x3 plates. Two of them will attach horizontally, following the direction of the build. The other two will stick off the front of the section toward the gear side. These will help us connect Section 1 to Section 2 in a later step.
- **Attach (2) 2x3 plates** in the center of Section 1 so they line up with the blue brick with holes.
 - Attach the other **(2) 2x3 plates** sticking off the front of the build toward the gear side. They should only connect to three studs.

Step 13 — Section 1 - Add Even More Plates



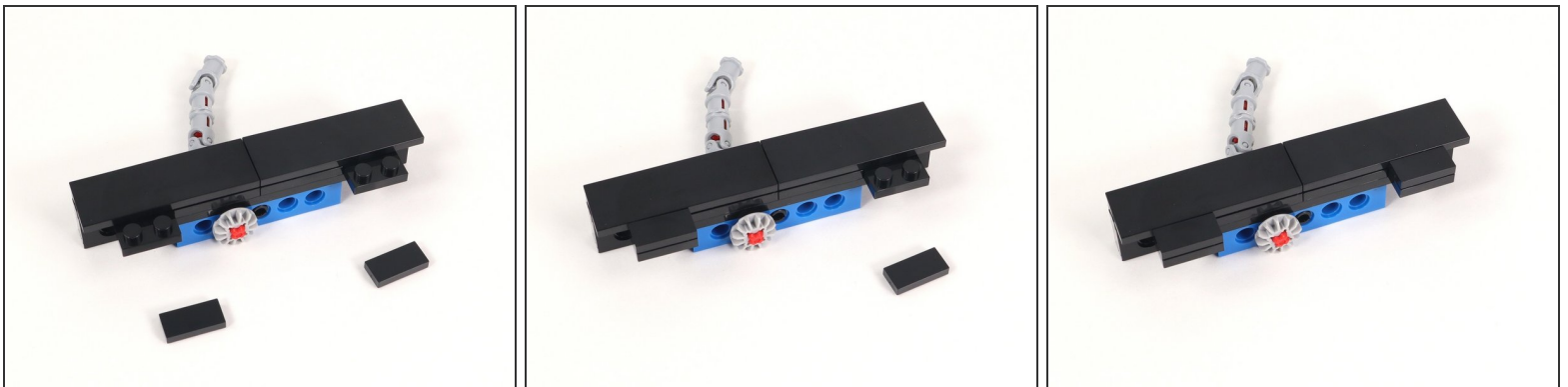
- Add a **1x1 plate** to each end of the build.

Step 14 — Section 1 - Add Tiles



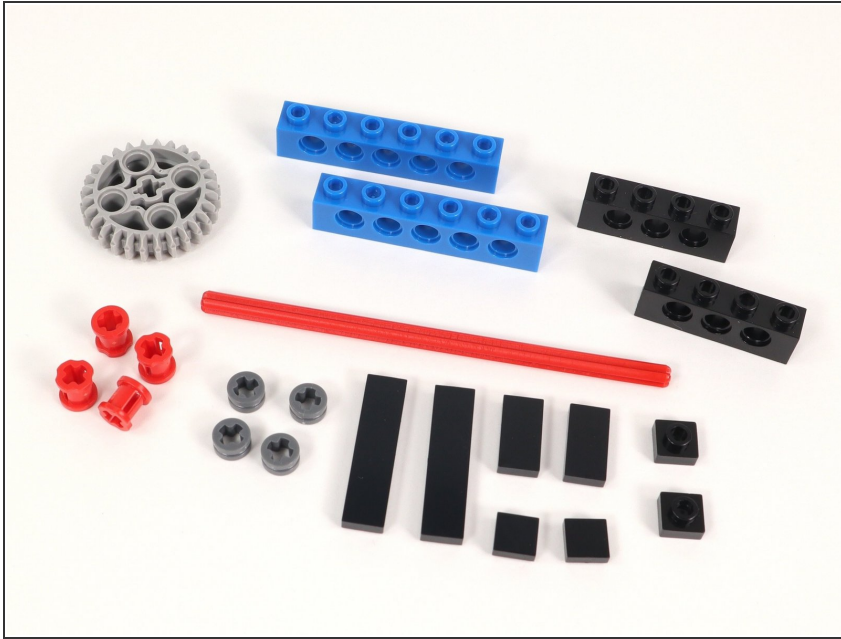
- **Add (2) 2x6 tiles** to cover the top of Section 1.

Step 15 — Section 1 - Add More Tiles



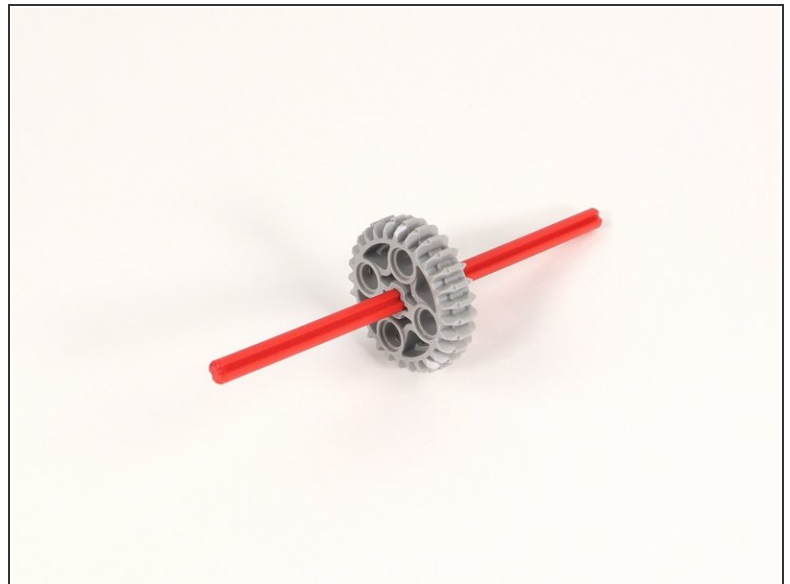
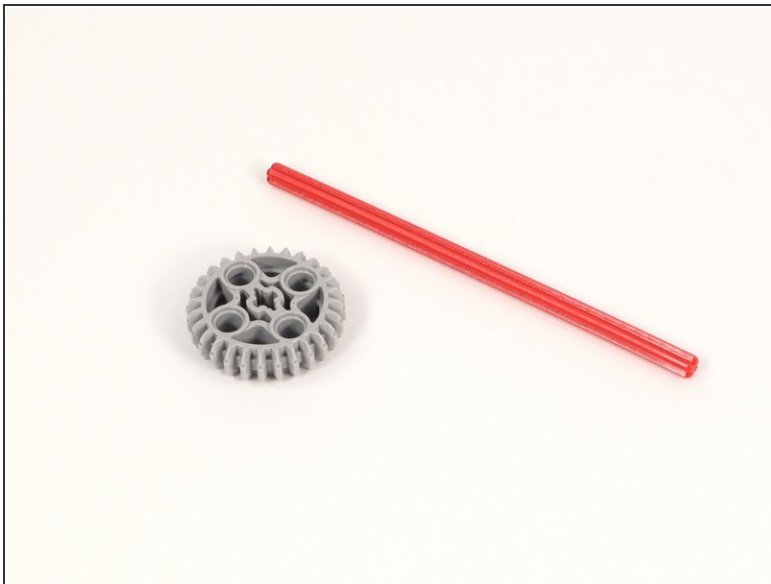
- **Add (2) 1x2 tiles** to the remaining exposed studs on Section 1.

Step 16 — Section 2 - Gather Parts



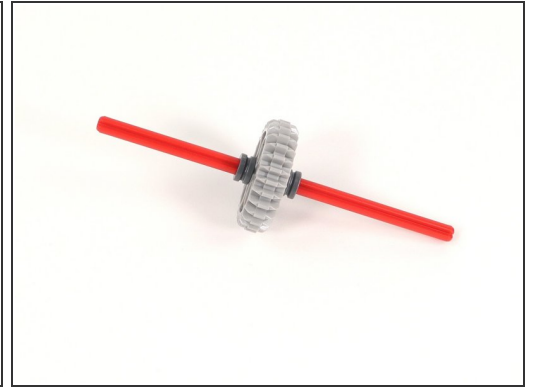
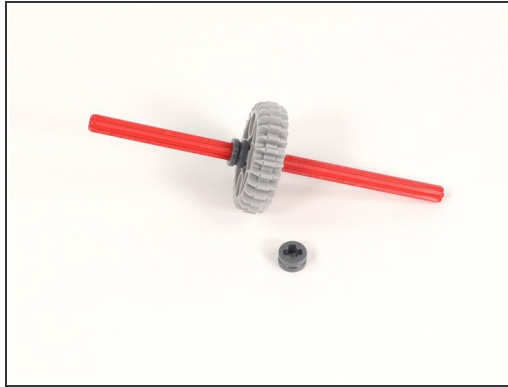
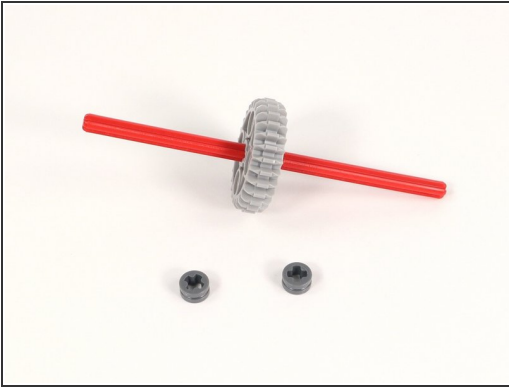
- **Gather the parts you will need for Section 2.**

Step 17 — Section 2 - Add Gear to Axle



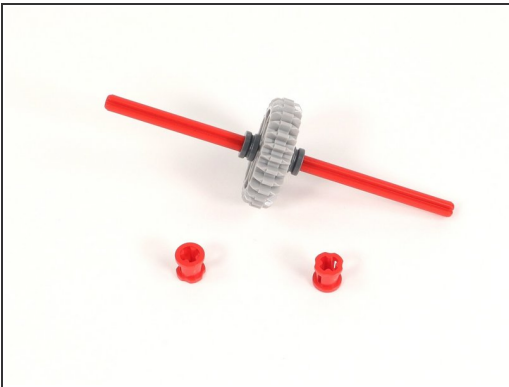
- **Add the large gear** to the center of the 12-stud long axle.

Step 18 — Section 2 - Add Half Bushings



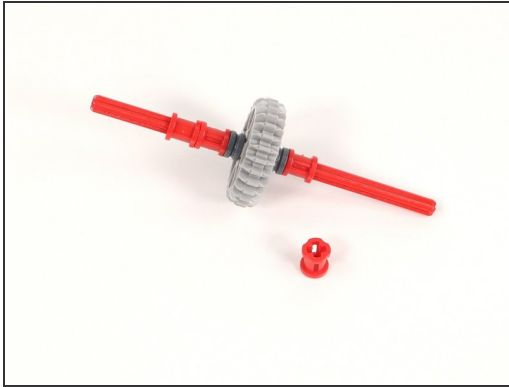
- Add a **half bushing** to **each side** of the large gear.

Step 19 — Section 2 - Add Full Bushings



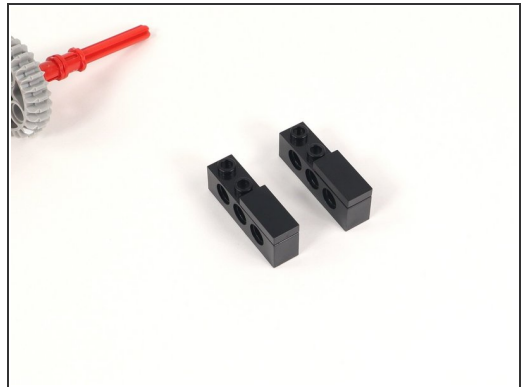
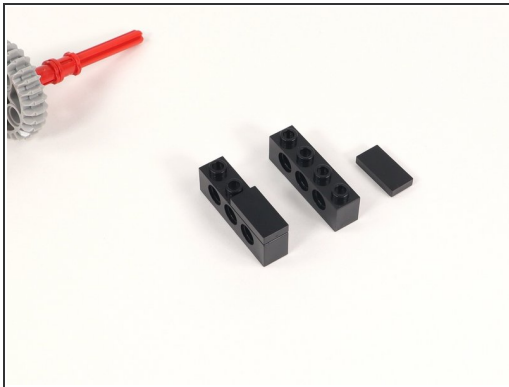
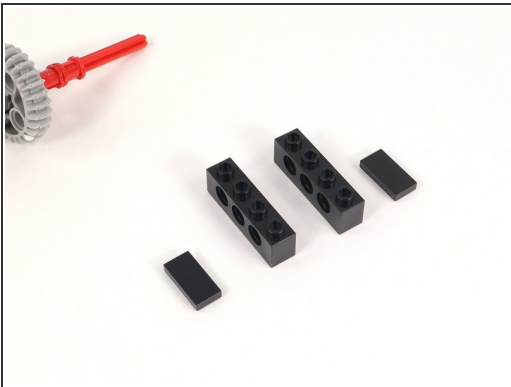
- Add a **full bushing** to **each side** of the large gear.

Step 20 — Section 2 - Add More Full Bushings



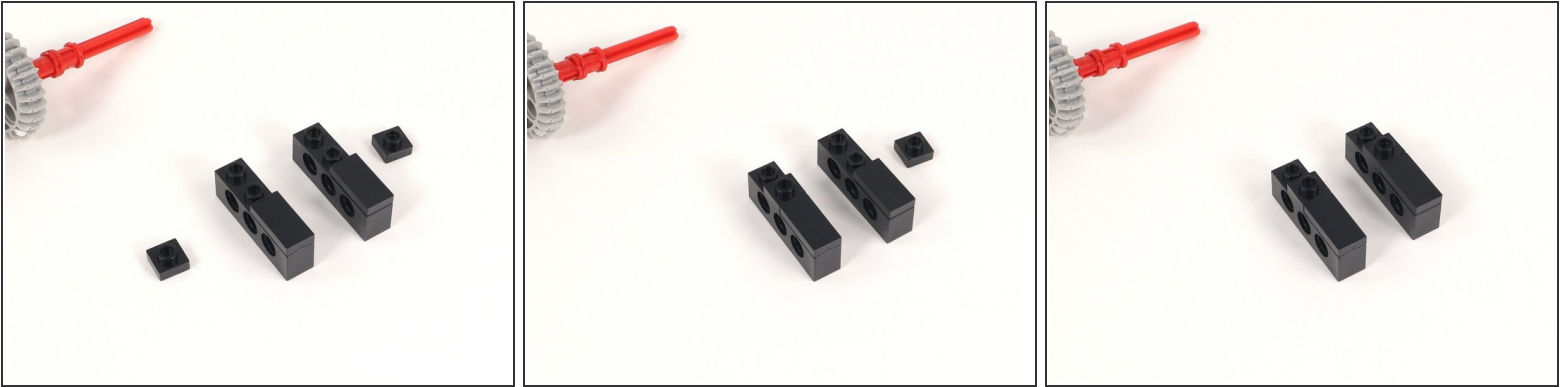
- Add **another full bushing to each side** of the large gear.

Step 21 — Section 2 - Add Tiles to Bricks with Holes



- Add a **1x2 tile** to the last two studs of a 1x4 brick with holes. **You will need two of these.**

Step 22 — Section 2 - Add Plates



- **Add a 1x1 plate** to each 1x4 brick with holes adjacent to the 1x2 plate added in the previous step.

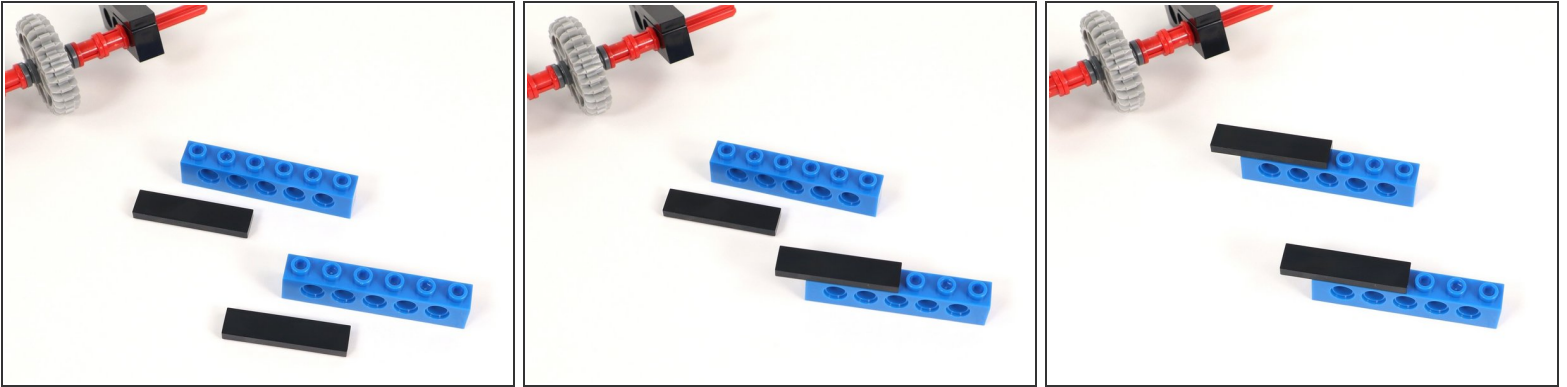
Step 23 — Section 2 - Add Bricks with Holes to Axle



- Slide one of the **1x4 brick with holes** onto **each end of the axle**.

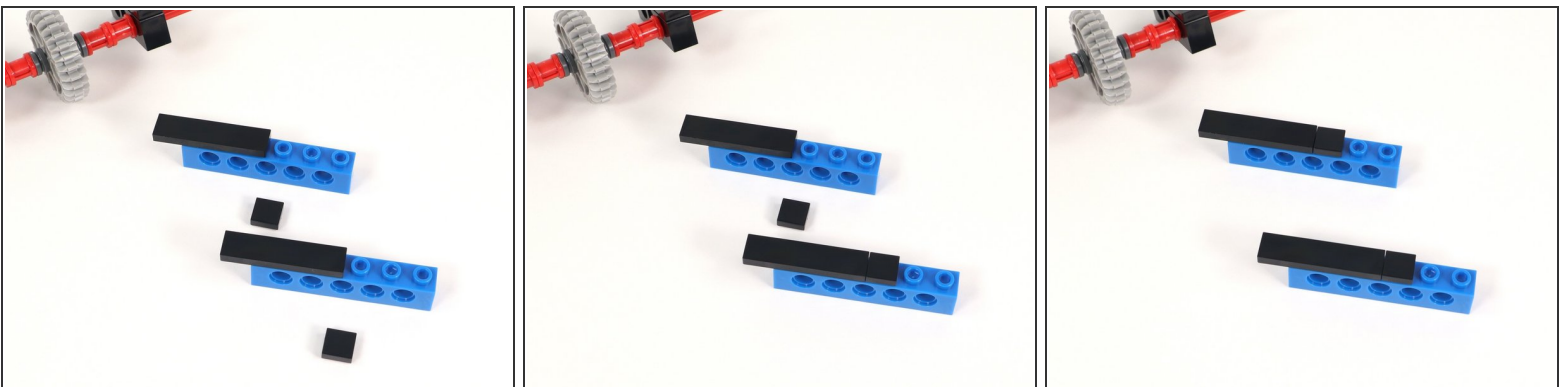
❗ The axle should be through the first hole (under the 1x2 tile).

Step 24 — Section 2 - Add Tiles to Bricks with Holes



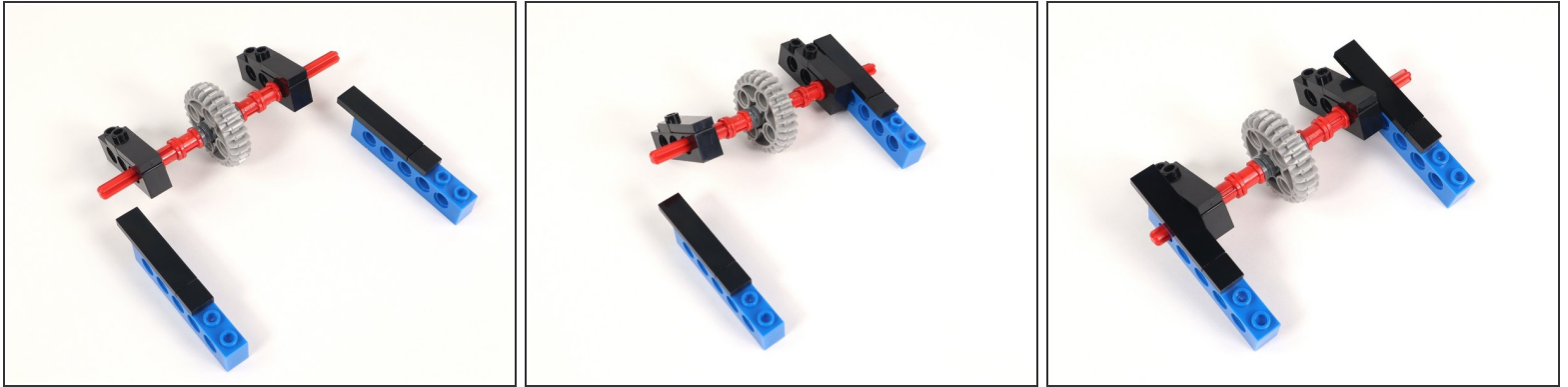
- **Add a 1x4 tile to the three studs on one end of a 1x6 brick with holes. You will need two of these.**
- ① One stud of the the tile will stick off the end of the brick. You should have three studs still exposed.

Step 25 — Section 2 - Add Tiles



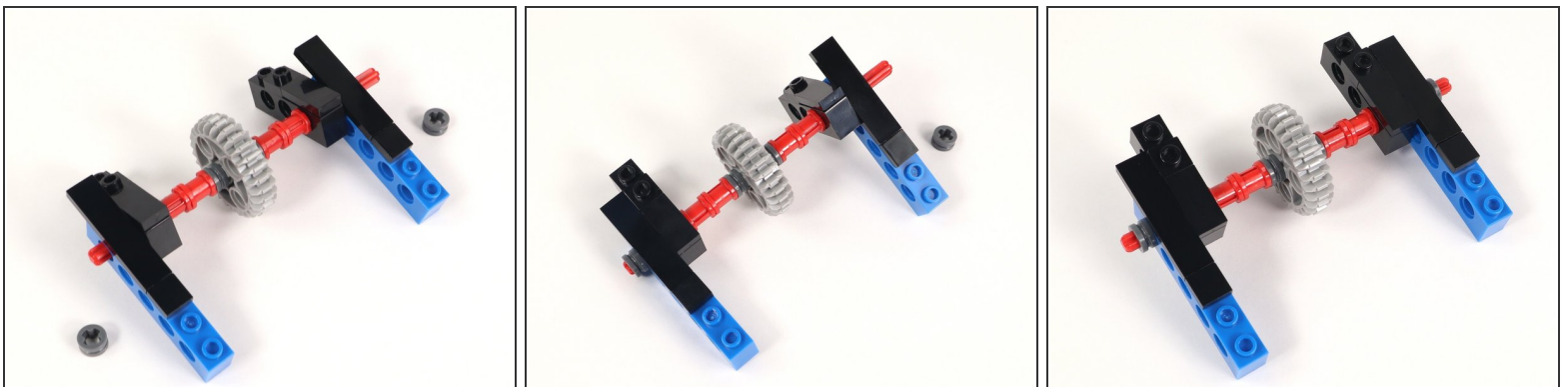
- **Add a 1x1 tile on the next open stud of each brick.**

Step 26 — Section 2 - Add Bricks with Holes to Axle



- **Add the bricks** with holes to **each side of the axle**. The axle should go through the very last hole under the 1x4 tile.
- ① Since the bricks with holes can swing around the axle, pay attention to photo three to assure your build is accurate.

Step 27 — Section 2 - Add Half Bushings



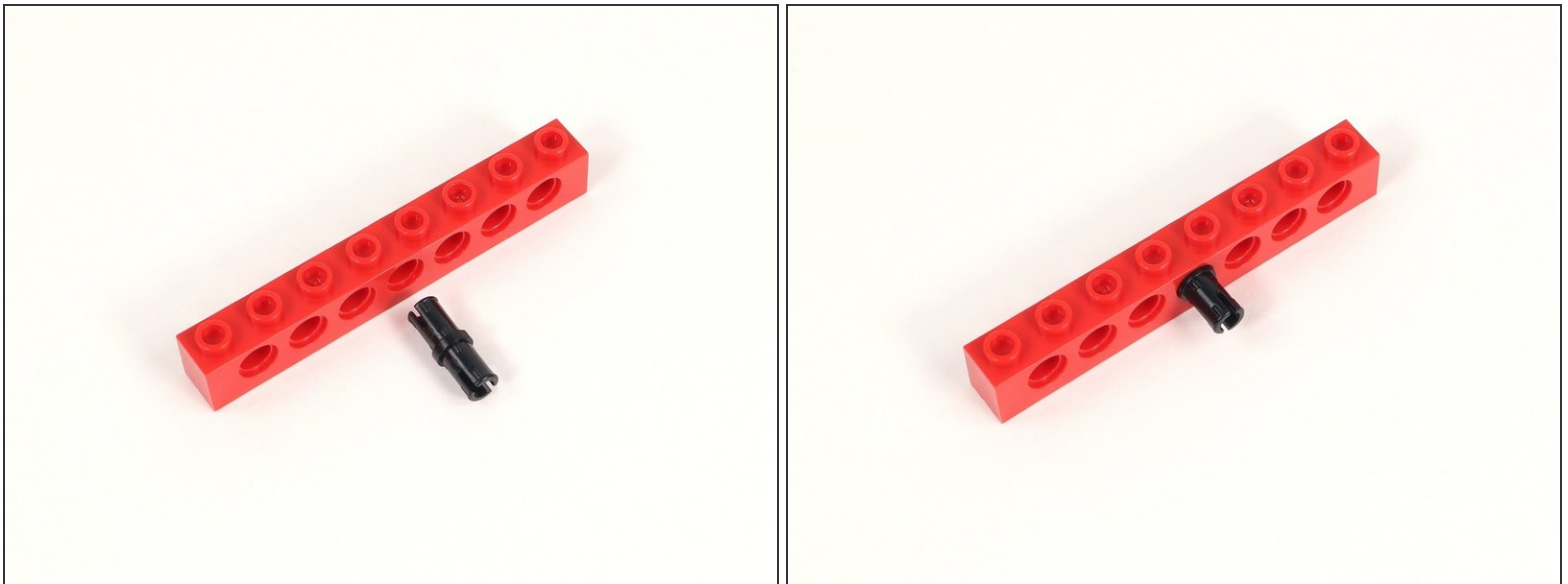
- **Add a half bushing** to each end of the axle to hold everything in place.
- ① The bricks may spin around the axle at this point. Do not worry about that since we will address it when we connect Section 1 and Section 2.

Step 28 — Section 3 - Gather Parts



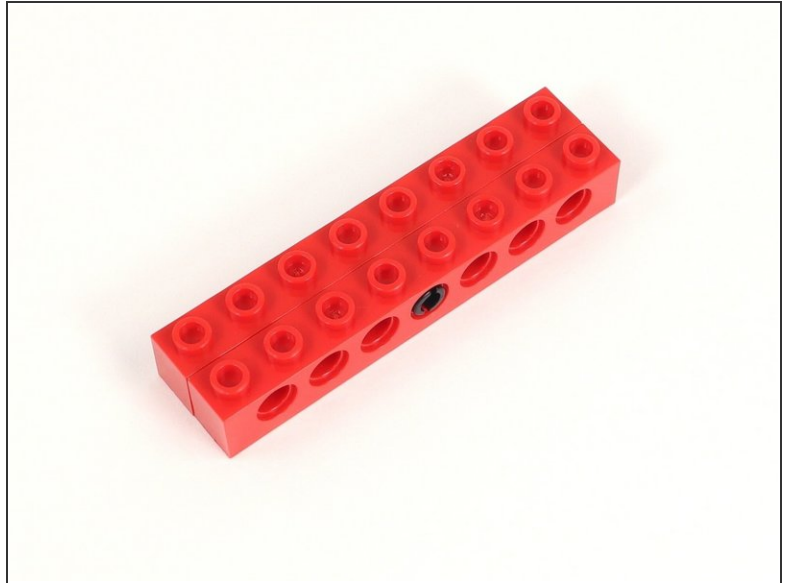
- **Gather the parts** you will need for **Section 3**.
- ① There are two different build options for the arms. With the pieces you have you can build both options and change them up as you would like. Option 1 has the black bent beams and Option 2 has the blue bent beams.

Step 29 — Section 3 - Add Pin to Brick with Holes



- **Add a black pin** to the center hole of a 1x8 brick with holes.

Step 30 — Section 3 - Add Brick with Holes



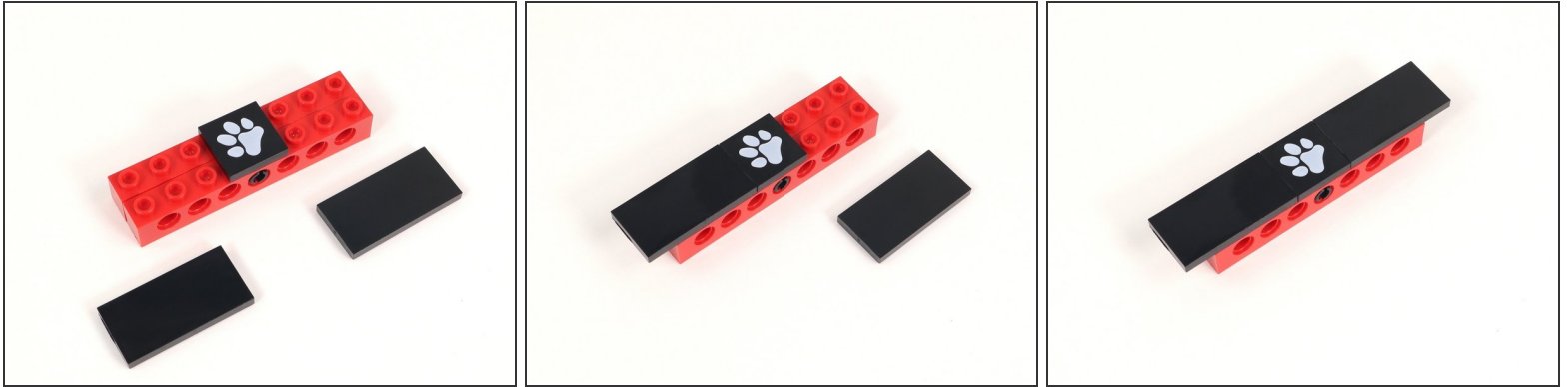
- **Add a second 1x8 brick with holes** to the other side of the black pin.

Step 31 — Section 3 - Add Paw Print Tile



- **Add the 2x2 tile with a paw print** to the middle four studs of the build.

Step 32 — Section 3 - Add Tiles



- Add a **2x4 tile** on either side of the paw print tile. Each of those tiles should hang off the build by one column of studs.

Step 33 — Section 3 - Add Gears to Axles



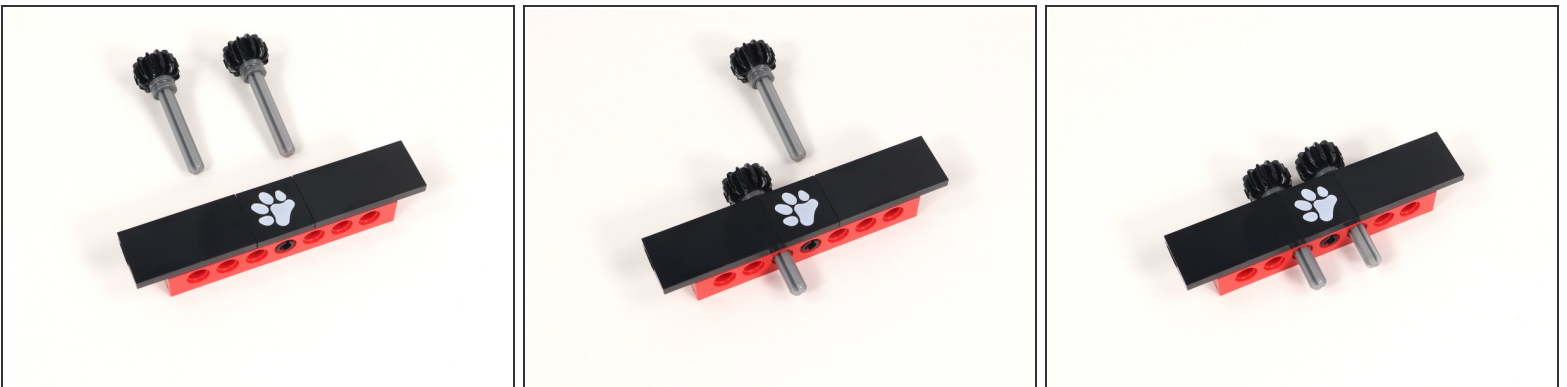
- Add a **small black gear to an axle with end stop** and push it all the way down to the end stop. You will need two of these.

Step 34 — Section 3 - Add Half Bushings to Axles



- **Add a half bushing** to each axle and push it all the way down to the gear.

Step 35 — Section 3 - Add Axles to Bricks with Holes



- **Insert the axles** through the holes to the left and right of the center hole (that has a black pin in it) from the back so the open end of the axle is facing the front.

Step 36 — Claw Arms Option 1 - Insert Axles



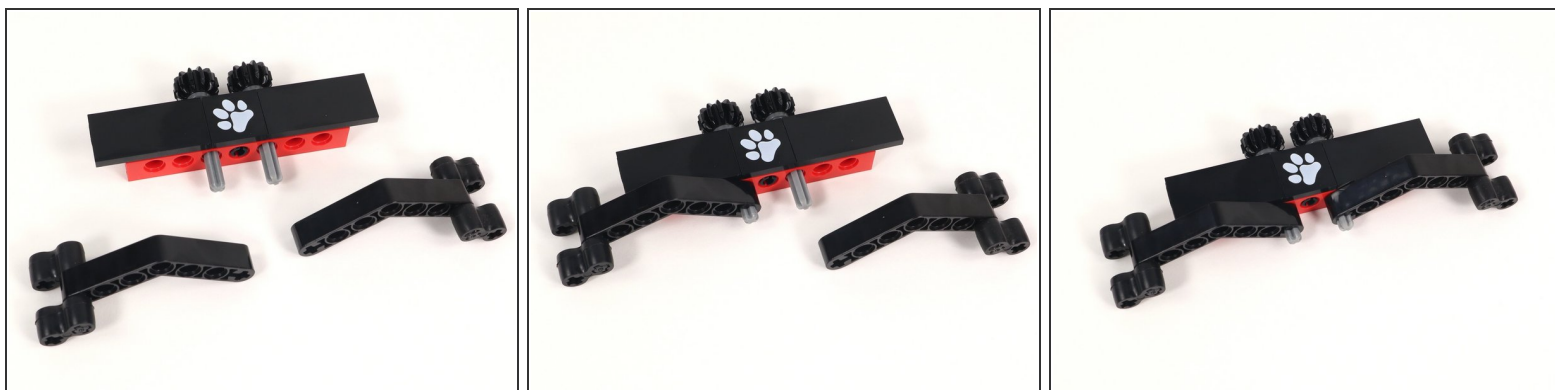
- ① There are two different options for arms on the Claw attachment. These are the steps for option 1.
- Insert a **3 stud long black axle** into the plus-shaped hole at the end of a black bent beam. **You will need two of these.**

Step 37 — Claw Arms Option 1 - Attach Rubber Grippers



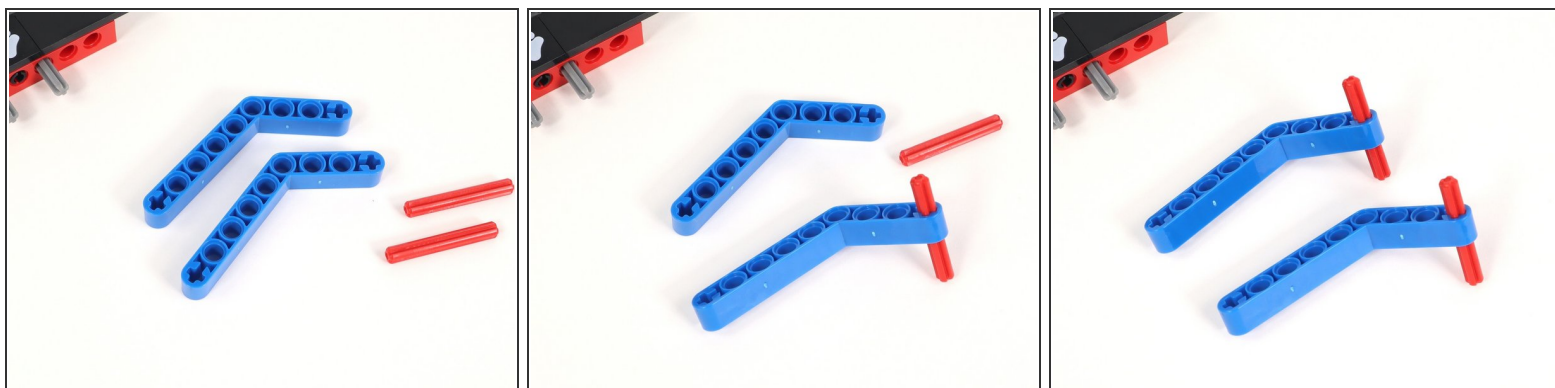
- ① There are two different options for arms on the Claw attachment. These are the steps for option 1.
- **Attach a rubber gripper** to each end of the axle on both grippers as pictured. These can be adjusted when using depending on what you are trying to grab.

Step 38 — Claw Arms Option 1 - Attach to Section 3



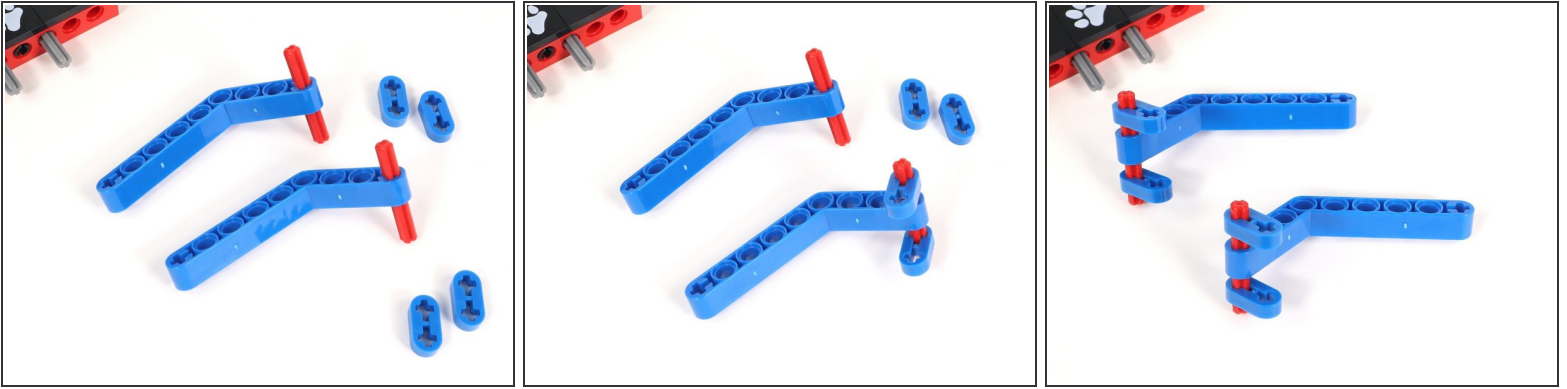
- ① There are two different options for arms on the Claw attachment. These are the steps for option 1.
- **Connect the Claw arms** to the axles on Section 3.

Step 39 — Claw Arms Option 2 - Insert Axles



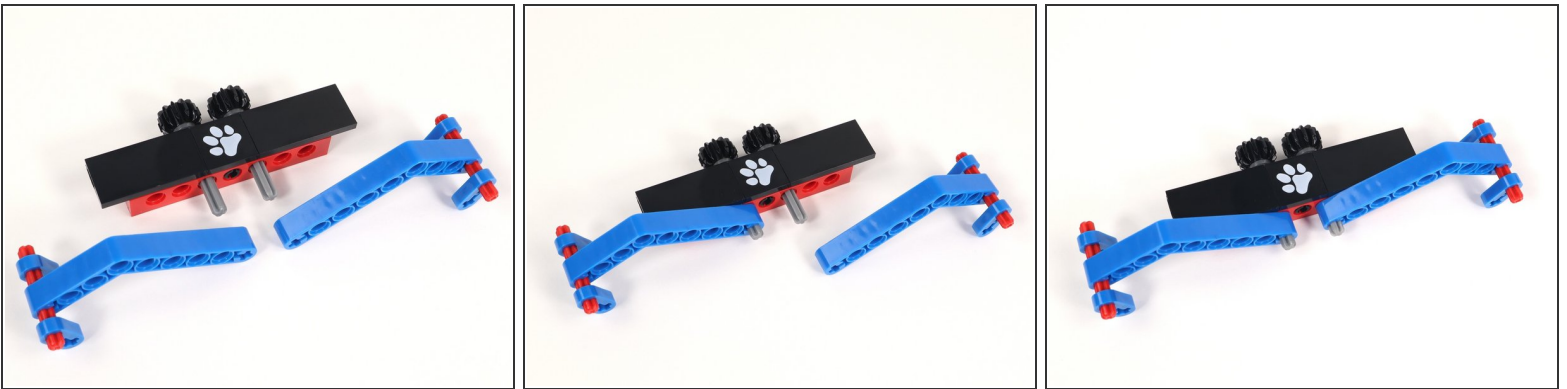
- ① There are two different options for arms on the Claw attachment. These are the steps for option 2.
- Insert a **4 stud long red axle** into the plus-shaped hole at the end of the short side of a blue bent beam. **You will need two of these.**
- ① Since the bent blue beam is not the same length on each side, you can play around with the placement of the axle based on your needs.

Step 40 — Claw Arms Option 2 - Attach Plastic Grippers



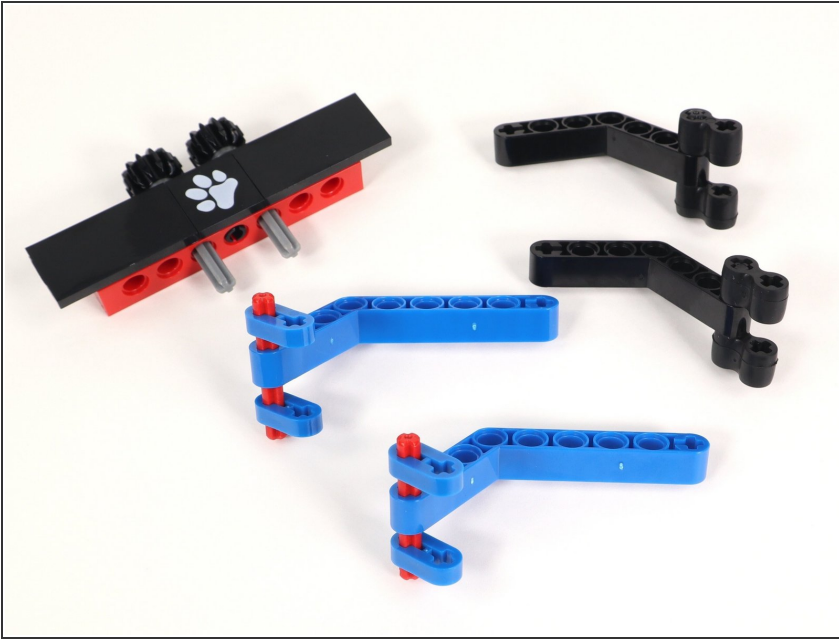
- ⓘ There are two different options for arms on the Claw attachment. These are the steps for option 2.
- **Attach a blue plastic 0.5 beam** to each end of the axle on both grippers. These can be adjusted when using depending on what you are trying to grab.

Step 41 — Claw Arms Option 2 - Attach to Section 3



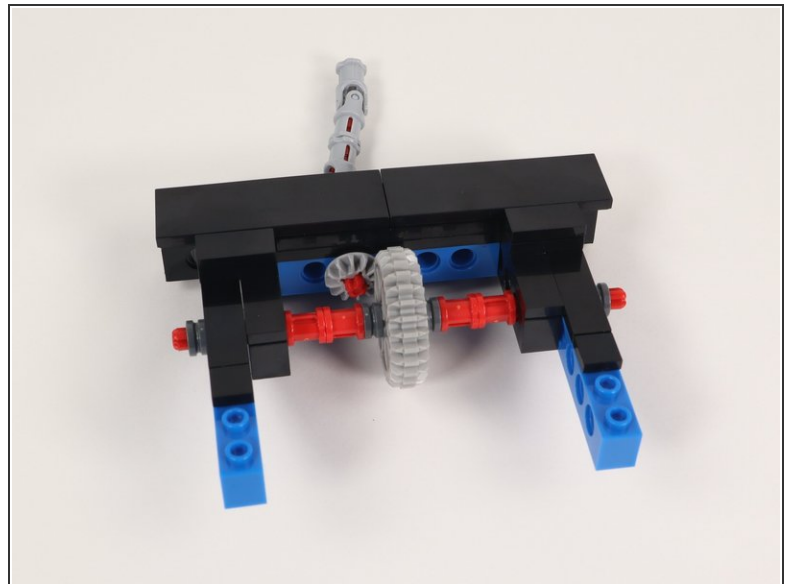
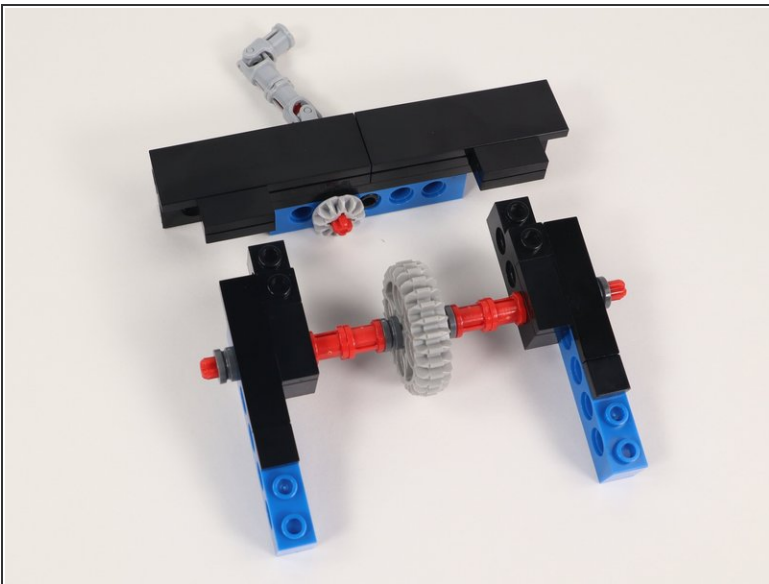
- ⓘ There are two different options for arms on the Claw attachment. These are the steps for option 2.
- **Connect the Claw arms** to the axles on Section 3.

Step 42 — Claw Arms



- Both sets of Claw arms are interchangeable. Do you have a task that needs something different? Change it up or use different pieces that don't come in this kit.
- You could even 3D print a completely new attachment for your Claw. The possibilities are endless!

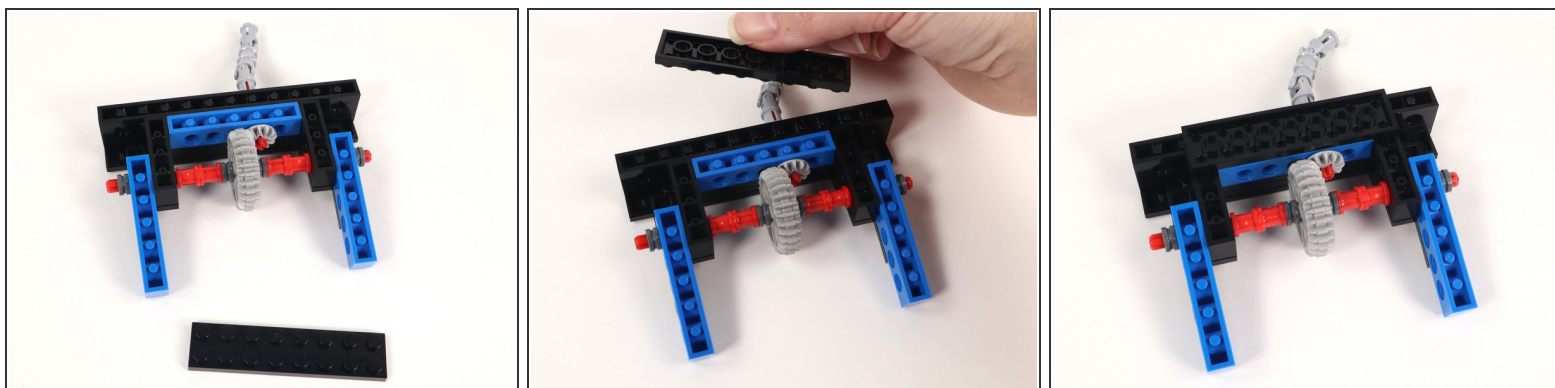
Step 43 — Connect Sections 1 and 2



- **Connect Section 1 and Section 2** by lining up the gears so they interlock and the two open studs on Section 2 snap in place to the bottom side of Section 1.

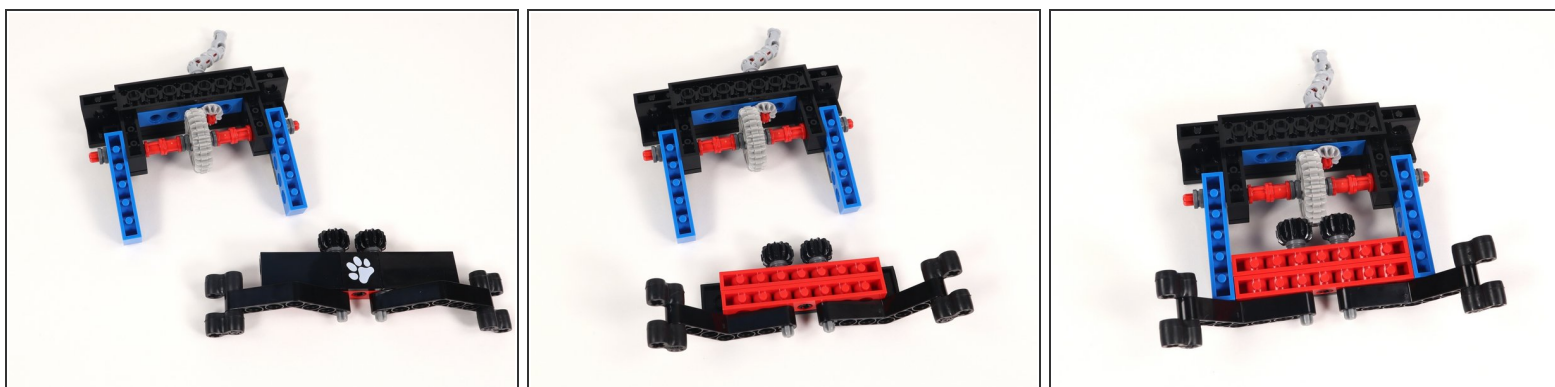
❗ It this point, when turning one gear the other should turn as well.

Step 44 — Reinforce Sections 1 and 2



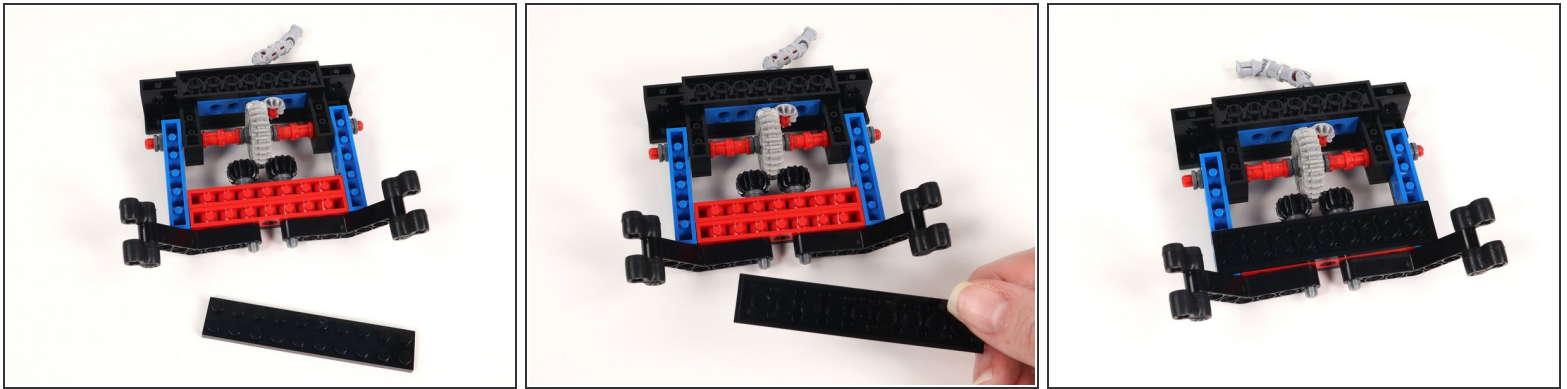
- Now that you have connected Section 1 and Section 2 **flip the build over** and **add a 2x8 plate to the bottom center** of the build. This will help keep the sections together.

Step 45 — Connect to Section 3



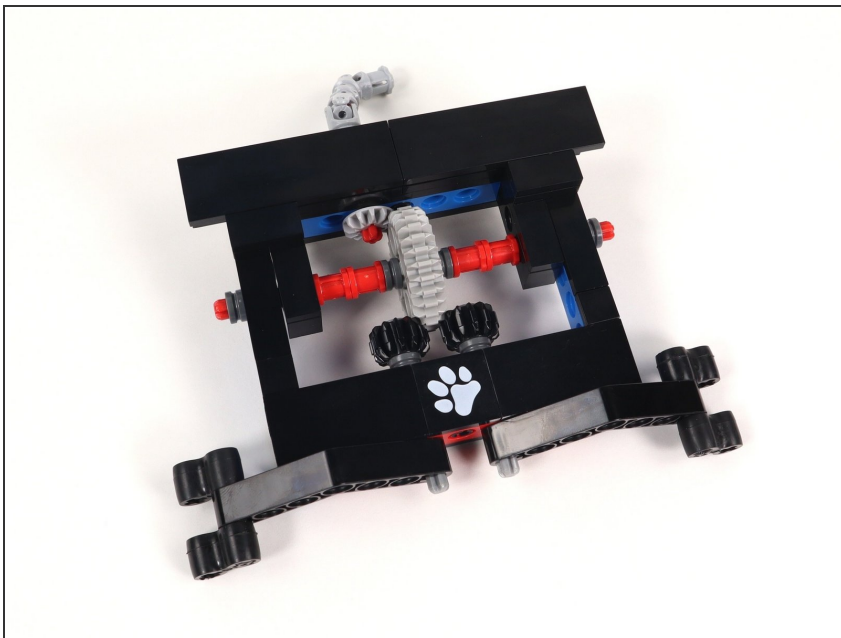
- With Section 1/2 still flipped upside down, take **Section 3** and **also flip it upside down**.
- Make sure that the **Claw arms are laying out to the sides**. This will help ensure that they are aligned correctly with one another once the gears connect.
- Connect the two sections** by inserting the open studs on the blue bricks with holes to the bottom of the black tiles on Section 3. Check to make sure that the teeth on the black gears mesh with the large gear.

Step 46 — Reinforce the Claw



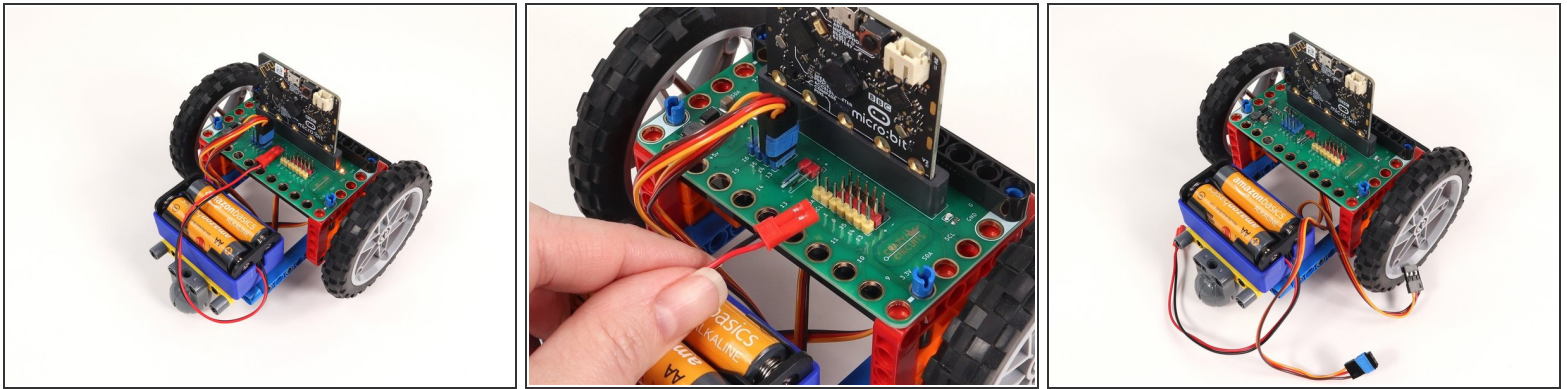
- **Add a 2x10 plate** to the bottom of the build to reinforce the connection of the sections.

Step 47 — Claw Attachment Completed



- You have completed the Claw attachment build! Now we need to make modifications to the [Bit Board Rover](#) so we can connect them.
- If you do not have a completed [Bit Board Rover](#) in hand, follow the directions and build one before proceeding.

Step 48 — Modify Rover - Disconnect Bit Board



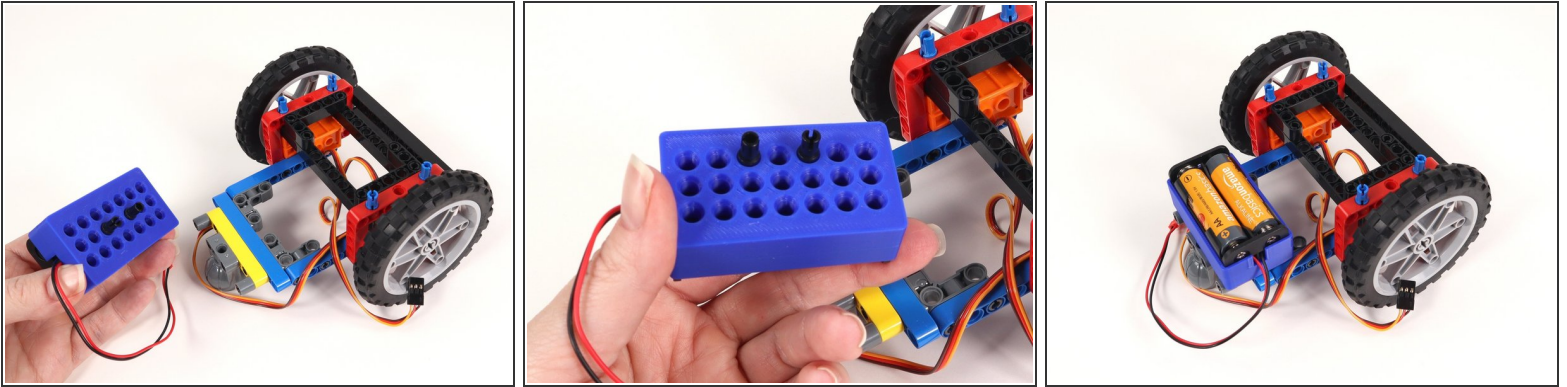
- On the back of the Rover **disconnect the battery pack and both servos** from the Bit Board.

Step 49 — Modify Rover - Remove Bit Board



- **Remove the long black beam** anchoring the Bit Board in place on the front of the Rover.
 - **Remove the Bit Board and MicroBit** from the Rover.
- ⓘ Set the black beam, MicroBit, and Bit Board aside. We will add these back in a later step.

Step 50 — Modify Rover - Move Battery Pack



- **Remove the battery pack** from the back of the Rover.
- **Adjust the location of the two black pins** on the bottom of the battery pack. They should be moved to the top row with an empty hole in between them.
- **Reattach the battery pack** to the Rover. All this did was move the battery pack farther back on the Rover so we can fit a motor on the build for the Claw.

Step 51 — Modify Rover - Remove L-Shaped Beams



- **Remove both L-shaped beams** and the 3 pins holding them in place.

Step 52 — Modify Rover - Remove Beams



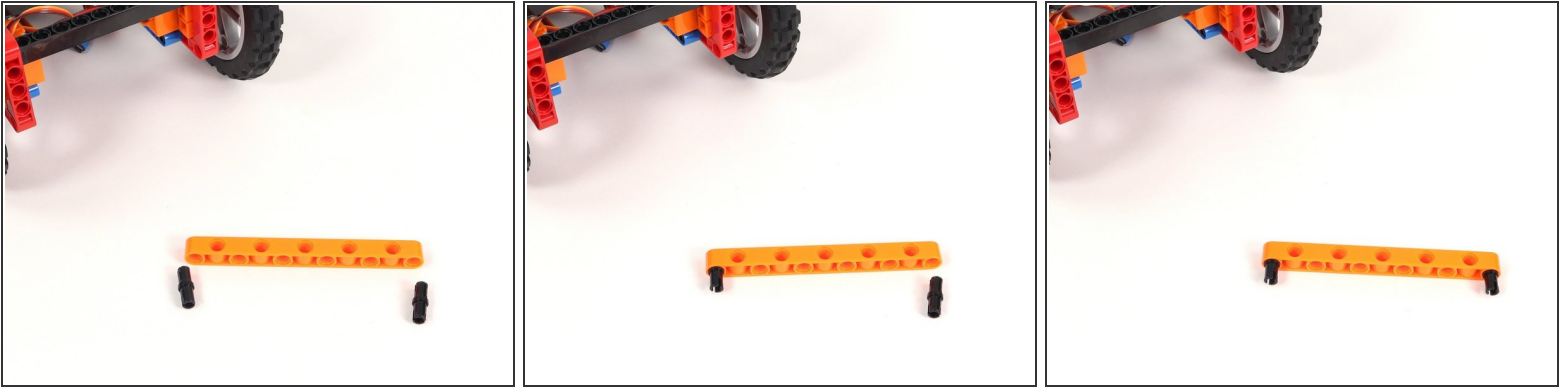
- **Remove the two long black beams** on the front of the Rover as well as the black pins holding them in place.

Step 53 — Modify Rover - Gather Parts



- **Gather the new parts** that will need to be added to modify the Rover.
- ① The gray 270° servo is the one that is used for the Gripper, Sweeper, and Lifter.

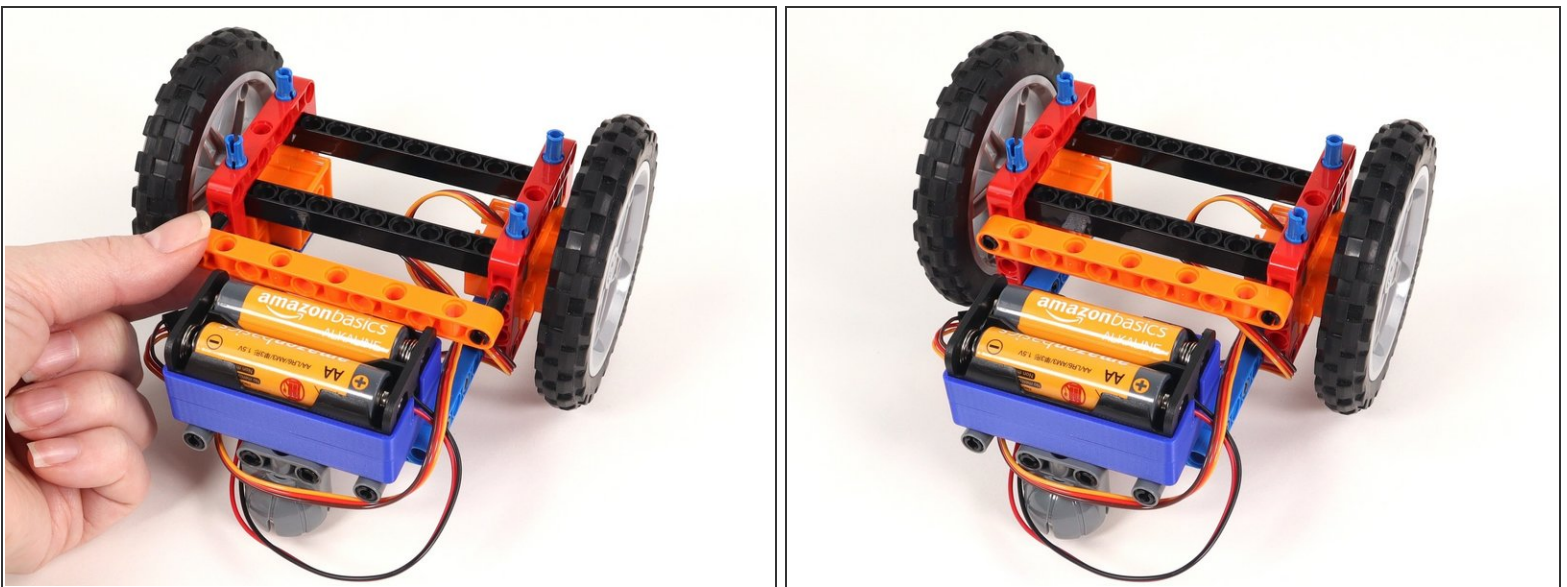
Step 54 — Modify Rover - Add Pins to Beam



- **Add black pins** to the first and last holes on the orange beam with side holes.

ⓘ These pins should be on the side with 6 holes.

Step 55 — Modify Rover - Add Beam to Rover



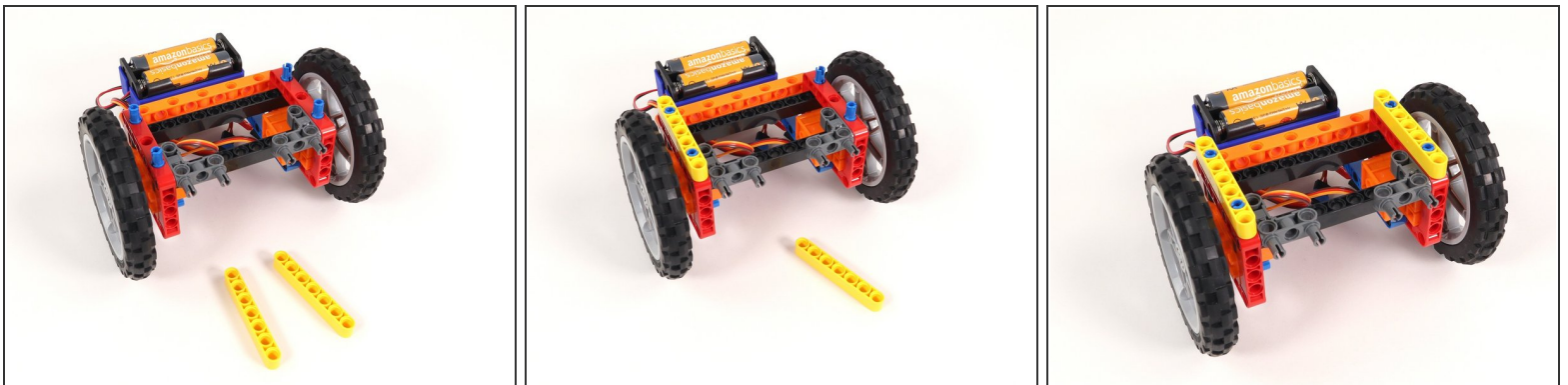
- **Add the orange beam** to the back of the Rover. The black pins should go in the top holes of the red frames.

Step 56 — Modify Rover - Add Gray 90° Connectors



- **Add two gray 90° connectors** to the Rover as shown. One side should connect to the inside of a red frame and the other pins should stick out towards the front of the Rover.

Step 57 — Modify Rover - Add Beams



- **Add a yellow beam** onto the blue pins on each side of the Rover

Step 58 — Modify Rover - Add Blue Pins



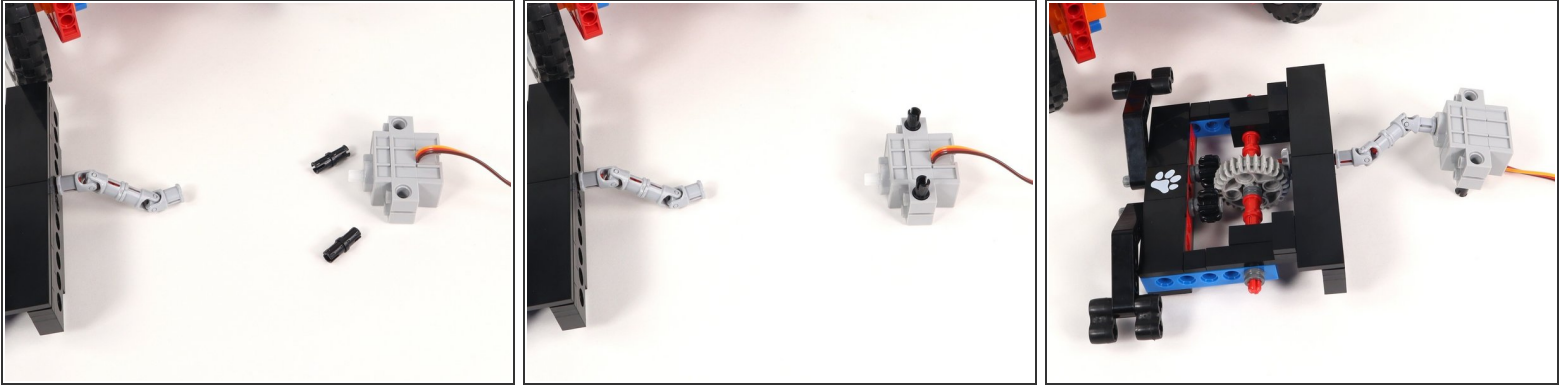
- Add four blue pins into the yellow beams as shown.
- ① The long pins should go in 1/3rd of the way, so make sure you have the orientation correct. (2/3rds should stick out the top.)

Step 59 — Modify Rover - Add Beams



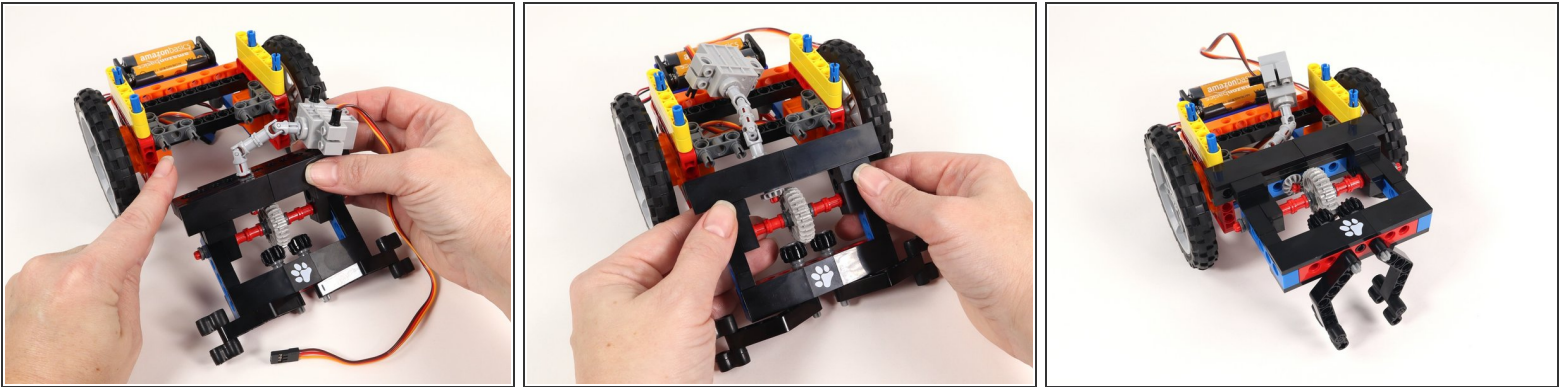
- **Add another yellow beam** onto each set of blue pins.
- ① Since 2/3rds of the blue pins are sticking out, you'll need to make sure to push the yellow beams down all the way so they are touching the other yellow beams. 1/3 of the blue pins should still be sticking out.

Step 60 — Connect Motor



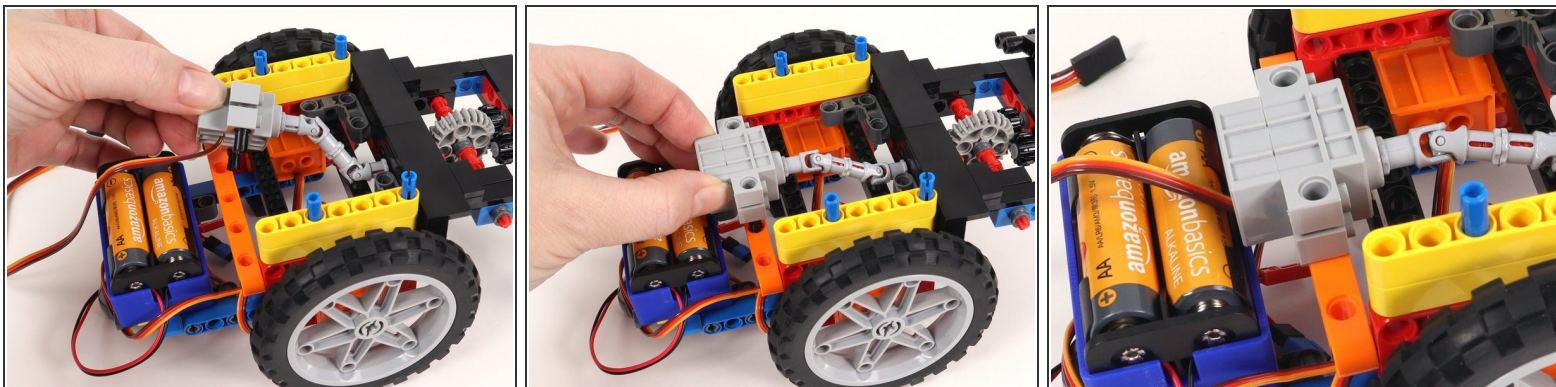
- **Insert two black pins** into the servo on the side where the wires connect.
- **Connect the servo shaft** to the universal joint on the Claw with the black pins and the wires facing down.

Step 61 — Connect Claw to Rover



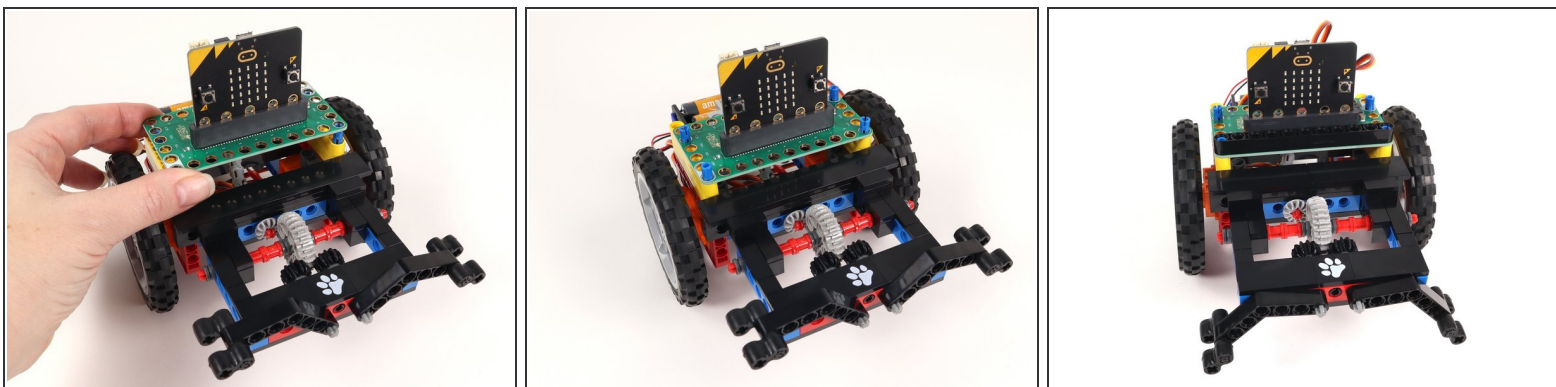
- **Connect the Claw** to the front of the Rover to the gray 90° connectors by pressing it into place on the exposed pins.

Step 62 — Connect Servo to Rover



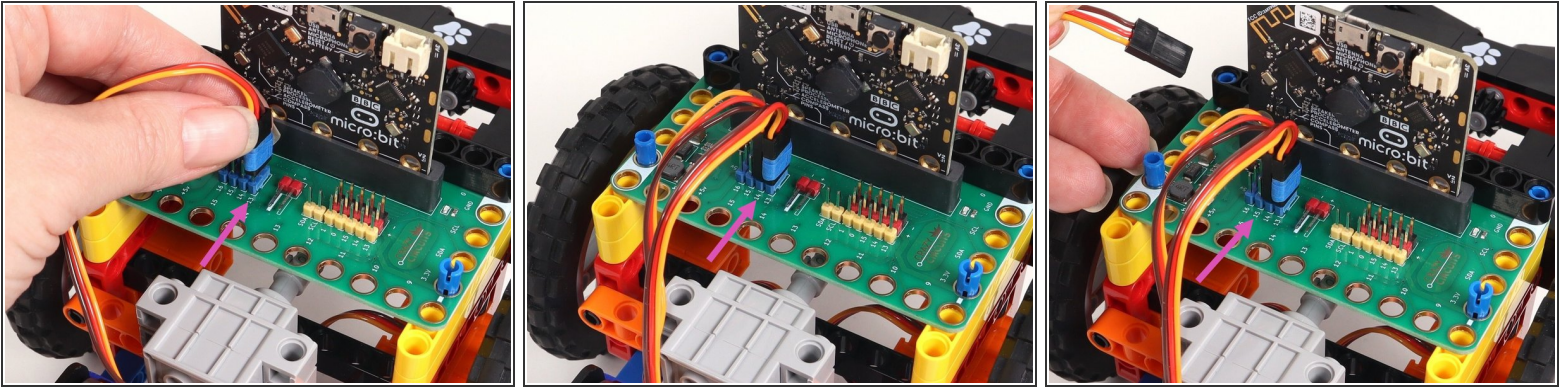
- **Connect the two black pins on the servo to the orange beam with side holes** on the back of the Rover. The wires should be facing the bottom of the Rover.

Step 63 — Add Bit Board



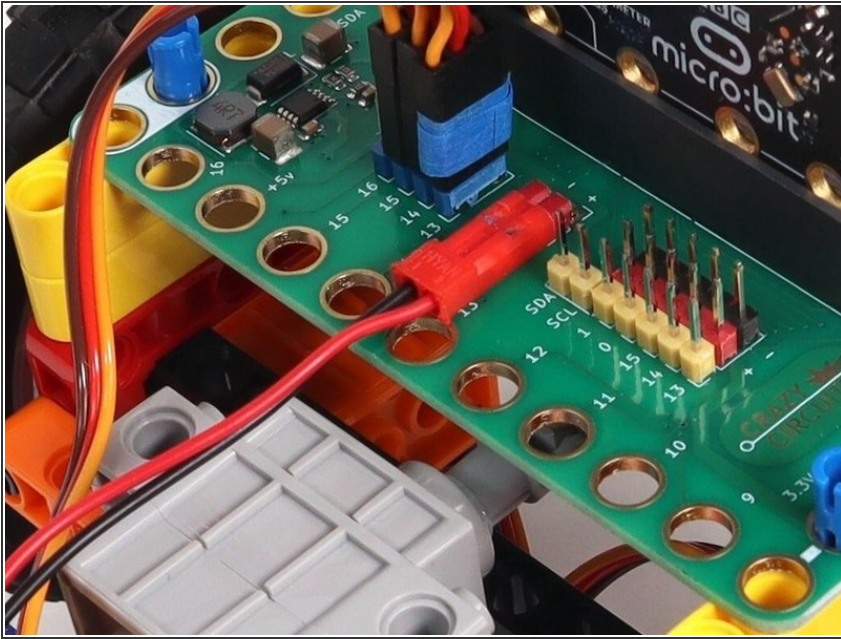
- **Add the Bit Board** on top of the blue pins we added in Step 57.
- ☑ Make sure the front of the Bit Board (and front of the micro:bit) are facing forward on the rover.
- We'll reattach the long black beam onto the blue pins on the front of the Bit Board. This will help hold it securely in place.
- Once the Bit Board is in place we can turn it around to the back so we can plug things back in.

Step 64 — Connect Servos



- Plug the left servo connector into the row for **Pin 13** of the blue 5V pins. The **orange** wire should go to the pin closest to the **13** on the board, the **red** wire goes into the **+5v** row, and the **brown** wire goes into the **-** row, which is ground.
 - Plug the right servo into the row for **Pin 14** of the blue 5V pins, matching the orientation of the servo connector for the left servo.
 - Plug the gray servo connected to the Claw into the row for **Pin 15** of the blue 5V pins, matching the orientation of the servo connector for the other servos.
- ❶ The blue painters tape is there to help delineate the left and right servos. You do not need to add it.

Step 65 — Connect Battery Pack



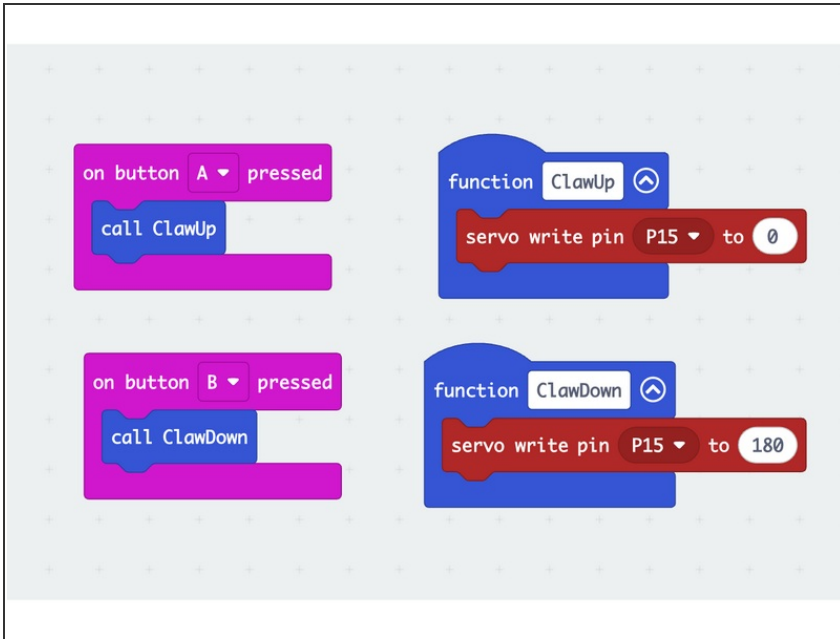
- The last connection is the battery pack. It connects to the Bit Board as shown to provide power to the micro:bit and the servos so your rover can move.

Step 66 — Check Wiring



- Take a moment to double check your wiring.
- Are the servo connectors oriented the right way? Hint: Make note of where the orange wire is.
- Is the battery pack plugged in properly? The red wire should align with the + symbol behind the connector pins and you should see two metal pieces showing through slots in the red plastic housing.
- If everything looks good, keep going!

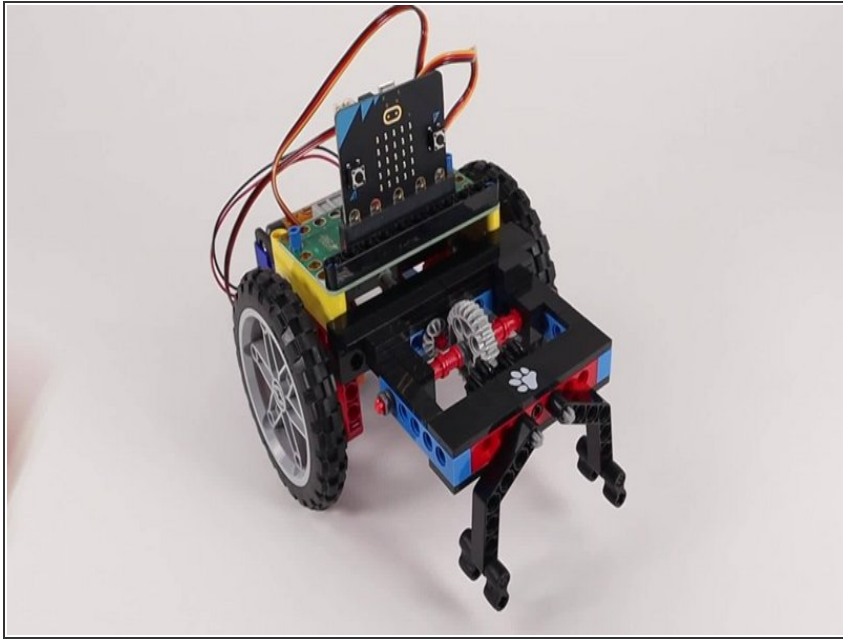
Step 67 — Load the Code - Test Code



⚠ If you've never used a micro:bit before you'll want to check out this guide: [Bit Board V2 Setup and Use](https://makecode.microbit.org/S63169-599...)

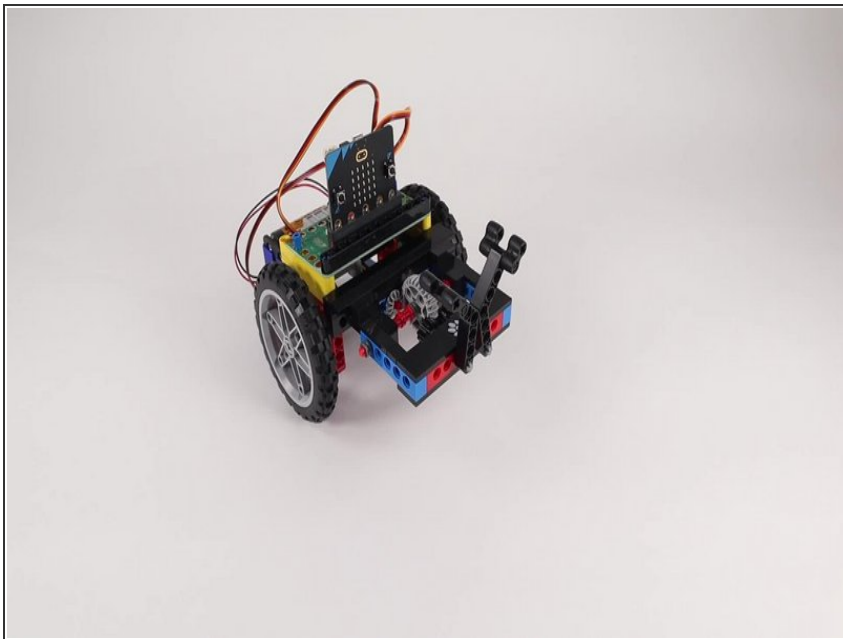
- We're going to load the following code for our Claw Test Code program:
<https://makecode.microbit.org/S63169-599...>
- This code is very simple, and is just meant to test the Claw.
- When you press the **A button** on the front of the micro:bit it should close and raise the Claw arms.
- When you press the **B button** on the front of the micro:bit it should lower and open the Claw arms.

Step 68 — Test It Out!



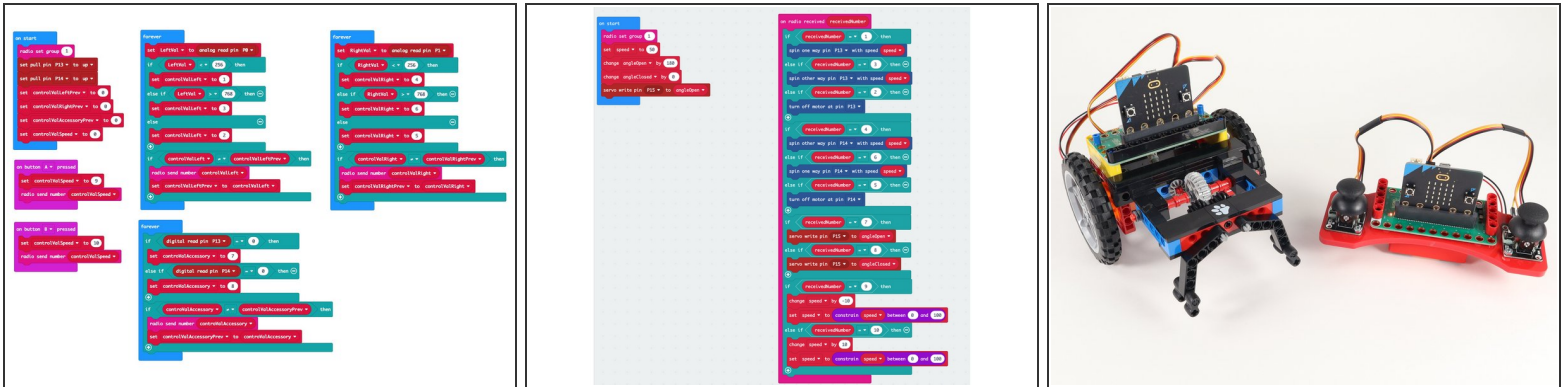
- To test the Claw, power the Bit Board with the battery pack.
- ⓘ If the angles for your Claw arms aren't similar to the video, check out the next step for troubleshooting.

Step 69 — Arm Adjustment



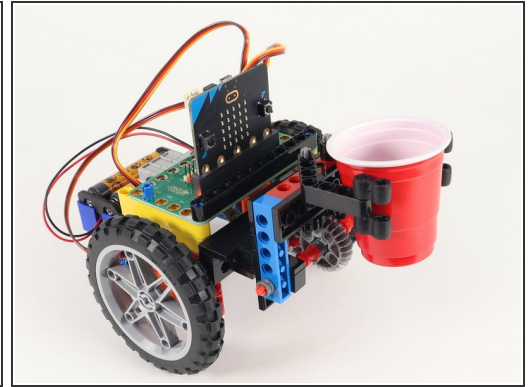
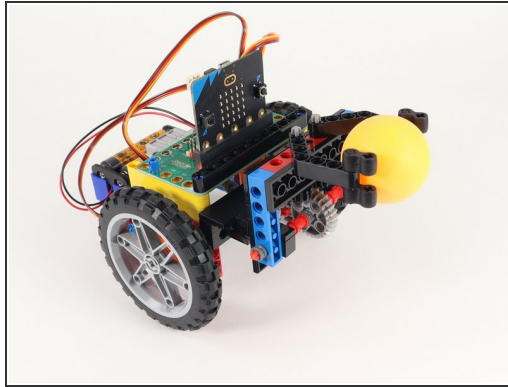
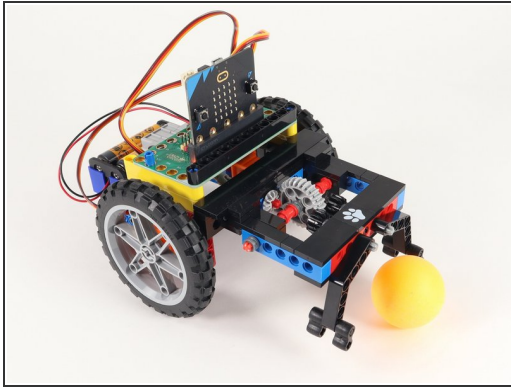
- If, when you test out the Claw, the arms rotate all the way to the top and are not aligned properly follow these steps:
- **After pressing Button B**, remove both arms from the axles.
- Reattach the arms at the correct open angle as shown in the video.

Step 70 — Remote Control with Claw



- If you've got a [Rover Thumbstick Remote](#) you can use the following code to control the Rover and Claw
 - Load the following code: **Rover Thumb Remote TX** program to the micro:bit **on the remote**:
<https://makecode.microbit.org/S00082-291...>
 - Load the code for the **Rover Thumb Remote Claw RX** onto the micro:bit **on the Rover**:
<https://makecode.microbit.org/S10511-326...>
- ❗ The TX stands for "Transmitter" which is the Remote. The RX stands for "Receiver" which is the Rover with the Claw.
- ❗ Note that we've set the radio group to 1 on both micro:bits. You can choose any number you want as long as the two micro:bits use the same number. For a classroom setting with multiple pairs you'll want each set to have a different number.
- Once the code is loaded you can drive around your Rover and lift things!

Step 71 — Find Items to Lift



- The Claw is a tricky attachment to use. It takes the right item and some practice to grab and lift an item successfully. We suggest ping pong balls or small cups as the first items you try to grab.
- What else can you grab and lift? Can you print a 3D object that is easy to grab? Can you build something that won't fall out of the Claw when lifted? This takes quite a bit of trial and error to find just the right items!