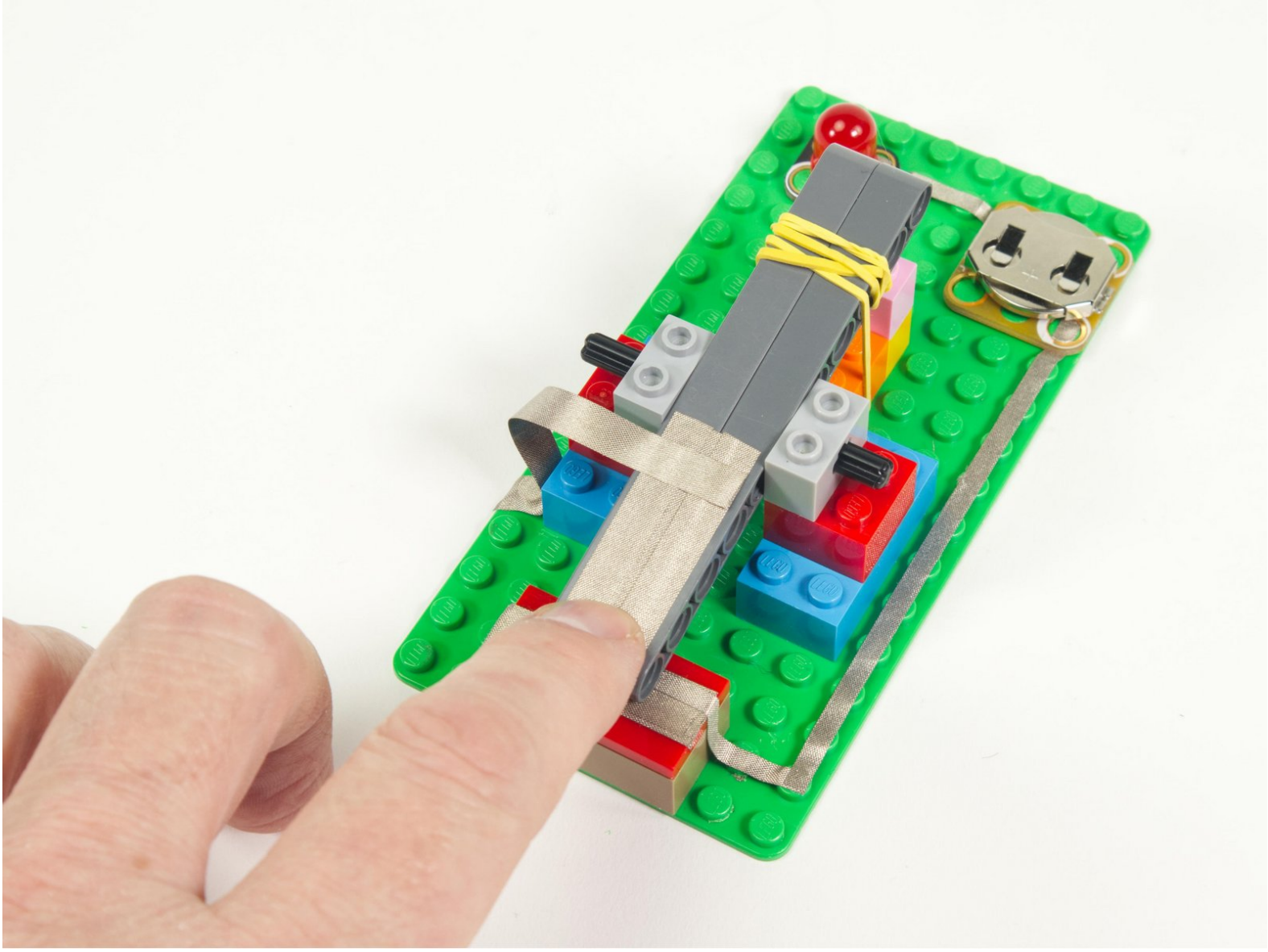
Telegraph Key Switch

Build this Telegraph-style Key Switch with LEGO and Maker Tape!

Written By: Pete Prodoehl



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INTRODUCTION

Build this Telegraph-style Key Switch with LEGO and Maker Tape!

You can use it for any circuit that needs a switch, and it works great with our Crazy Circuits parts including the Bit Board with micro:bit

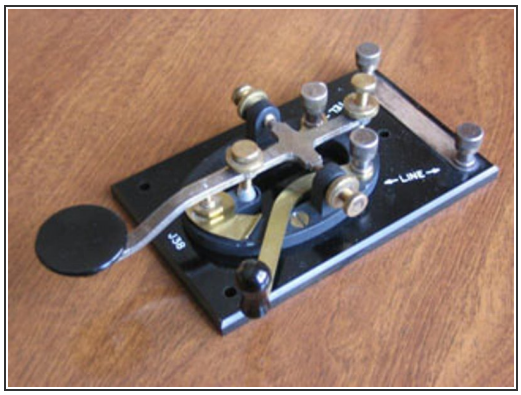
TOOLS:

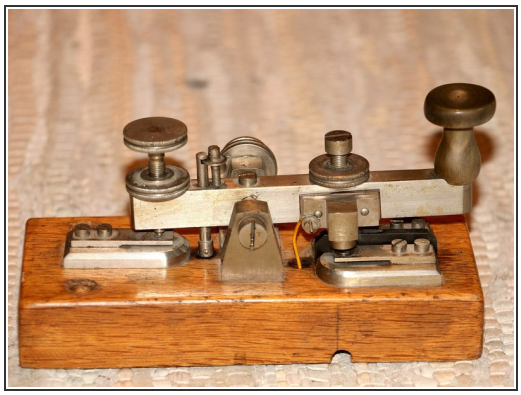
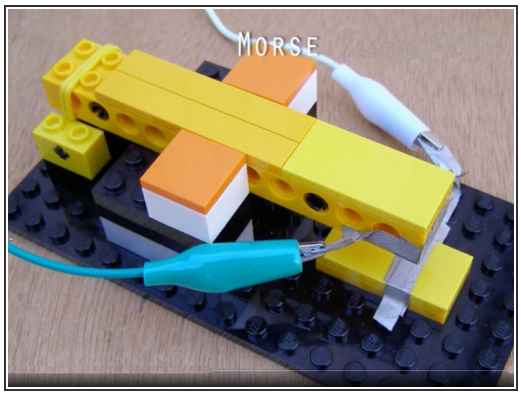
- Scissors (1)

PARTS:

- Maker Tape (1)
  1/8" & 1/4"
- LEGO Baseplate (1)
- Misc LEGO Parts (1)
- LEGO Beam 11 (32525 / 64290) (2)
- LEGO Brick 1 x 2 with Axle Hole (32064) (2)
- LEGO Tile 2 x 4 (87079) (1)
- LEGO Axle 6 (3706) (1)
- Rubber Bands (1)

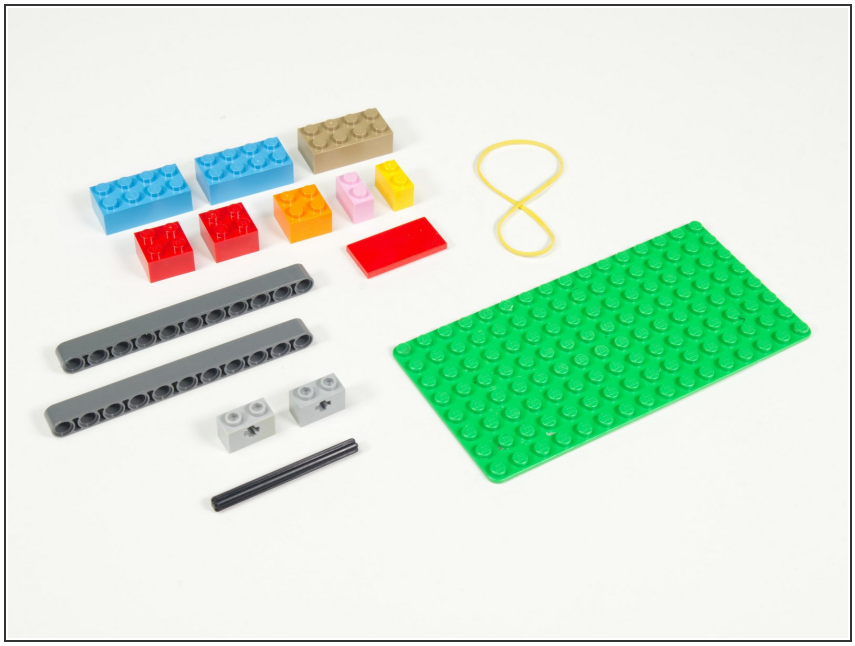
Step 1 — What is a Telegraph Key?



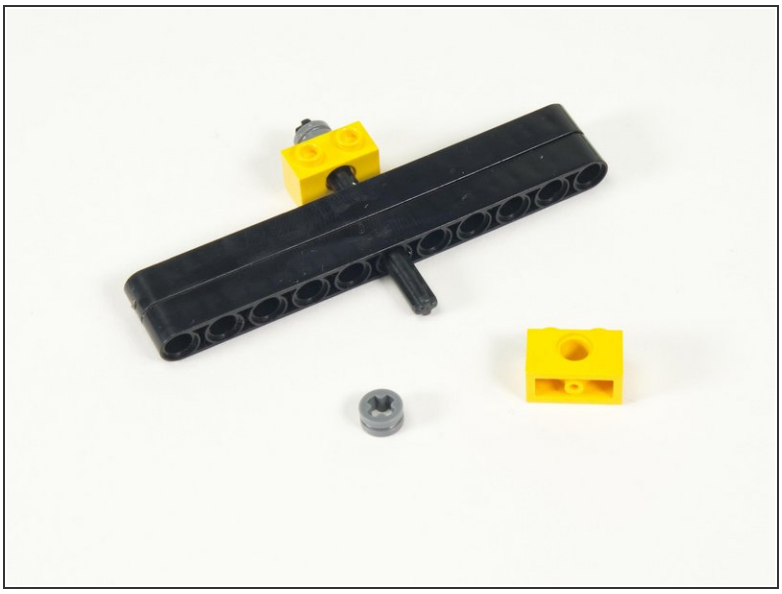
- A **Telegraph Key** is used for sending Morse code, and it's sometimes called a **Morse Key**. This isn't exactly a Telegraph Key but the design is similar enough that we're going to call it that.
- We were inspired to build our version after seeing the one that Martine Segers built.

Step 2 — Gather Materials



- We're going to use a few specific LEGO parts, but we'll also highlight some alternate parts you can use.
- Besides the normal bricks and baseplate we're using the following parts:
  - 2 x LEGO Beam 11 (32525 / 64290)
  - 2 x LEGO Brick 1 x 2 with Axle Hole ('X' Opening) (32064)
  - 1 x LEGO Tile 2 x 4 (87079)
  - 1 x LEGO Axle 6 (3706)
  - 1 x Rubber Band

Step 3 — Alternate Parts

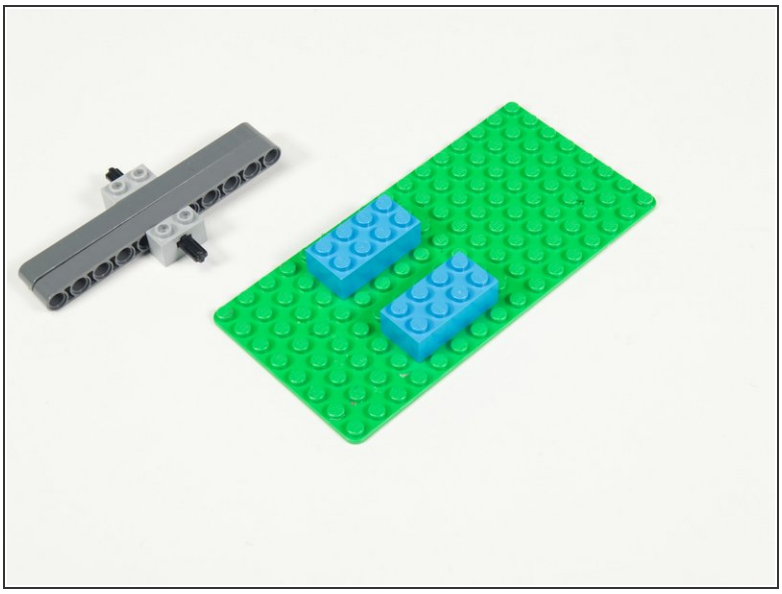


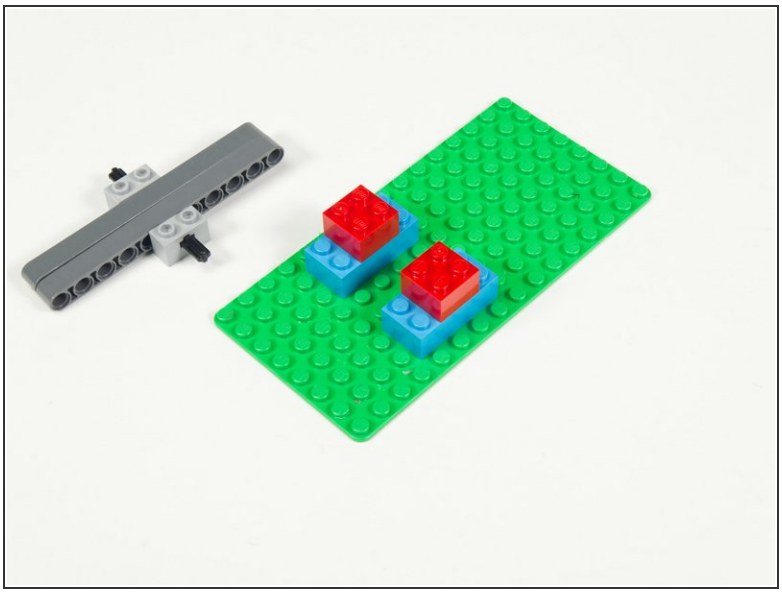
- If you don't have any 1 x 2 bricks with axle holes you can instead use two LEGO Brick 1 x 2 with Hole (3700).
- You'll also need some bushings to hold the axle in place. You can use the LEGO Half Bushing (32123 / 42136) or LEGO Technic Bush 1/2 with Teeth Type 1 (4265) or LEGO Technic Bush 1/2 with Teeth Type 2 (4265).

Step 4 — Add Lever

- We'll start by creating the lever.
- Place the axle through the two beams at the center with the two 1 x 2 bricks with axle holes on either side.

Step 5 — Add Lever Support Bricks





- Add two 2 x 4 bricks to a baseplate. (If using a small baseplate make note of the position so you can fit the whole mechanism.)
- Add two 2 x 2 bricks centered on top of the 2 x 4 bricks.
- This will serve as the support platform for the lever mechanism we've already assembled.

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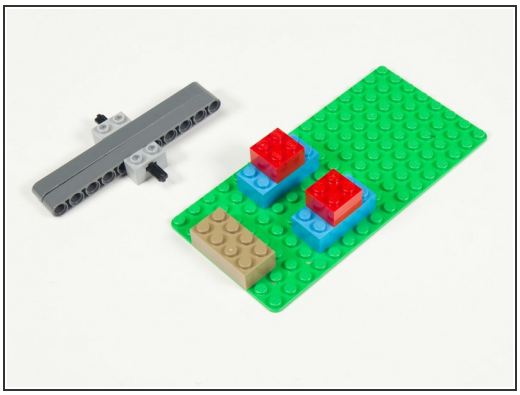
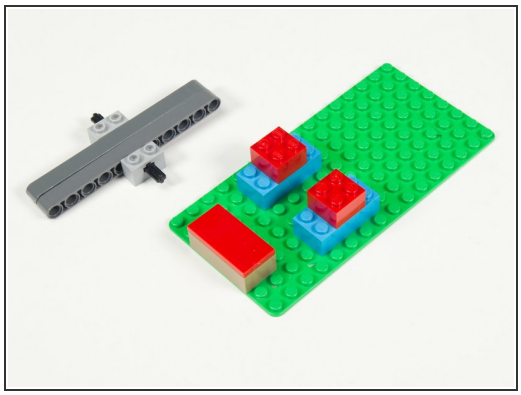
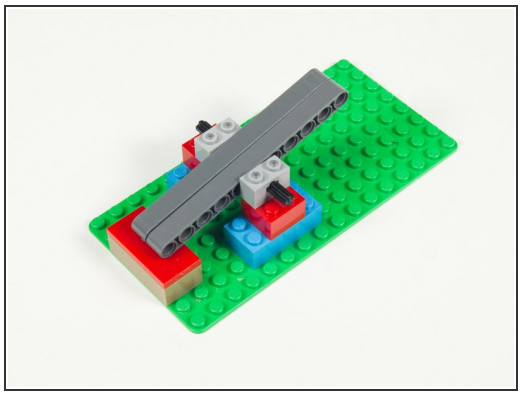
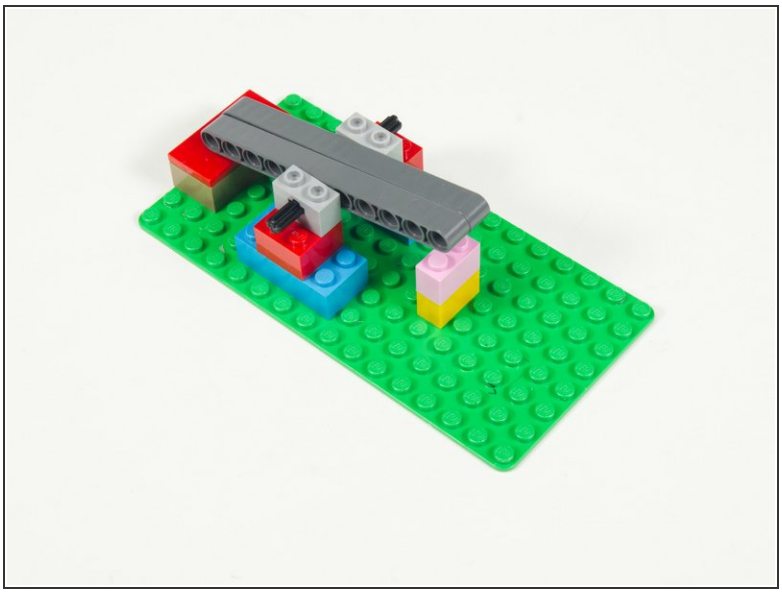
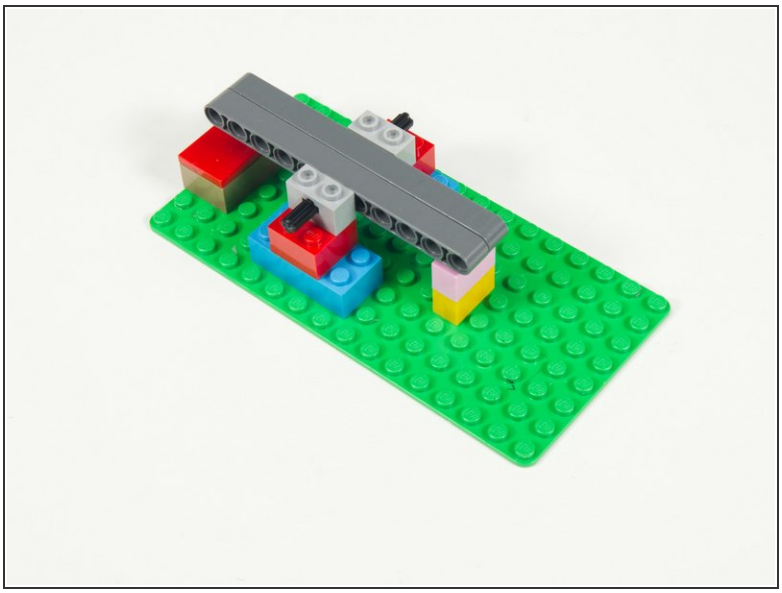
Step 6 — Add Contact Brick

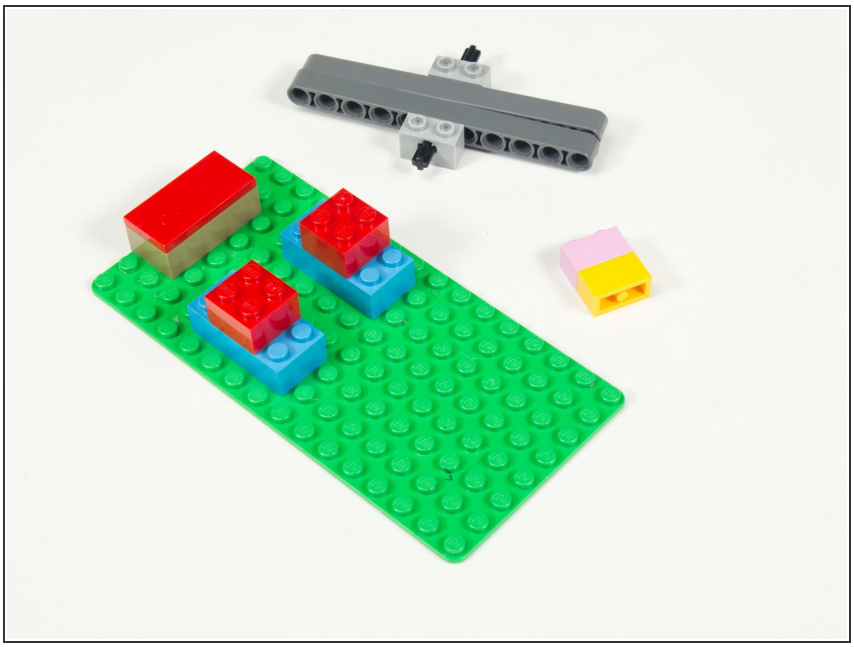
- Add a 2 x 4 brick to the baseplate.
- And then add a 2 x 4 flat tile on top of it.
- Check the positioning by placing the lever mechanism on the support bricks.
- The beams should touch the center of the flat tile.

Step 7 — Add Stopper Bricks

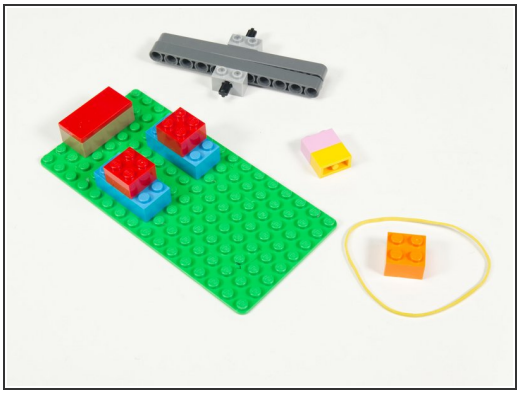
- Add two 1 x 2 bricks beneath the opposite end of the lever.
- Check that the beams of the lever touch down on top of the **Stopper Bricks**.

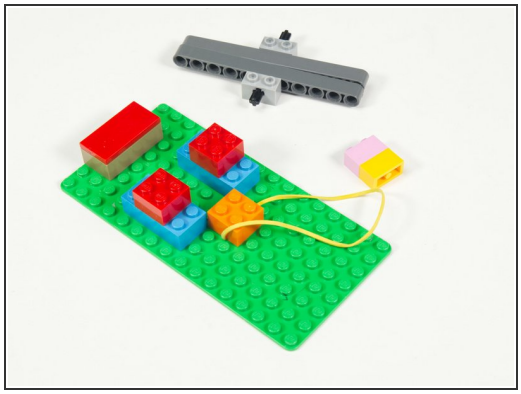
Step 8 — Remove Lever Mechanism

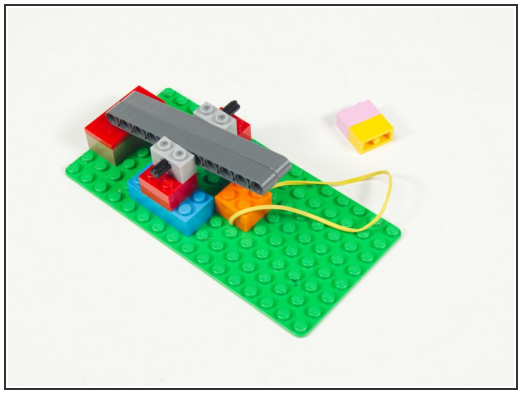


- We're going to temporarily remove the lever mechanism and the **Stopper Bricks** we added in the previous step.
- We'll add them back after we add the rubber band.

Step 9 — Add the Rubber Band







- Next we'll use our **Rubber Band** and a 2 x 2 brick to create our *spring* mechanism.
- Place the rubber band under the brick and then stick the brick down to the baseplate.
- Add the lever mechanism back in place.

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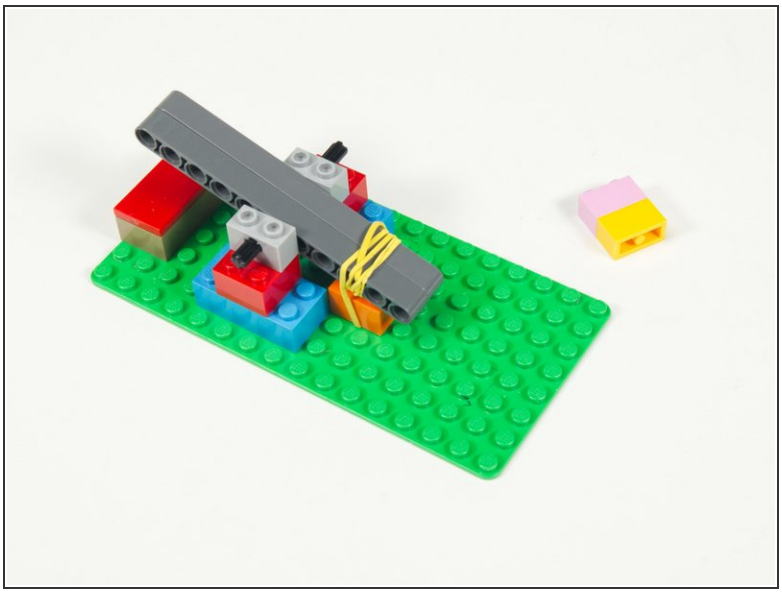
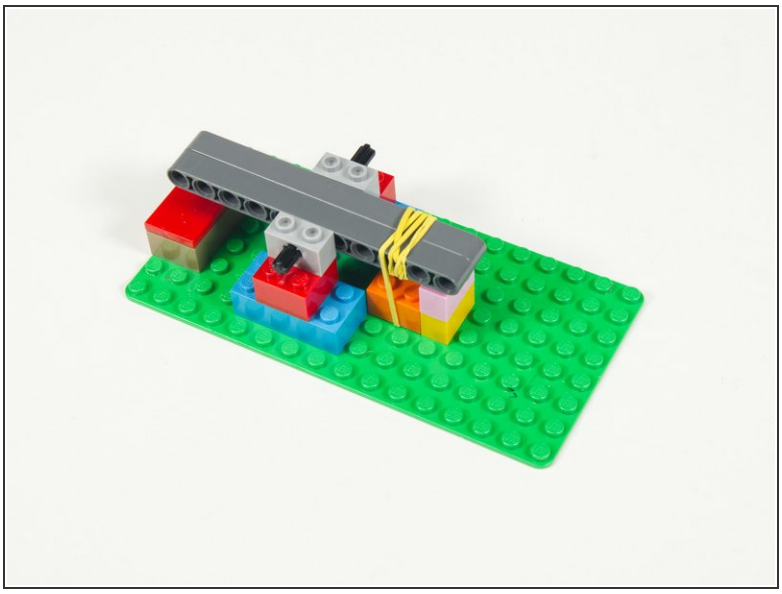
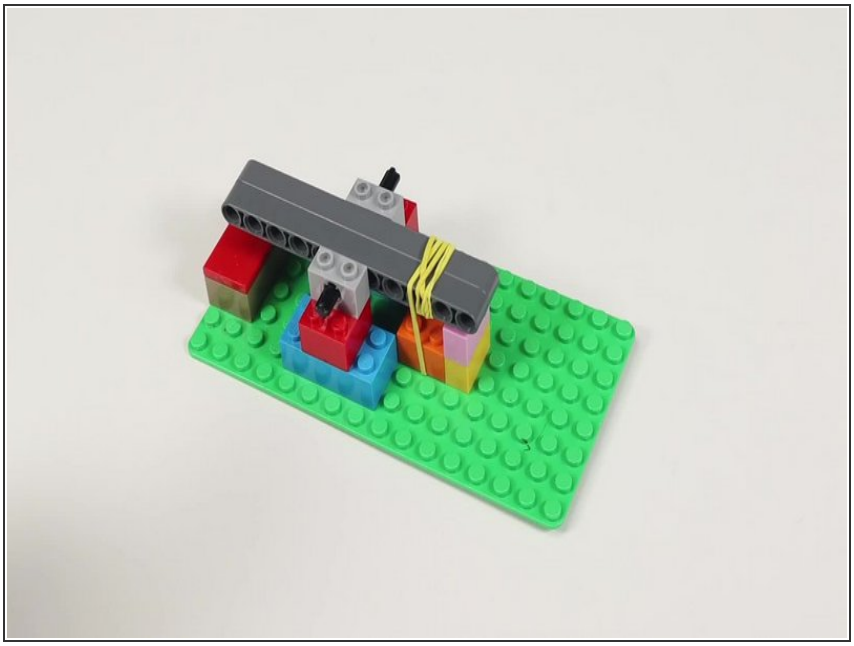
Step 10 — Wrap the Rubber Band





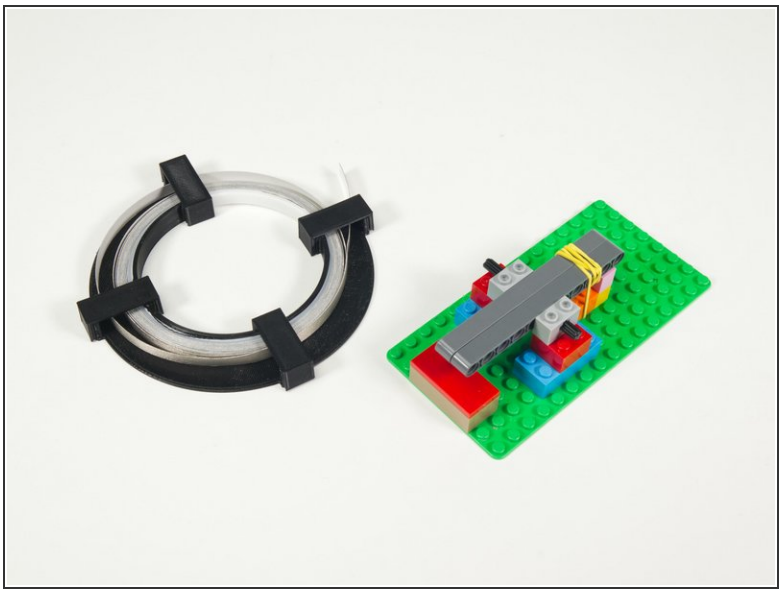
- Wrap the **Rubber Band** around the beams so they get pulled down towards the brick.
- Add the **Stopper Bricks** back into place and test the lever movement.

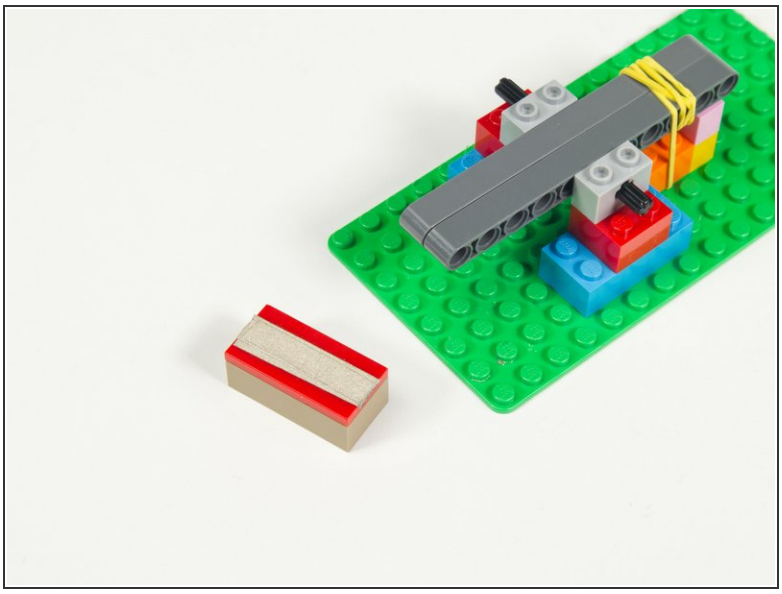
Step 11 — Test Lever Motion



- With the full assembly complete you should be able to test the action of the lever.
- Do you get a good satisfying "click!" when pressed down? Does the lever spring back into place when released?
- If it's all good then we're ready to add conductivity to our switch.

Step 12 — Add Maker Tape to Contact Brick





- Grab that roll of 1/4" Maker Tape!
- Remove the **Contact Brick** (the one with the flat tile) and add Maker Tape to it.
- Add a few pieces across the top as shown.
- Layering a few pieces right in the center will help the lever make better contact when pressed down.

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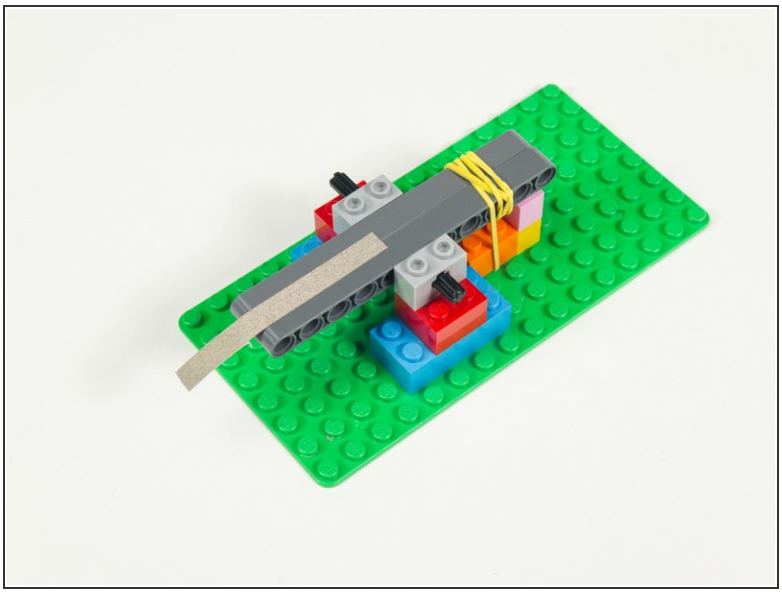
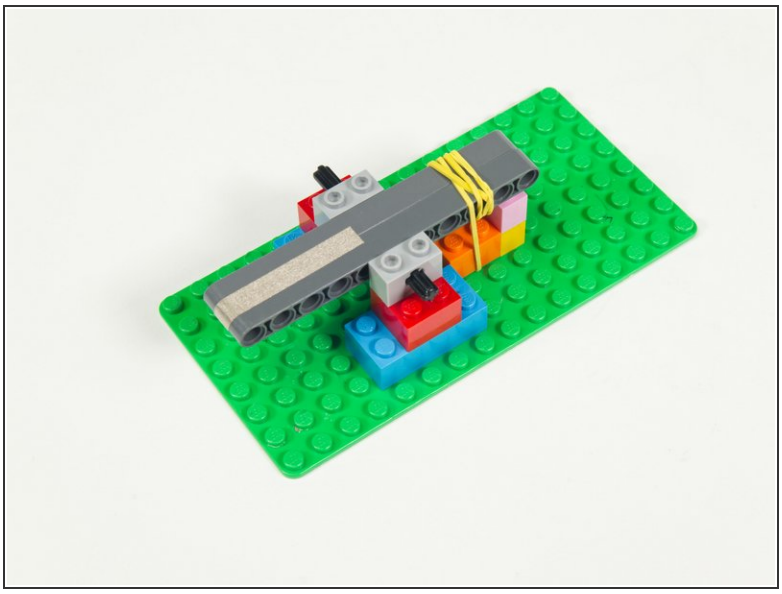
Step 13 — Add Maker Tape to Beams





- Add a strip of Maker Tape down the center of the beams so it holds them together.
- Leave enough at the end so it can wrap underneath at least 1.5 centimeters.

Reminder: If you cut a piece that is too short you can just add another piece and layer it on top. Maker Tape is conductive on the top and the bottom!

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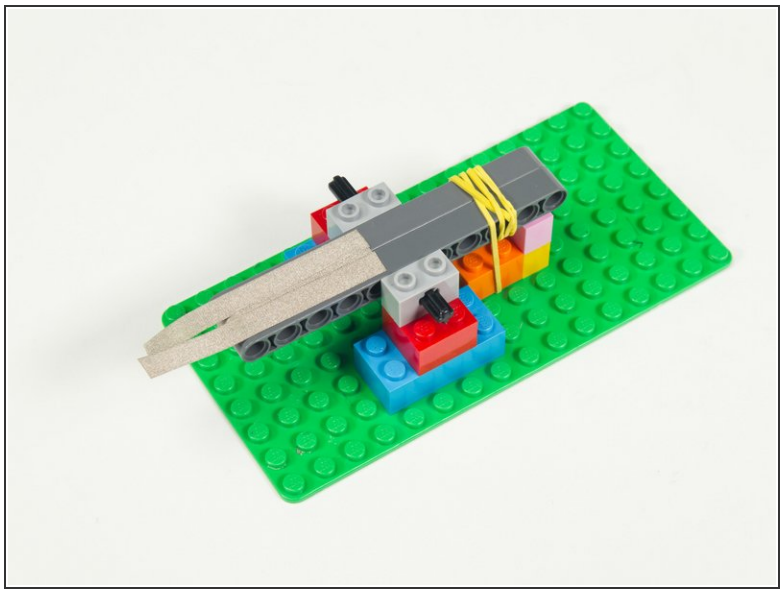
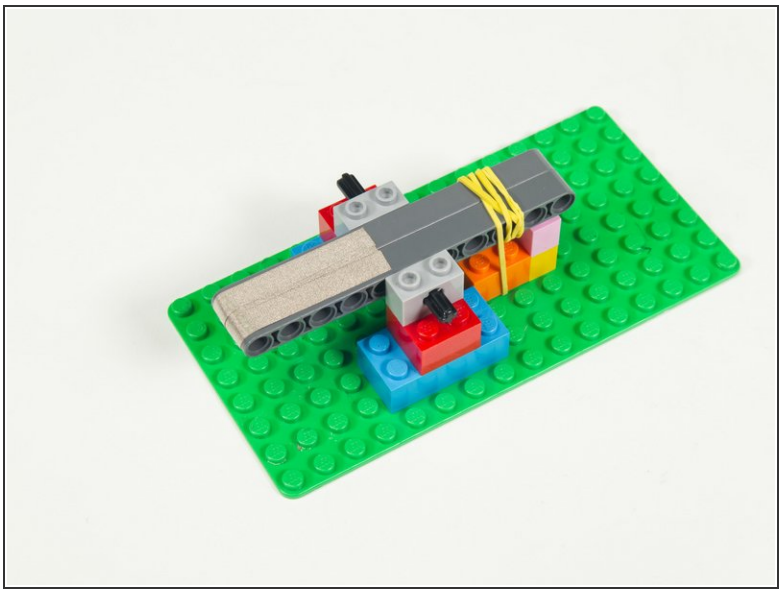
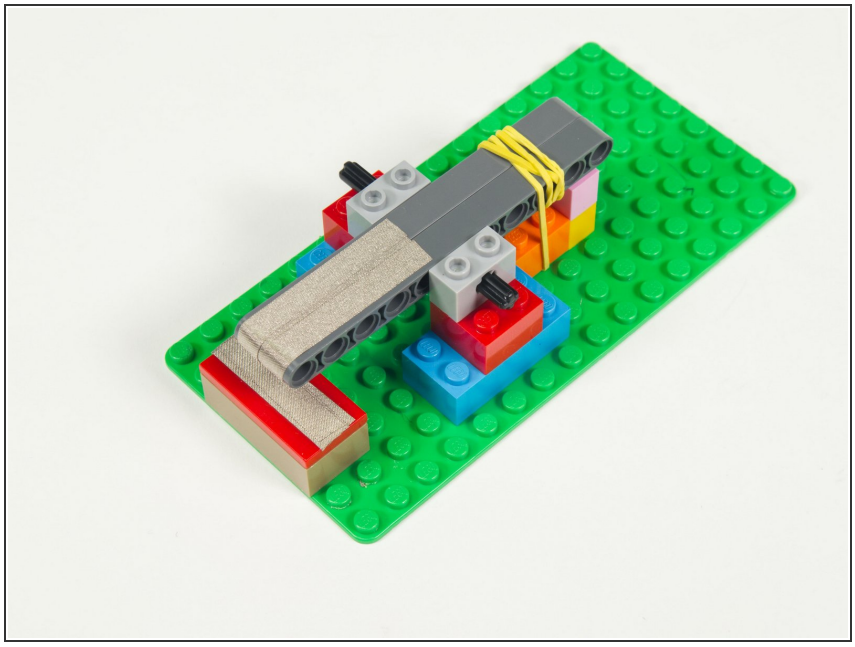
Step 14 — Add More Maker Tape





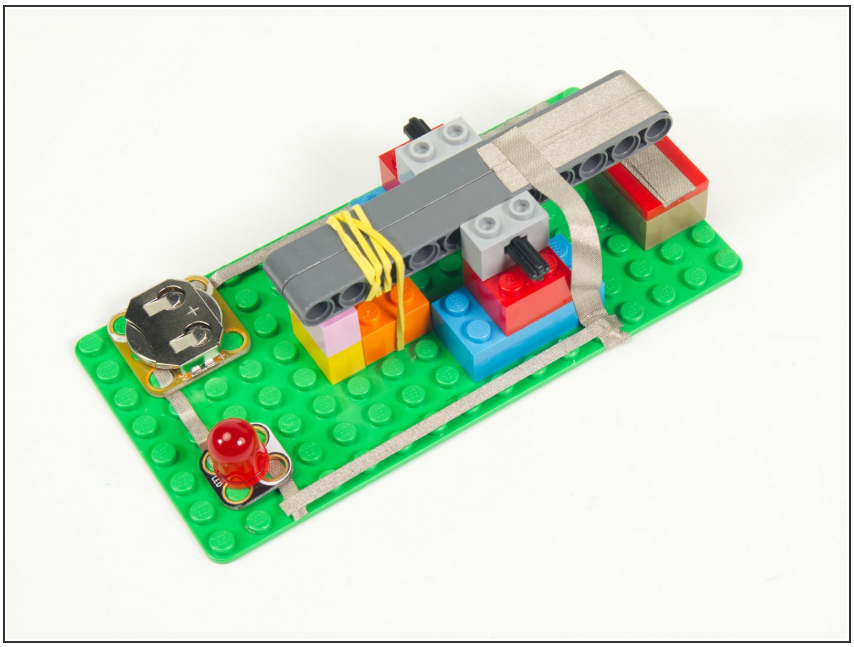
- Add two more strips of Maker Tape, again leaving enough at the end to wrap around to the bottom of the beams.

Step 15 — Add Contact Brick



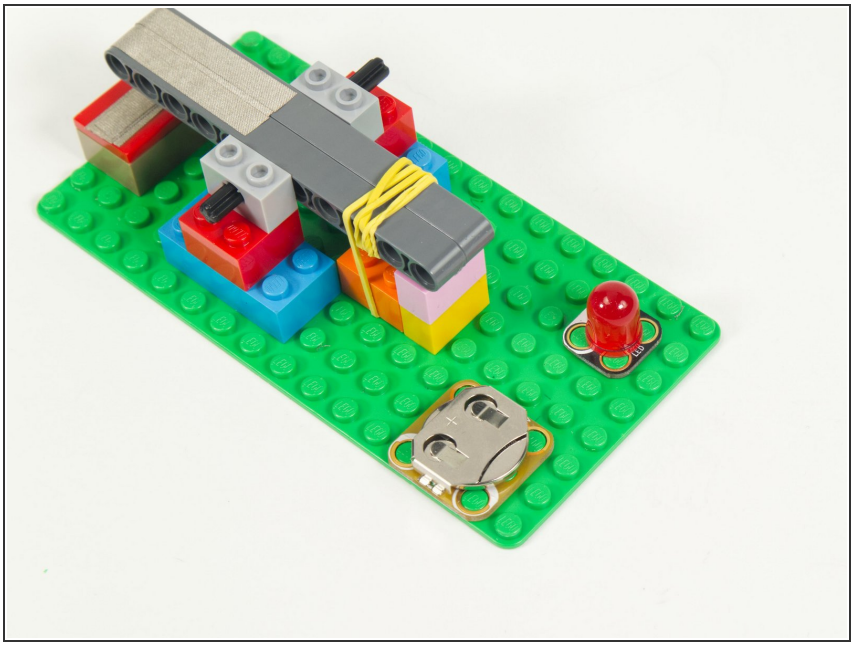
- With the Maker Tape applied you can put the **Contact Brick** back in place.

Step 16 — Build a Circuit!



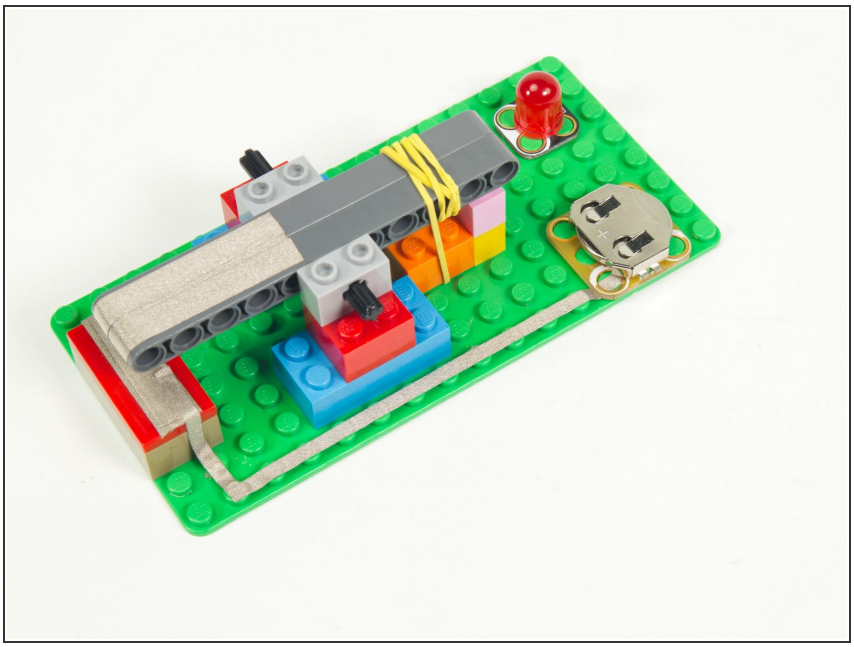
- Our switch is almost ready to use! We just need to add the electrical connections so we can use it in a circuit.
- We'll build a simple circuit with a **Battery** and an **LED** for our switch to control.

Step 17 — Position Battery and LED



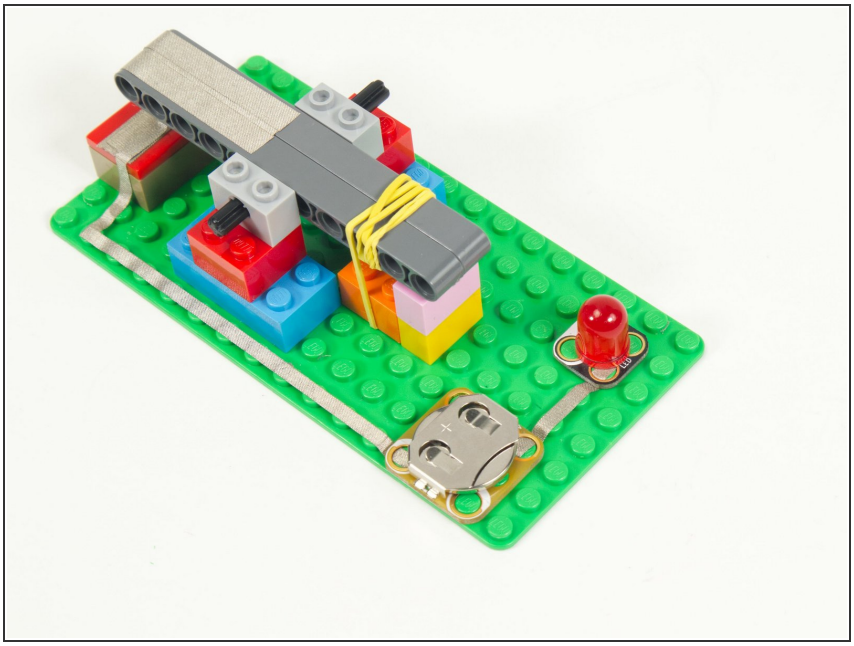
- We've got just enough room on our small baseplate to fit a **Crazy Circuits Battery Holder** and **LED**.

Step 18 — Add 1/8" Maker Tape



- Run a piece of **1/8" Maker Tape** from the **Contact Brick** of the switch to the **Negative** side of the **Battery Holder**.

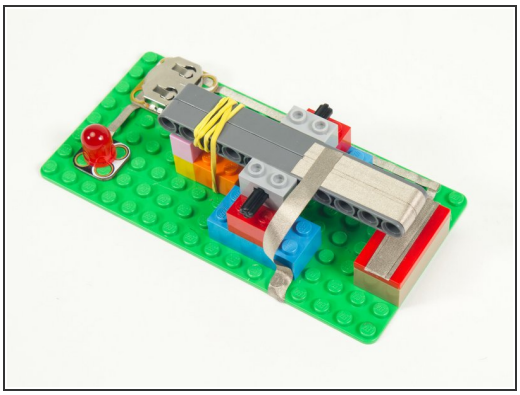
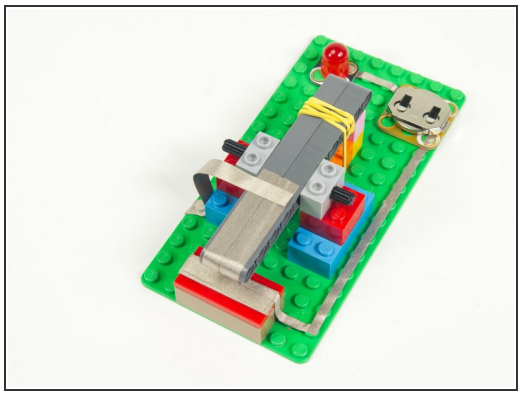
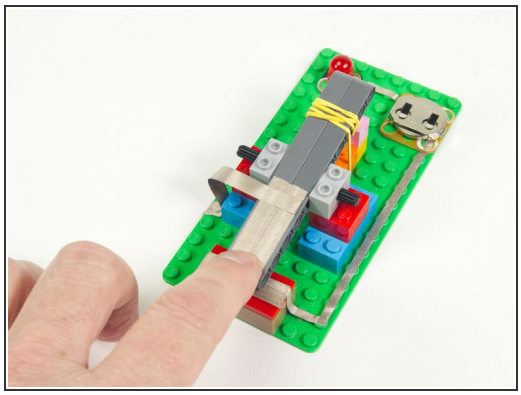
Step 19 — Connect Battery to LED



- Add a piece of Maker Tape between the **Positive** side of the **Battery Holder** and the **Positive** side of the **LED**.

⚠ Make sure your parts are aligned properly! The white rings around the holes on the Crazy Circuits parts indicate **Negative** (or **Ground**).

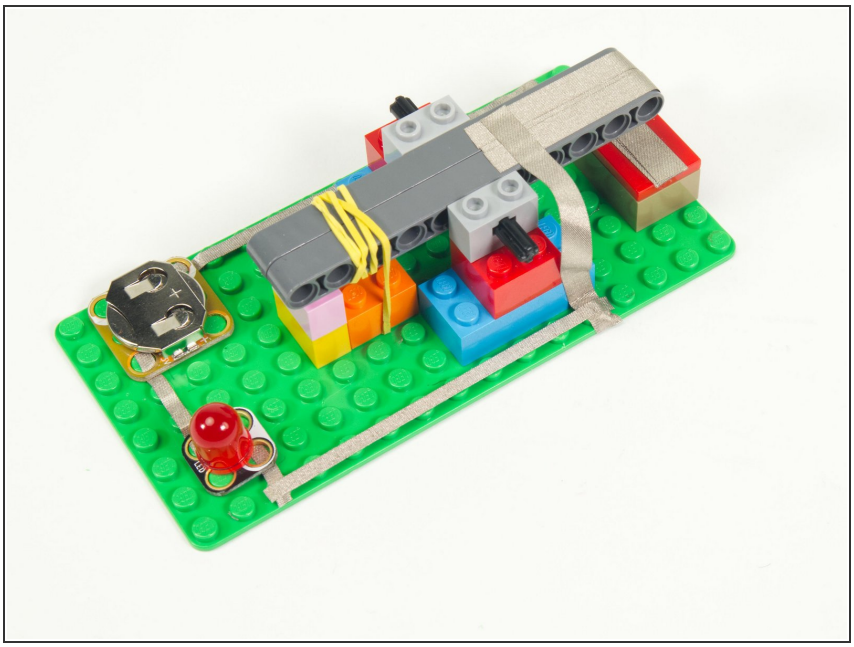
Step 20 — Add 1/4" Maker Tape

- In Step 18 we added Maker Tape that connected to the **Contact Brick**, so now we need to add Maker Tape that will connect to the lever side of the switch.
- Maker Tape is flexible (a great quality) so we'll use a strip that runs from the Maker Tape on the top of the lever beams down to the baseplate.
- Make sure there's some slack so the lever can still move freely.

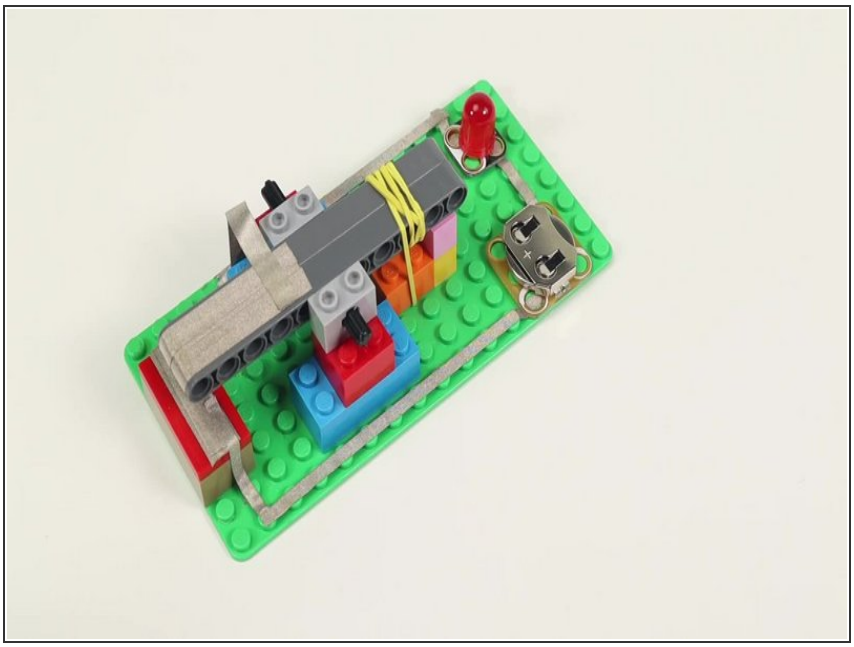
ⓘ If you have issues with the middle of the Maker Tape sticking to anything you can always use a piece with most of the backing still in place.

Step 21 — Connect the LED



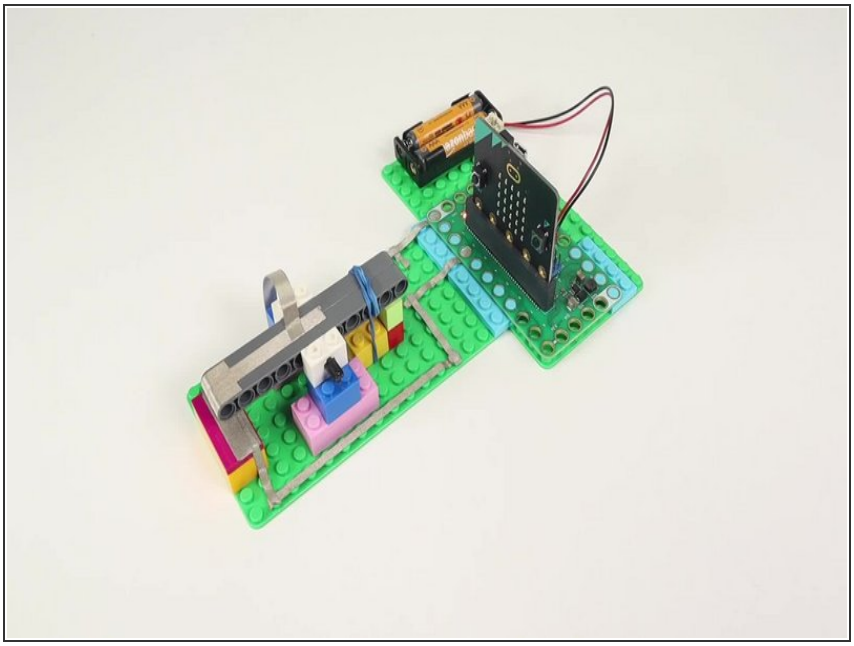
- The final connection! We just need to add some **1/8" Maker Tape** to connect the **Negative** side of the **LED** to the 1/4" Maker Tape we added in the previous step.

Step 22 — Test it Out!



- With our circuit complete, it's ready for testing!
- Press that lever down! Did the LED light up? If not, recheck the previous steps to make sure you didn't miss anything.
- Make sure you're using a fresh battery as well!

Step 23 — Take it Further



- We connected our Telegraph Switch to our Bit Board and programmed the micro:bit to make beeps... Yes, it's Morse Code!
- What else could you use this lever switch for? Perhaps a piano with multiple keys/switches/notes?
- Make something awesome with your switch!