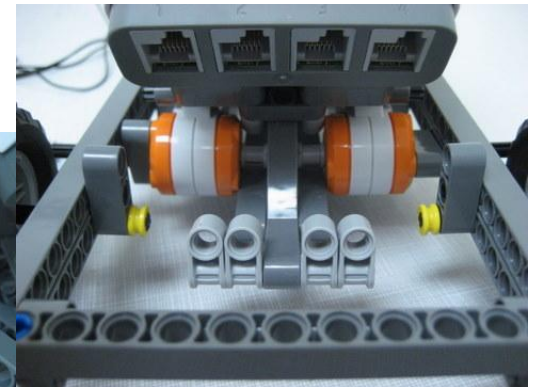
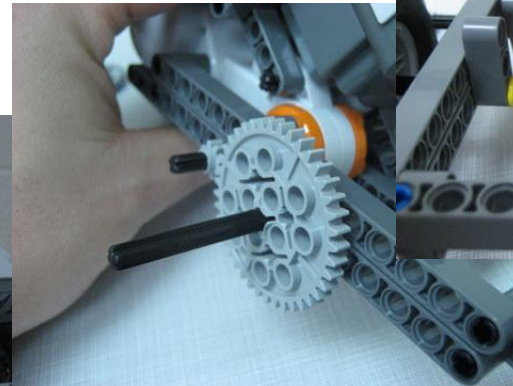
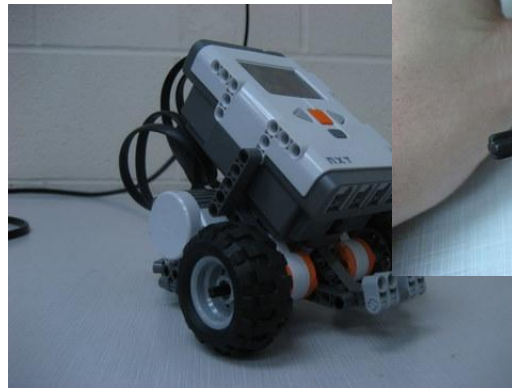


# Adding Gears to the NXT Taskbot

John Ball, GK I2 Fellow 2007-2008

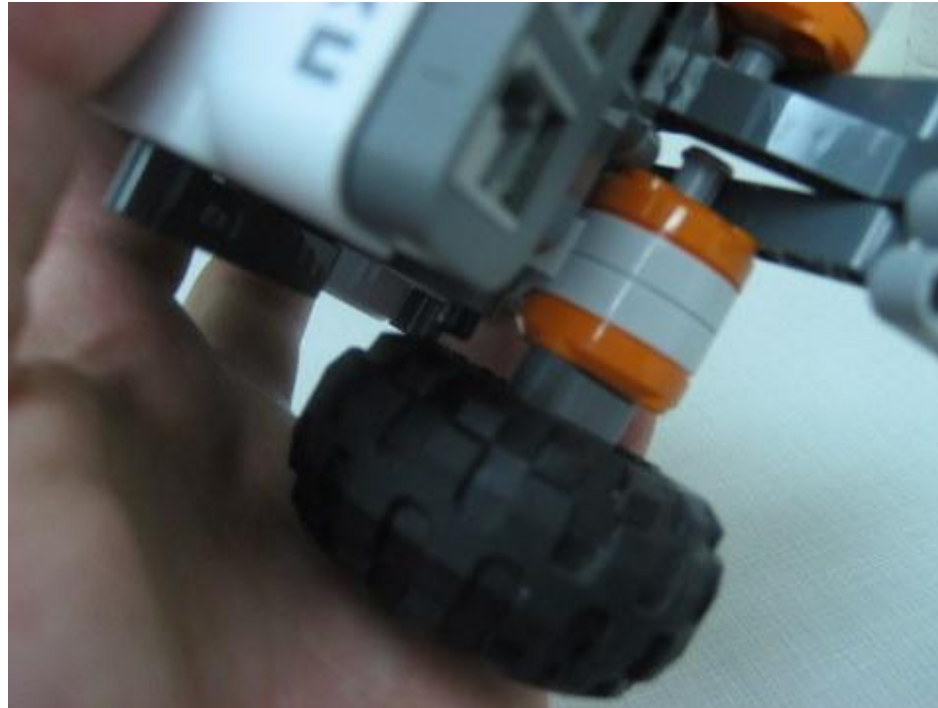


## Adding Gears to the NXT Taskbot



- Here's the basic Taskbot that you can build with the LEGO NXT kit using the instruction booklet.

## Adding Gears to the NXT Taskbot



- As you can see, there's not really any room to put gears that will change the speed and power of the wheels.

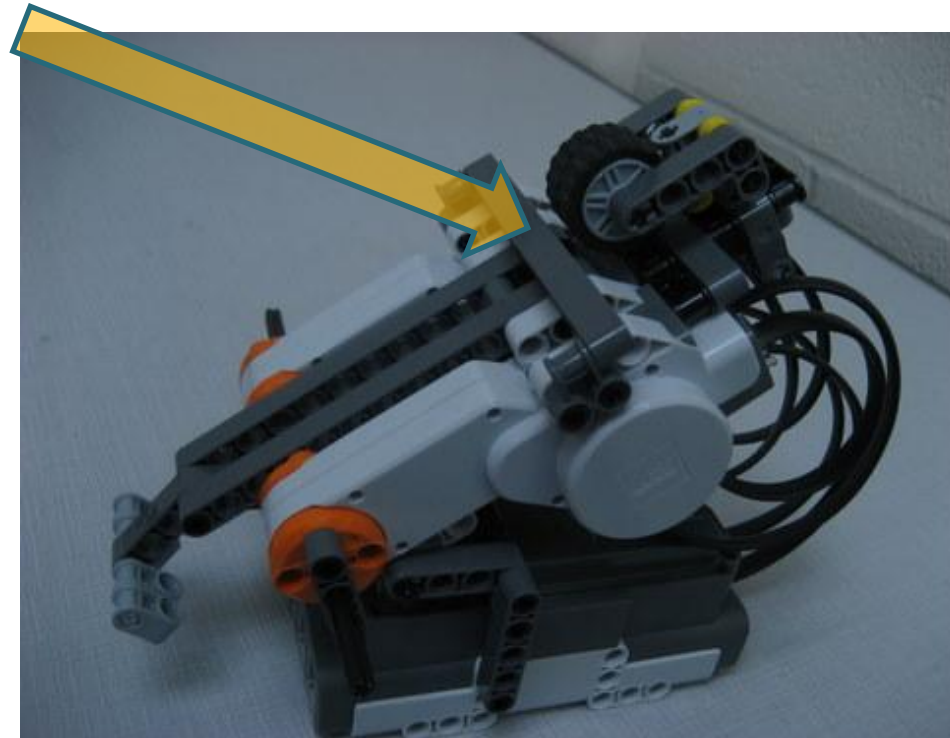
The next few slides give (hopefully) detailed instructions on how to modify the Taskbot to allow you to use it in gear-related activities without having to completely rebuild the robot.

## Adding Gears to the NXT Taskbot



- First, we need to take the wheels and the yellow bushings off of the axles. Keep these handy, because we'll use them later.

## Adding Gears to the NXT Taskbot



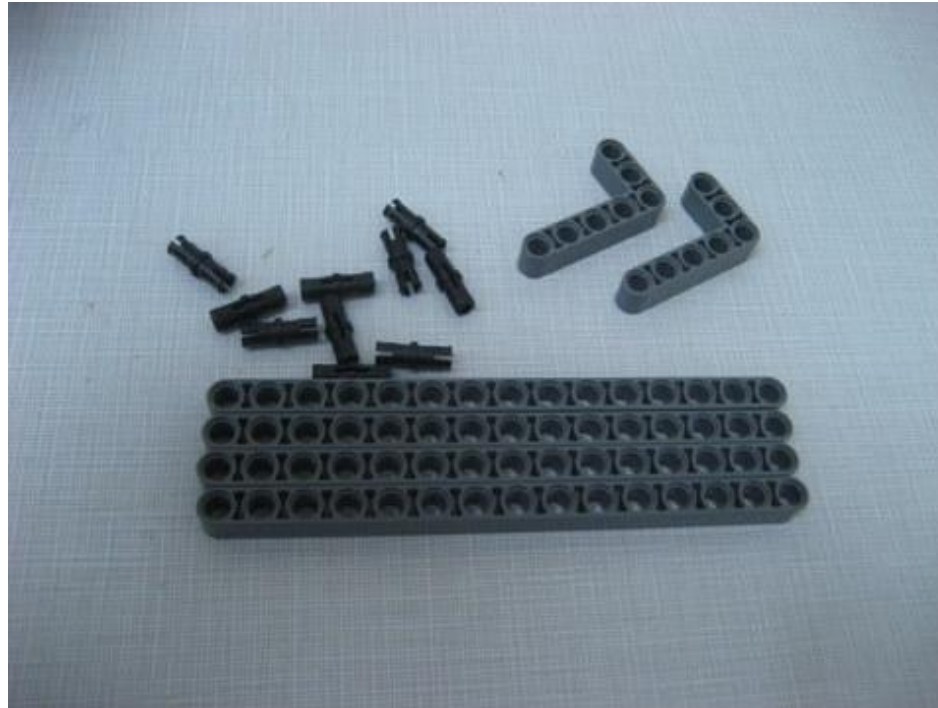
- Next turn over the Taskbot like so. Do you see the beam that the arrow points to? We're going to take it off.

## Adding Gears to the NXT Taskbot



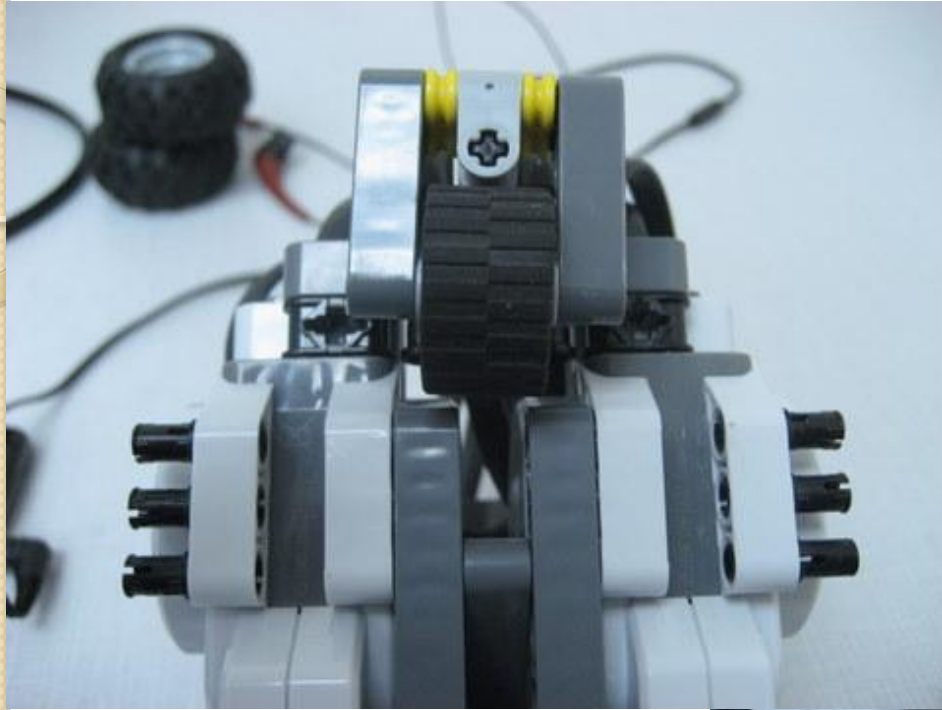
- Here are the three parts that come from taking that beam off. Leave the pins in them; we'll use these parts later.

## Adding Gears to the NXT Taskbot



- Before we move on, these are the rest of the parts you will need to make the rest of this frame. The long beams are 15 holes long.

## Adding Gears to the NXT Taskbot



- On each side of the robot, insert three pegs in the holes under the motors near the back of the robot.

## Adding Gears to the NXT Taskbot



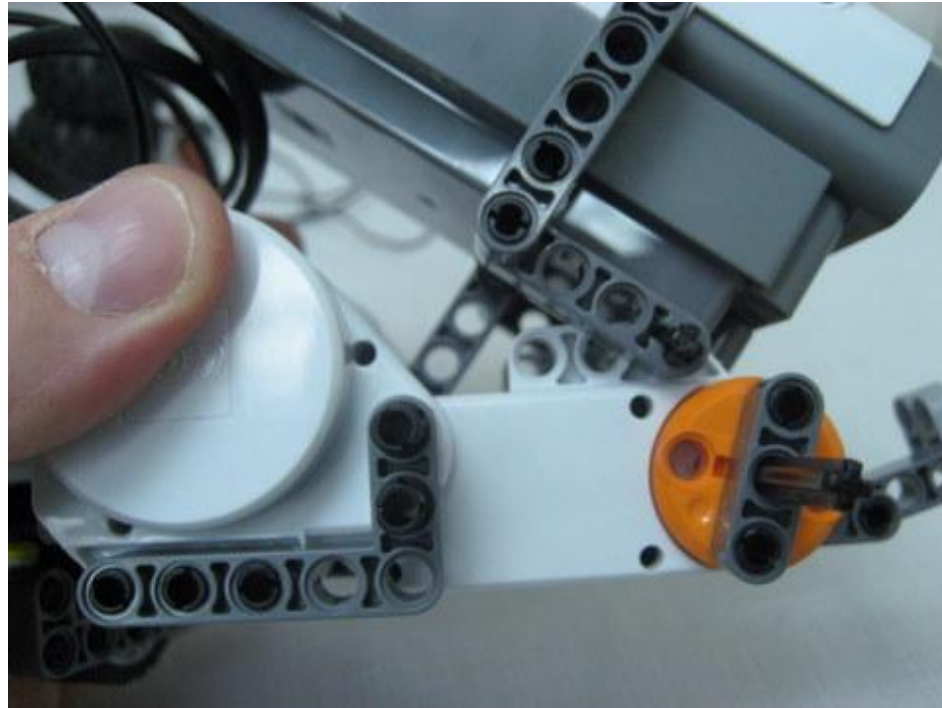
- Next, on each side, attach the L-shaped bracket so that all three black pegs are covered. The upward leg of the bracket should face the front of the robot.

## Adding Gears to the NXT Taskbot



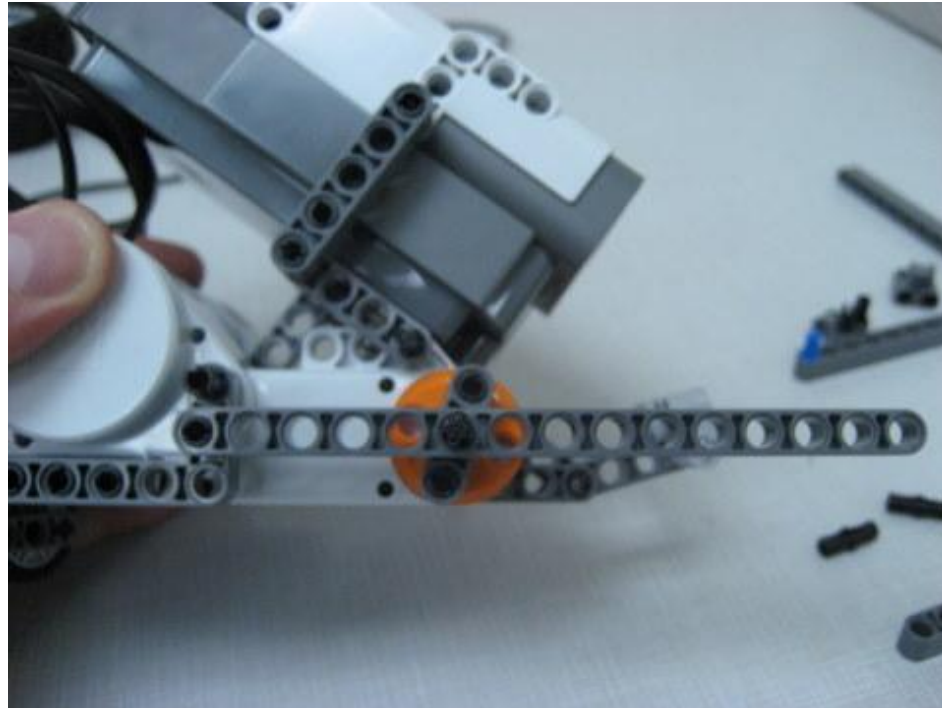
- Still on both sides, insert two black pegs in the two upper holes in the L-bracket.

## Adding Gears to the NXT Taskbot



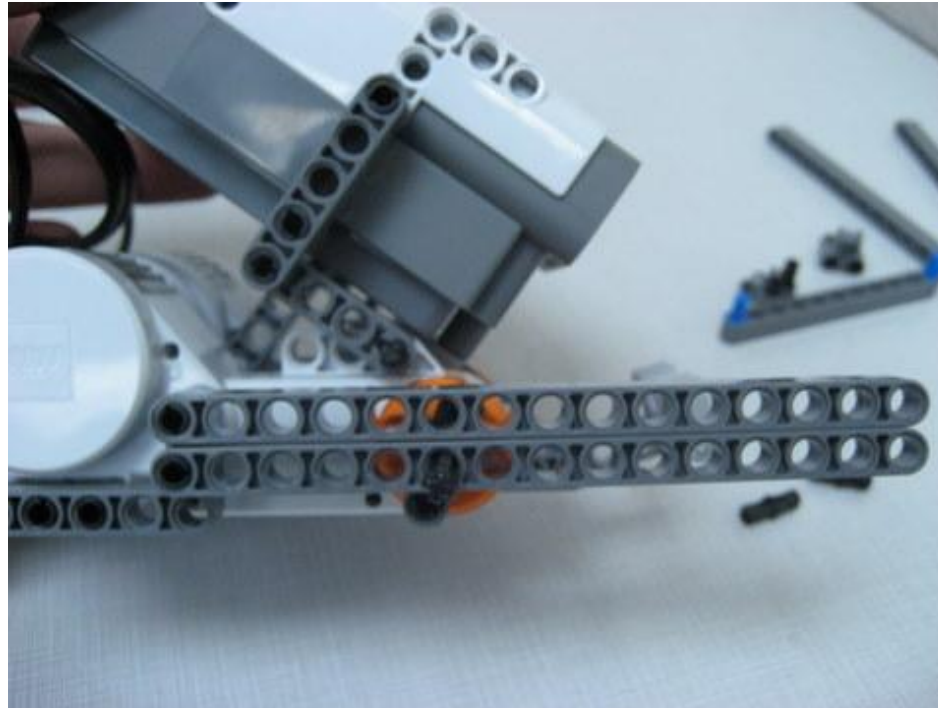
- Next, turn the robot right-side up again. Here is what it should look like.

## Adding Gears to the NXT Taskbot



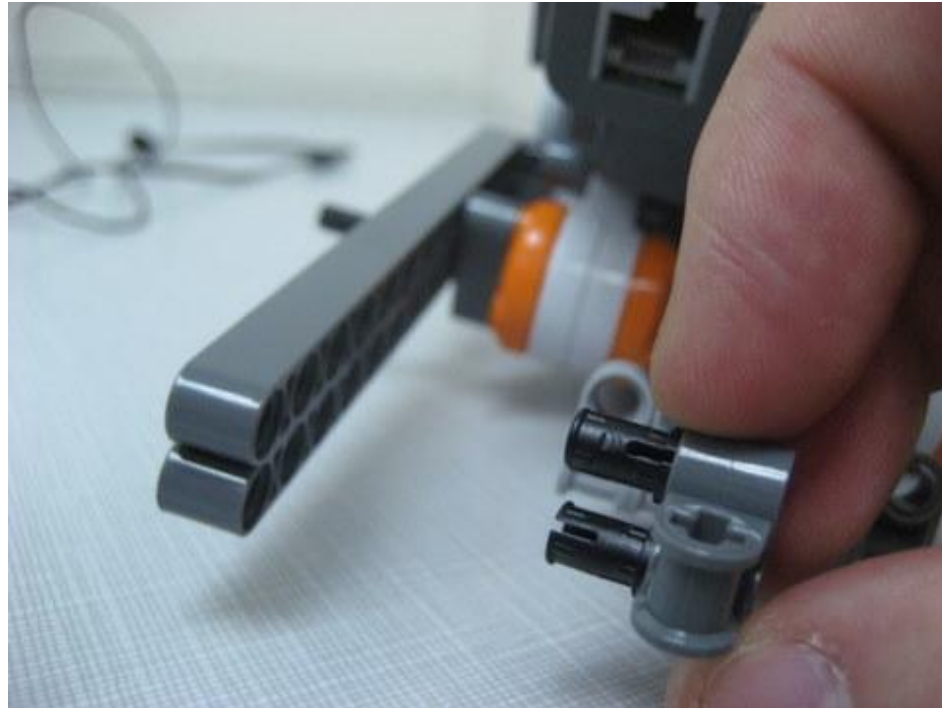
- Take one of the 15-hole beams and place it over one black peg and the axle that is in the motor. The beam should be as far forward as possible.

## Adding Gears to the NXT Taskbot



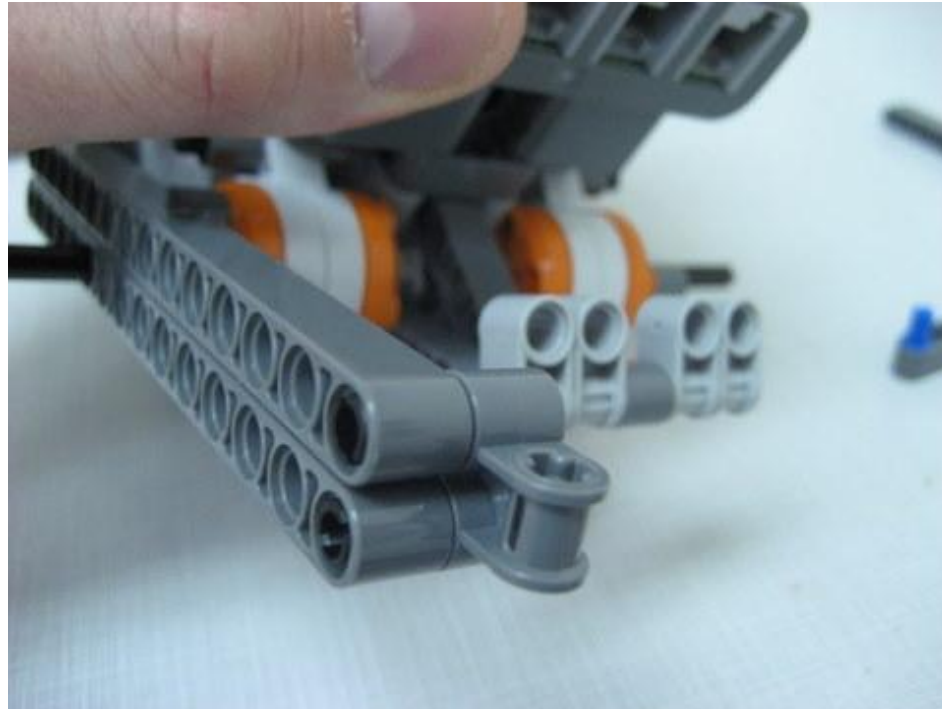
- Next, place a second beam above the first beam so that it covers the other black peg in the L-bracket.

## Adding Gears to the NXT Taskbot



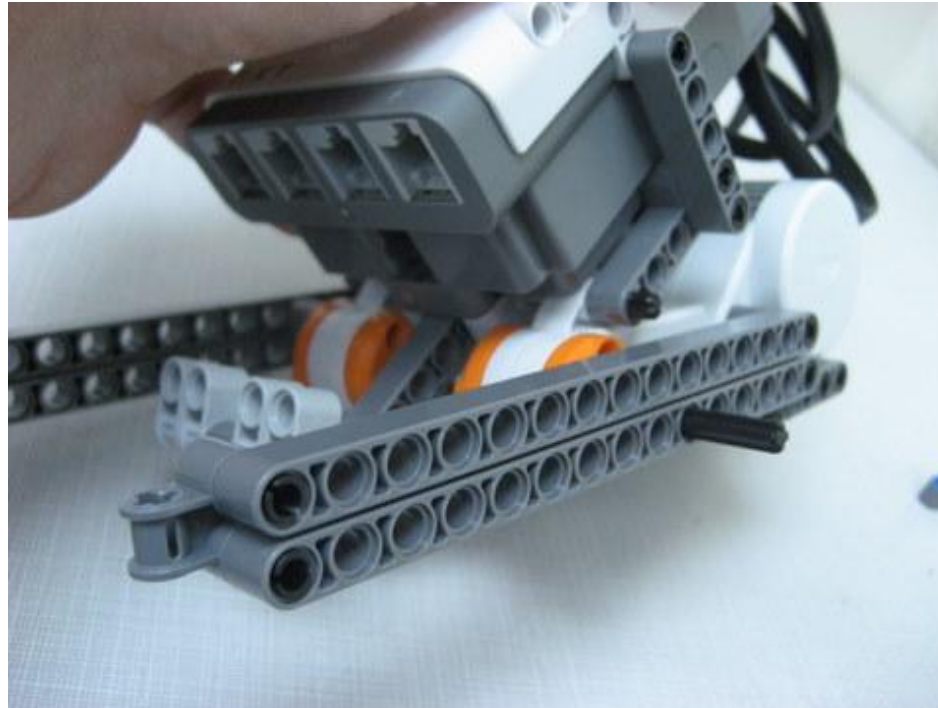
- The piece in my fingers is one of the pieces taken from the beam on the bottom of the robot earlier in the instructions. We're going to use this next.

## Adding Gears to the NXT Taskbot



- Use this piece to hold the ends of the two long beams together as shown above.

## Adding Gears to the NXT Taskbot



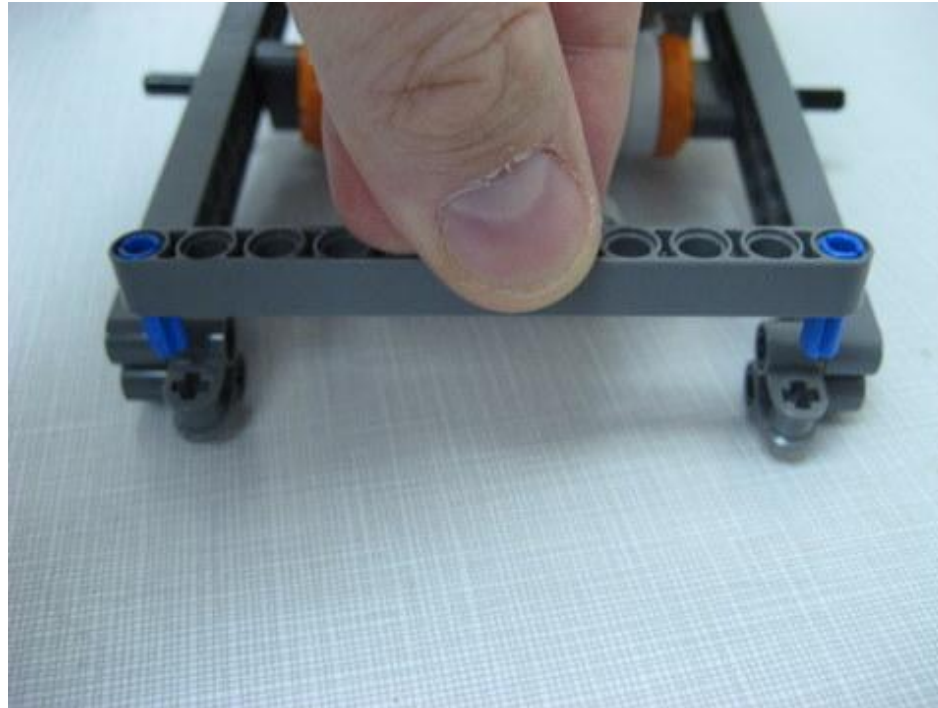
- Next, repeat the last few steps for the other side of the robot. It should look the same as the first side.

## Adding Gears to the NXT Taskbot



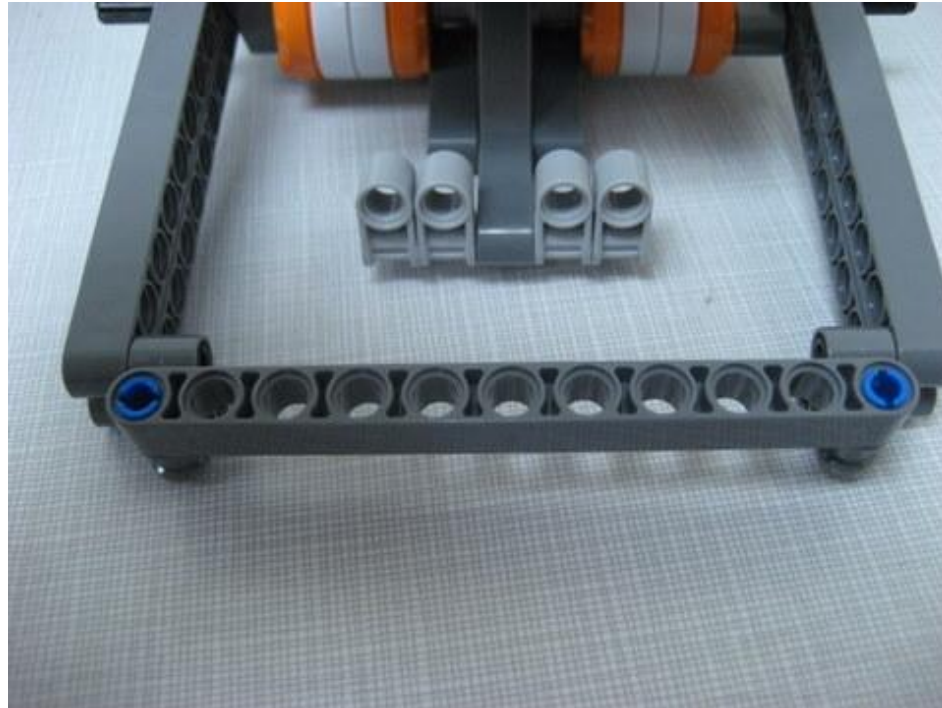
- Here's another view of the front of the robot with both sides finished. Do you see the piece in the background that we took from the bottom of the robot? We're going to use that next.

## Adding Gears to the NXT Taskbot



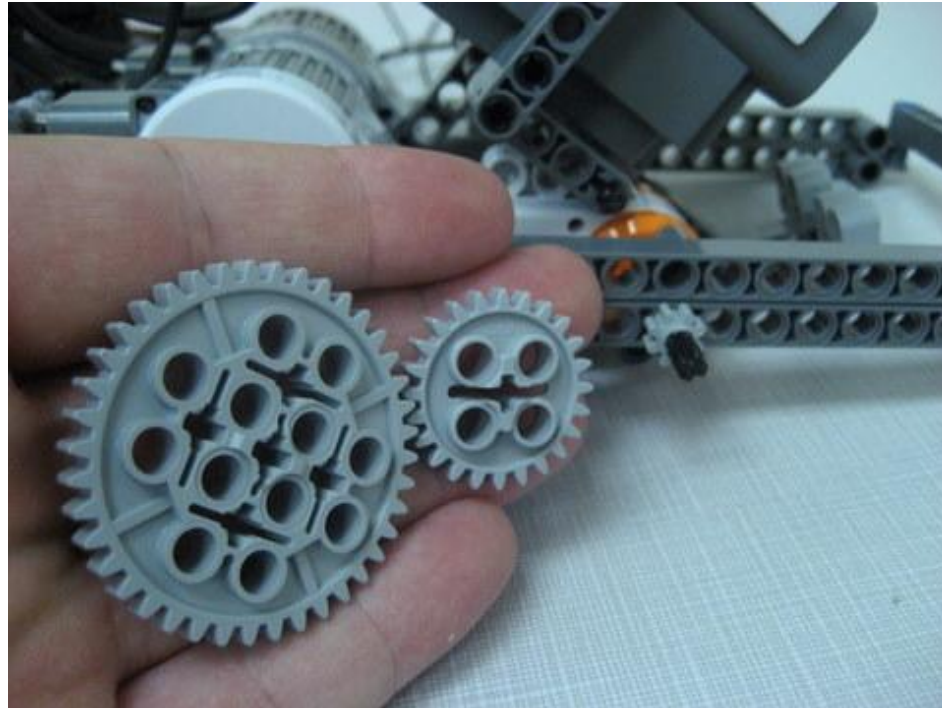
- With the blue pegs facing down, use this beam to hold the two sides of the frame together.

## Adding Gears to the NXT Taskbot



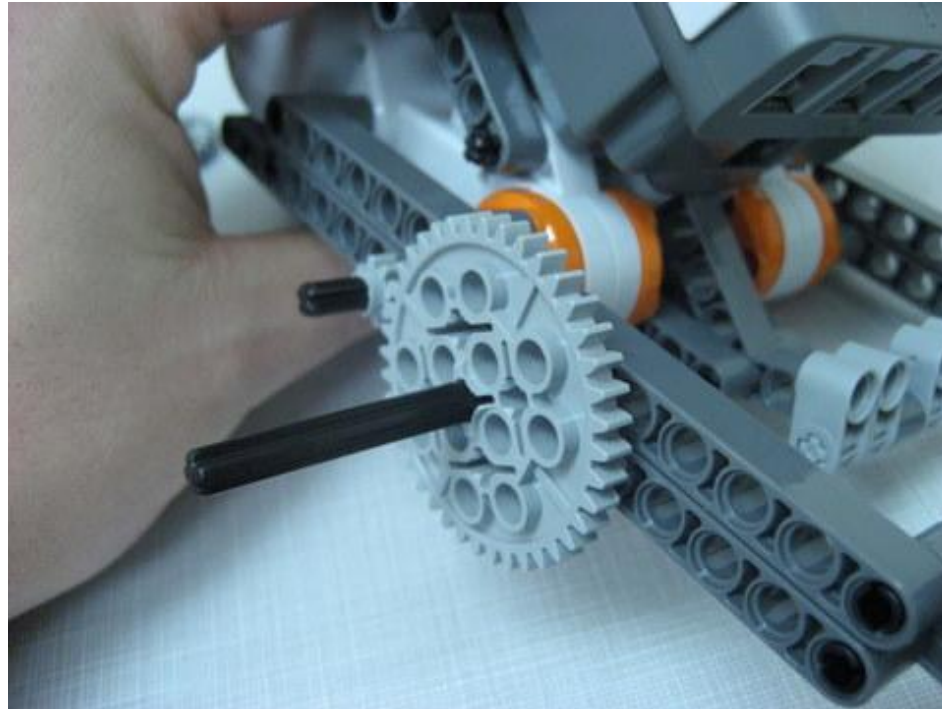
- Here's what it should look like when you are done.

## Adding Gears to the NXT Taskbot



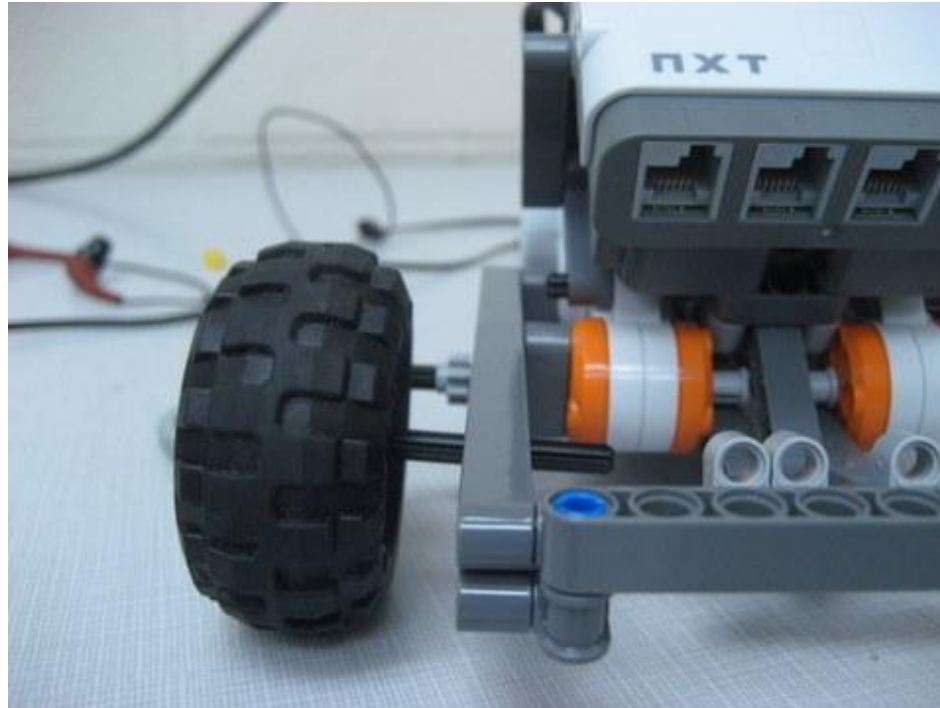
- Now that the frame is finished, we can add gears. If you're confident that you can add gears, you might not need the rest of these instructions.

## Adding Gears to the NXT Taskbot



- The first thing to do is pick the gears you want and figure out the spacing you will need. Make sure the axle is long enough that you can add a bushing behind the frame and so that there is room to add the wheel.

## Adding Gears to the NXT Taskbot



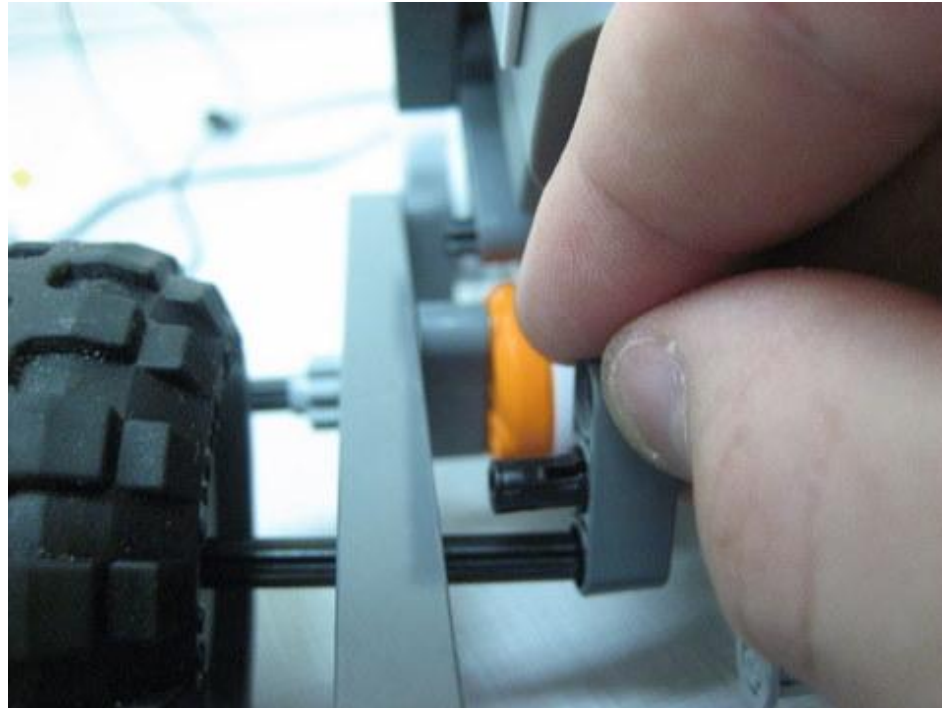
- Once you've added the wheel's axle, it might be wobbly, like the picture above. In the next few steps, I'll show you how to add a brace to make it more sturdy.

## Adding Gears to the NXT Taskbot



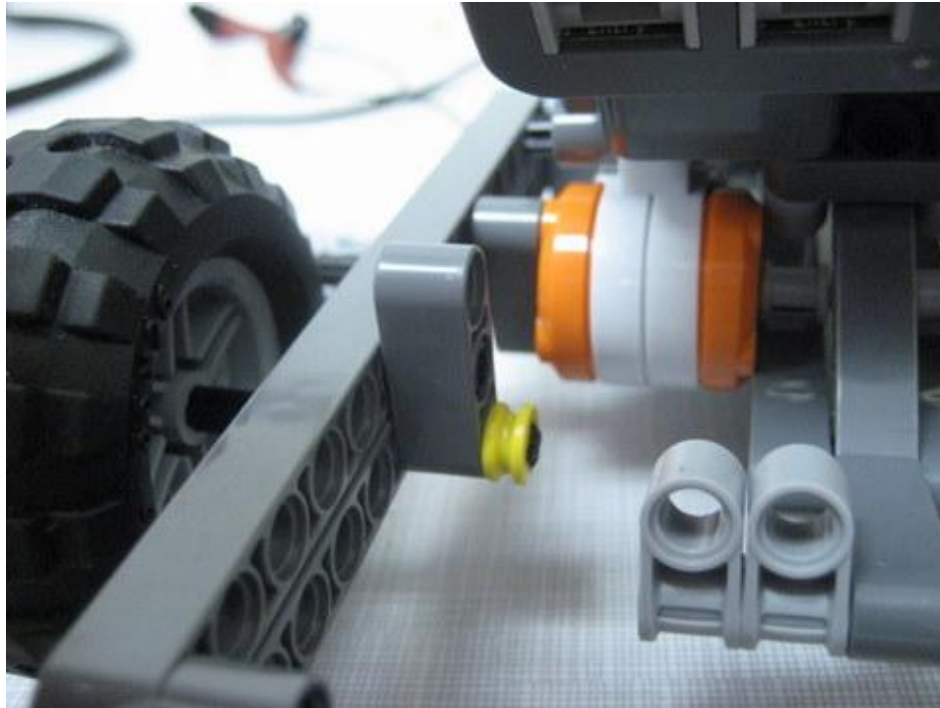
- The basic parts of our brace are one of these 3-hole beams and a black peg.

## Adding Gears to the NXT Taskbot



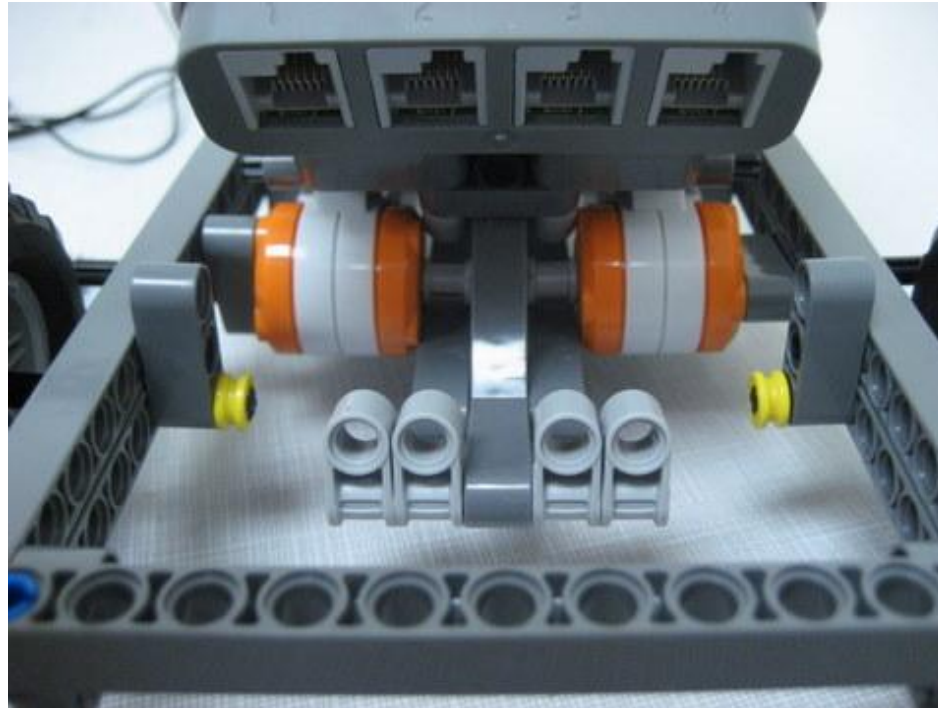
- Once you've figured out where the wheel's axle should be, you can put this brace on so that the bottom hole holds the axle, and the black peg slides into the hole directly above the axle.

## Adding Gears to the NXT Taskbot



- Once you've added the brace, you can add a bushing of your choice to hold the axle in place.

## Adding Gears to the NXT Taskbot



- Here's a picture of the frame with both braces added and the axles in place.

## Adding Gears to the NXT Taskbot



- If you want to be really ambitious, you can try a double-brace to make the axle even sturdier. I use two 3-hole beams, a black peg, and a long black peg.

## Adding Gears to the NXT Taskbot



- Here's what it looks like when you put it together.

## Adding Gears to the NXT Taskbot



- And here's what the frame looks like with two double-braces. With time and effort, you could use beams to connect the frame all the way across. If you did this, the frame would hardly bend at all.

Hopefully, you should now be able to easily add and remove this frame without taking too much time away from programming and other activities.

Good luck with all of your LEGO and gears related activities!