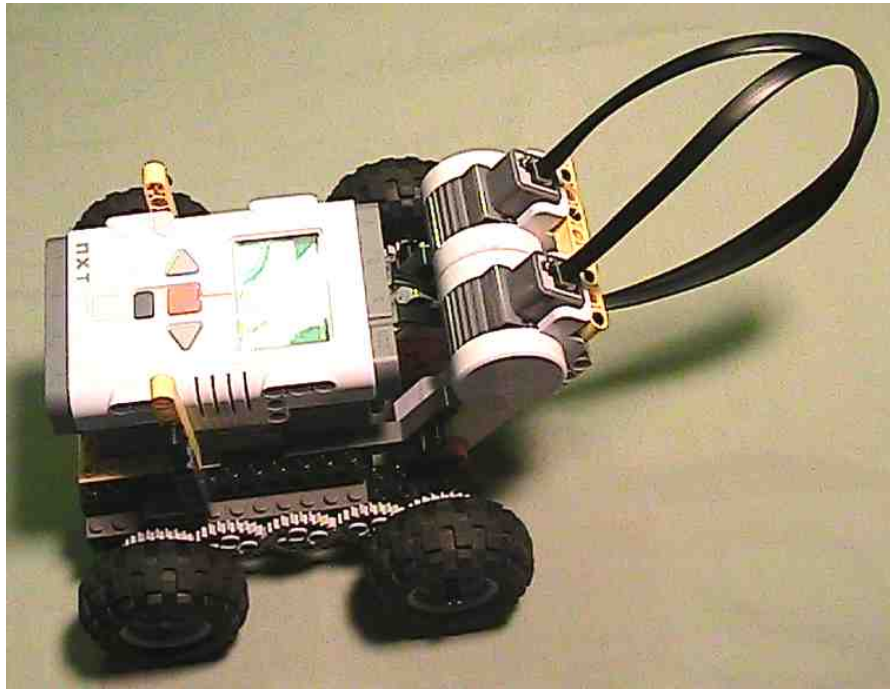
NXT 4-Wheeled ATV Robot

by Tom Bickford
Maine Robotics



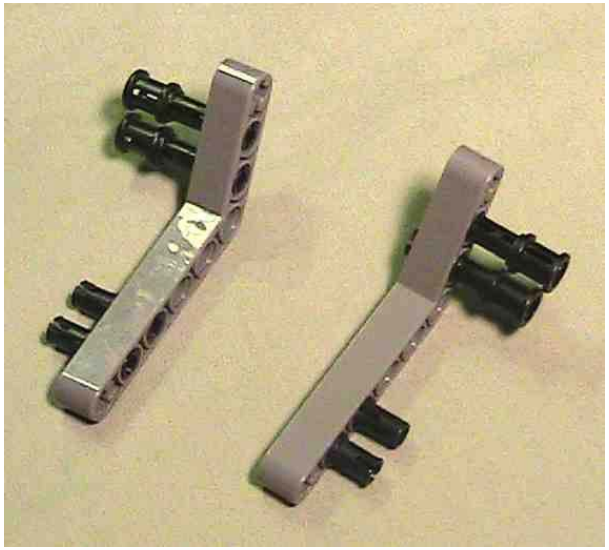
Parts List

- NXT
- (2) wires
- (2) NXT motors
- (2) 6x3 bent technic lift arms
- (1) 5x3 right angle technic lift arm
- (1) 11.5 double bent technic lift arm
- (1) 6x8 rectangle technic brick
- (2) 1x12 technic bricks
- (4) 1x16 technic bricks
- (4) 6x12 plates
- (2) 1x8 technic bricks
- (1) 2x4 brick
- (1) #9 straight technic lift arm
- (2) #10 axles
- (2) #7 axles
- (6) #4 axles
- (10) 24 tooth gears
- Black friction pins
- Long black friction pins with stop bushings
- Axle/pin connectors
- Bushings
- (4) NXT drive wheels

NXT and Motor Attachments

NOTE: Since the NXT is 9 knobs wide and the Chassis is 10, this design uses different right and left attachments to accommodate this difference. One side uses an 11.5 double bent lift arm, and the other uses a 3x5 “L” lift arm and a #7 straight lift arm.

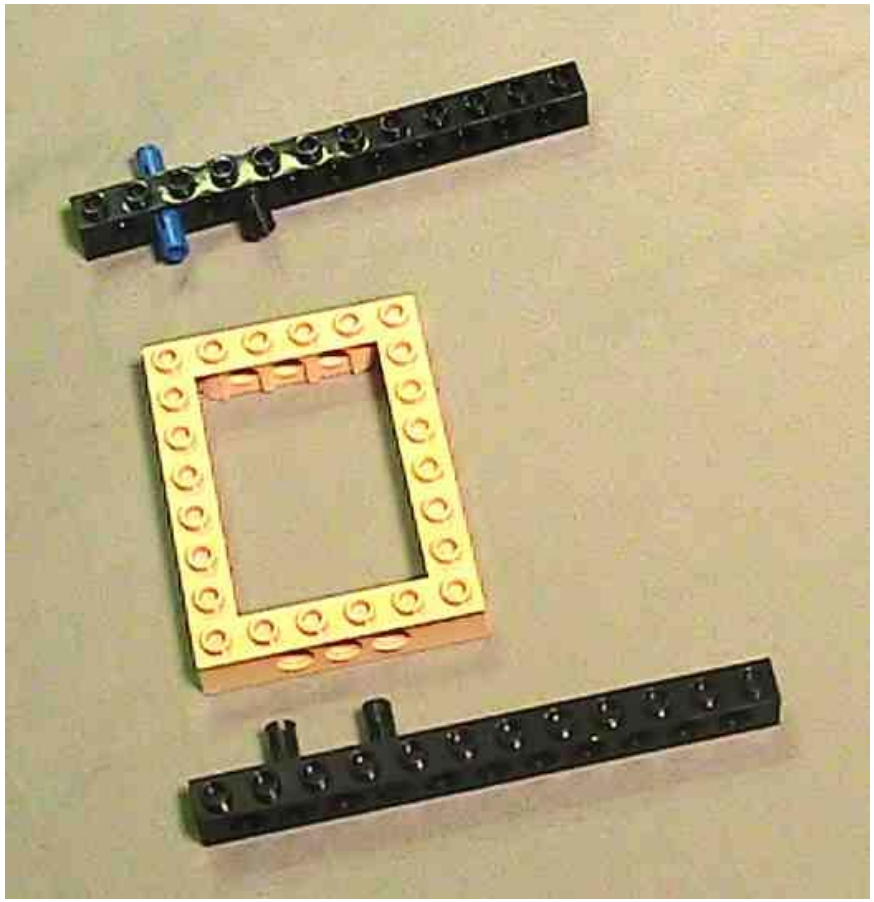
The Motors are attached using two 9 hole bent lift arms, but other arrangements can easily be accommodated.



NOTE pin placement. There is one pin-axle used on the end of the 11.5 double bent, but otherwise they are short friction pins or long pins with the stop bushing.

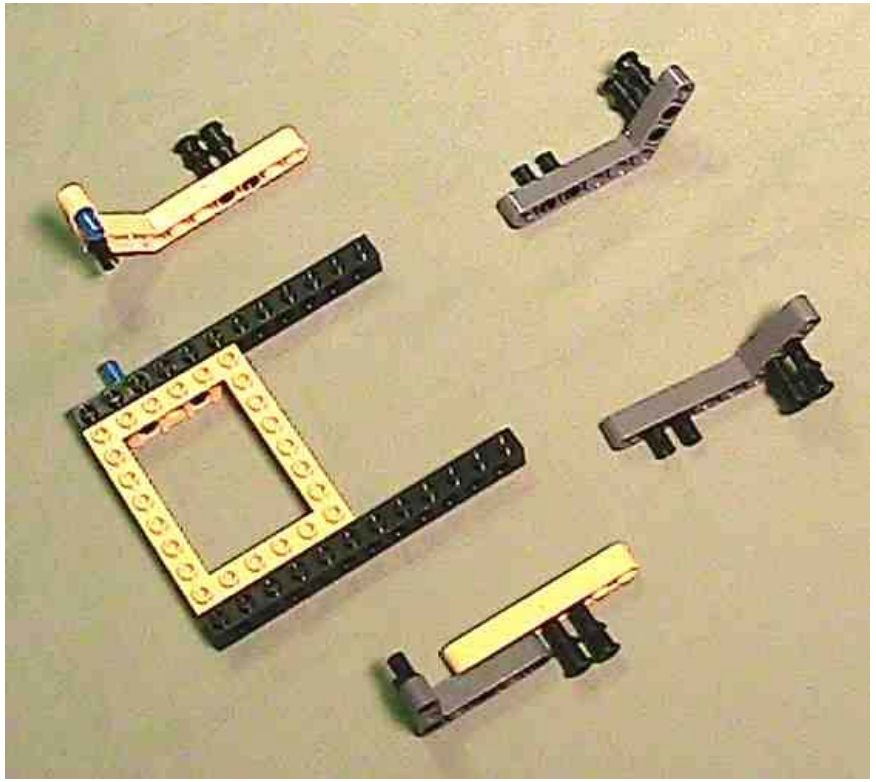
NXT and Motor Base and Assembly

Using a 6x8 Technic square and two #12 Technic bricks (beams), assemble the base as shown. Note which hole uses the long friction pin, all others are the short friction pins.



Alignment of pieces

General alignment of the different pieces for the NXT and Motor base and attachments.

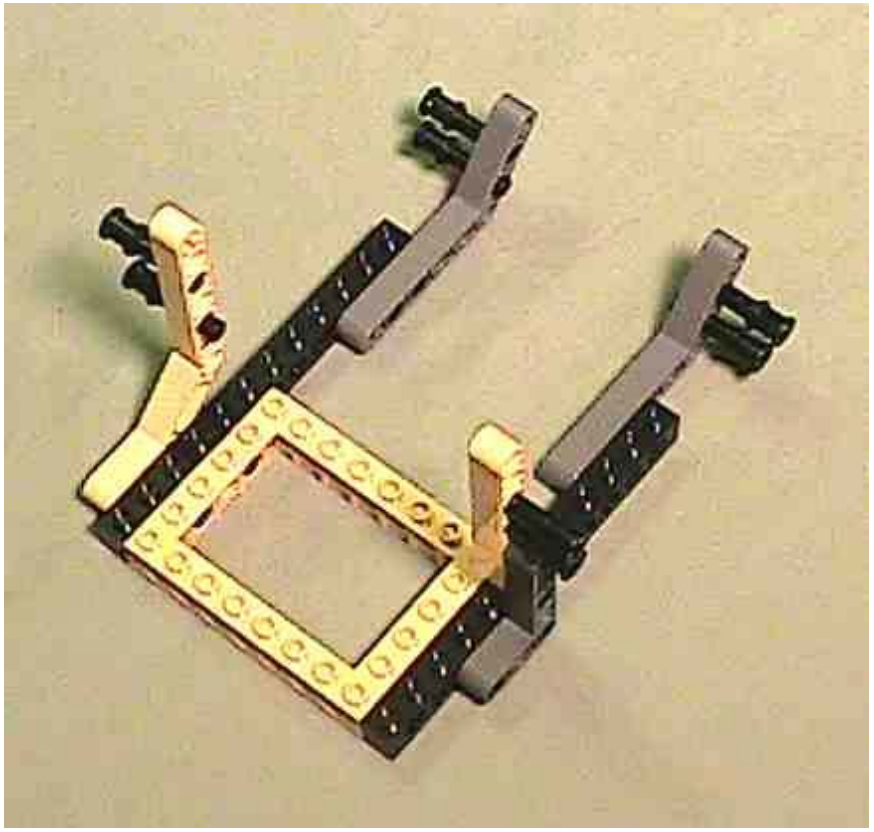


Complete NXT and Motor Base

Attach the 11.5 double bent to one side, as shown, and using the front 3 holes on that side.

Attach the 3x5 “L” lift arm to the opposite side using the 3, 4, and 5 holes.

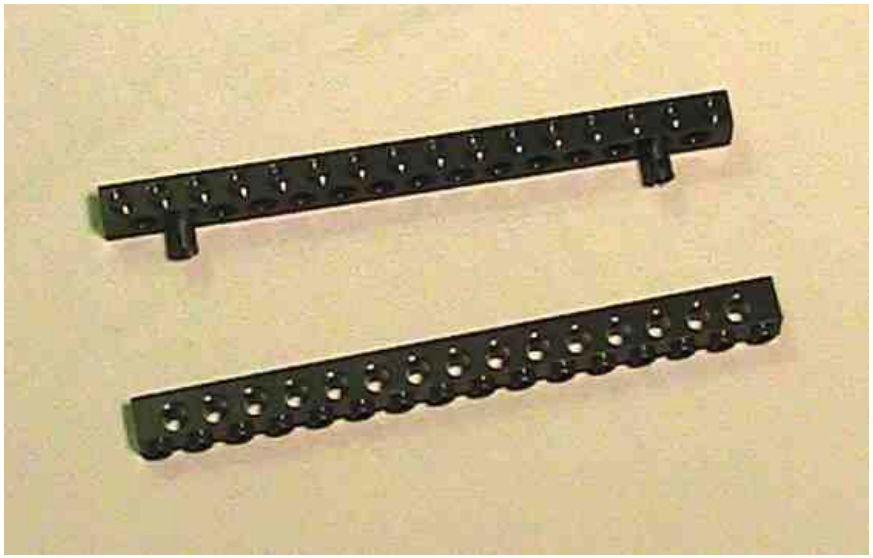
Attach the two motor arms using the last two inside holes on each side. With the long friction pins and full bushings to the outside.



Building the Chassis Base

Connect two 1 x 16 Technic bricks together using two short friction pins (black)

Connect using the 2nd hole in from each end.

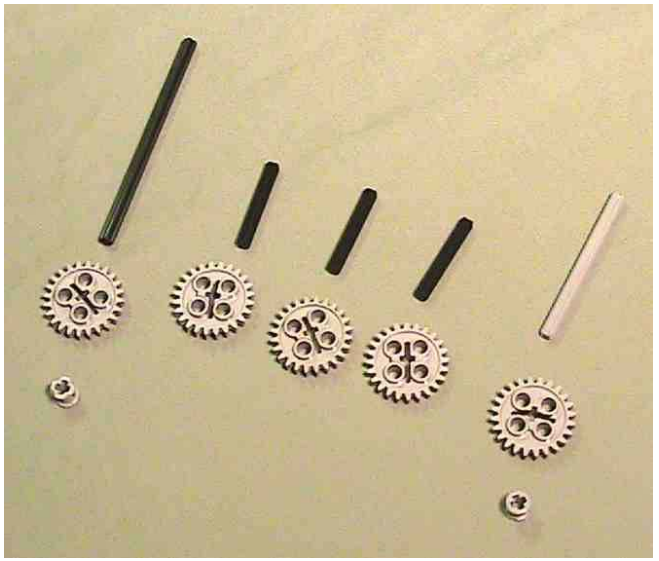


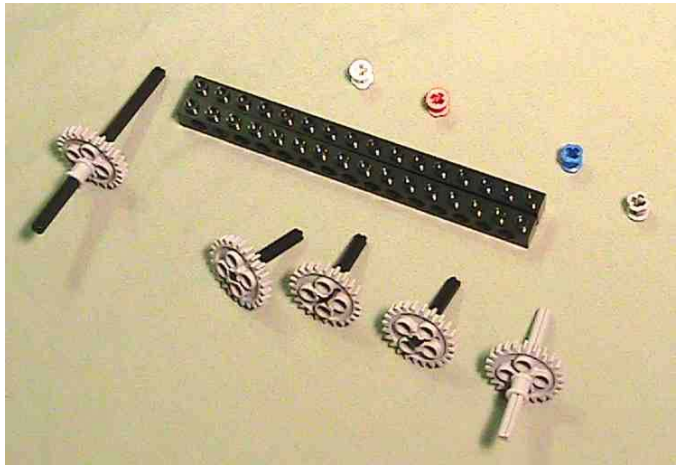
Gear and Drive Train

In order for both wheels on a side to be driven together, there has to be a way to transmit the power from the drive axle to the other wheel axle.

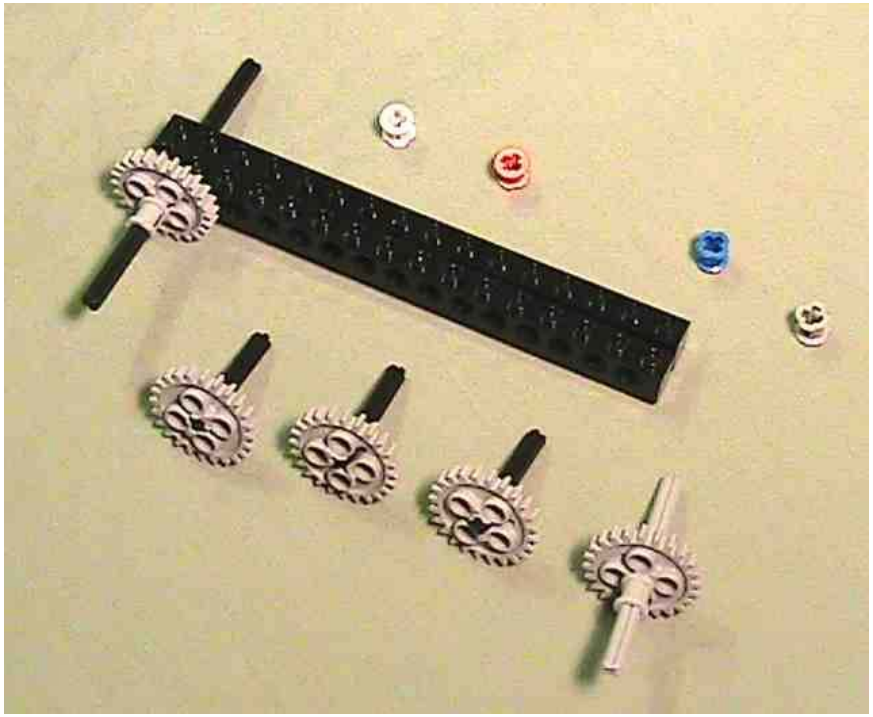
Since gear-to-gear connections change the rotational direction of the axle, you need an ODD number of gears to allow both wheels to turn in the same direction. Hence there are 5 gears in the drive train.

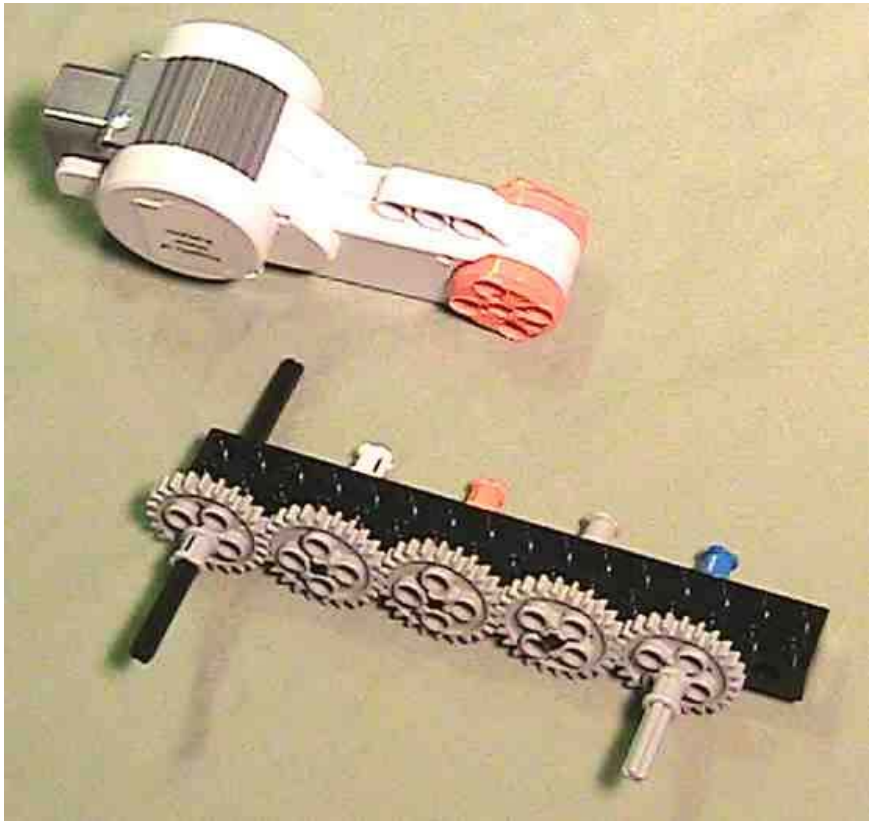
The longest axle will run through the wheel, the chassis and the motor. The second to longest axle has to run through the wheel and the chassis. The shortest



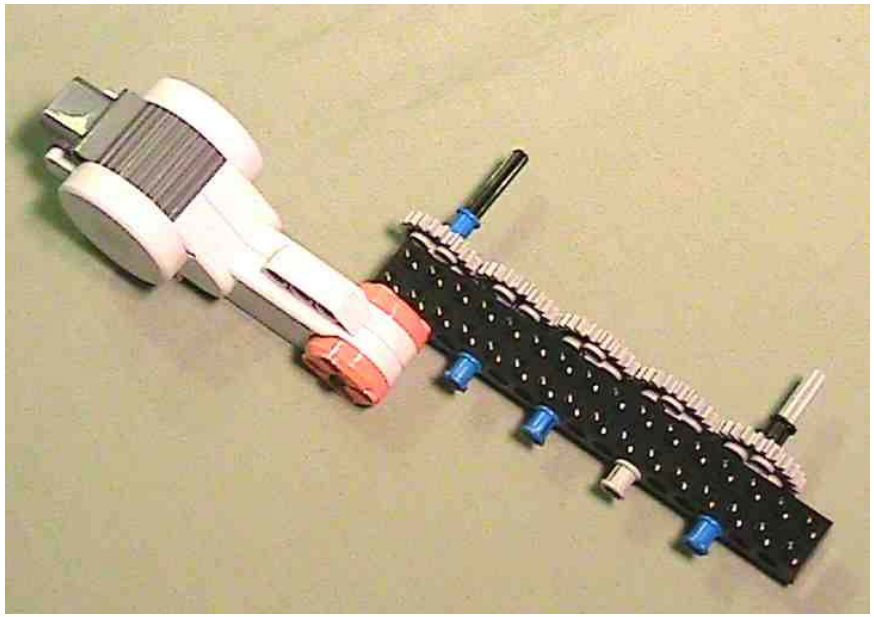


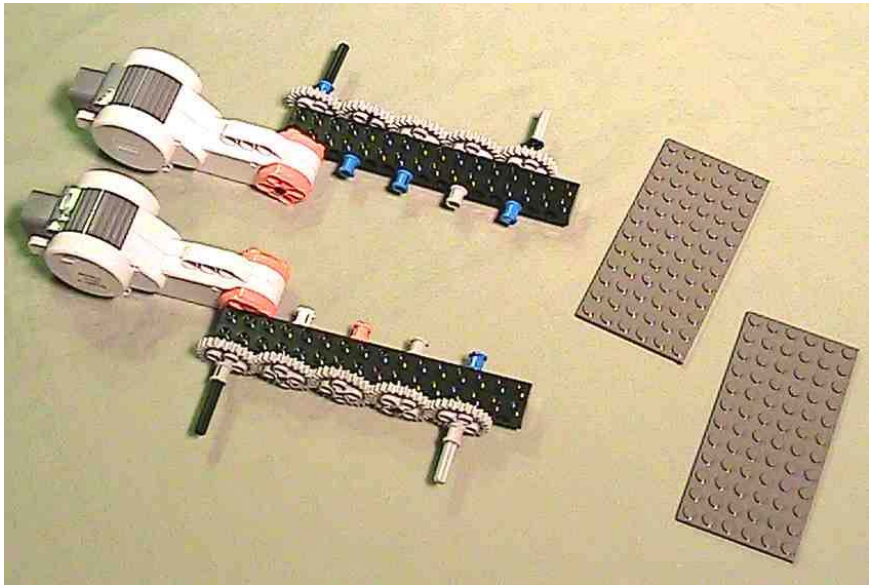
Add gear chain to chassis sides



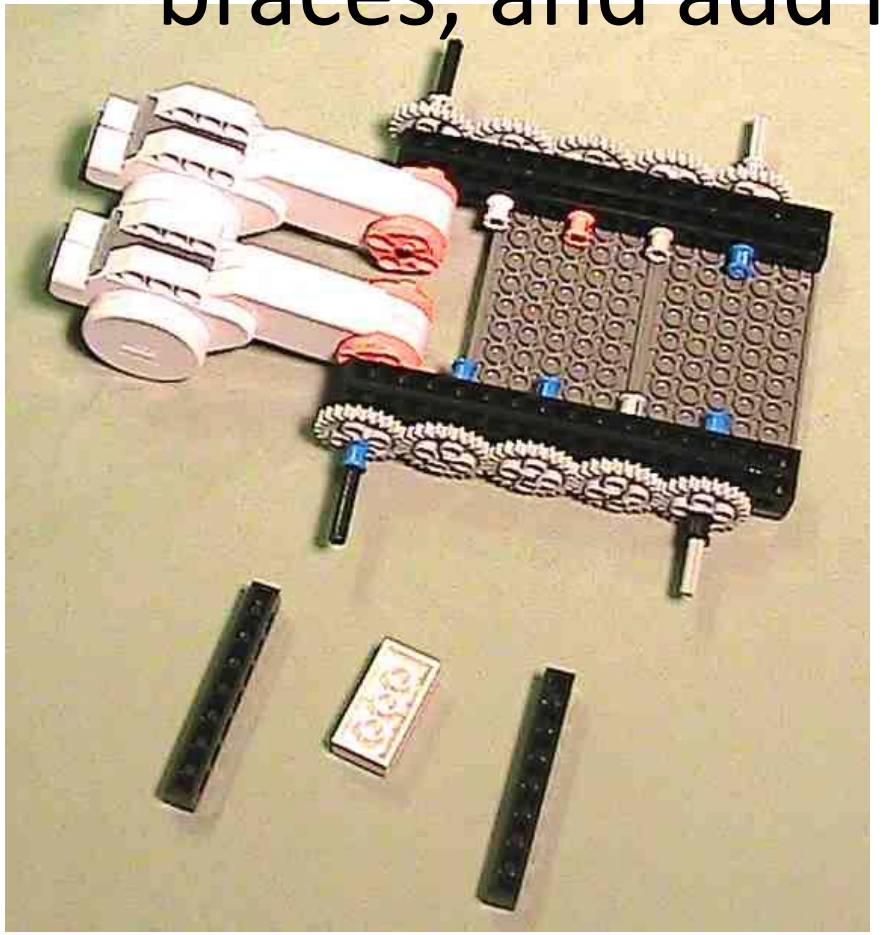


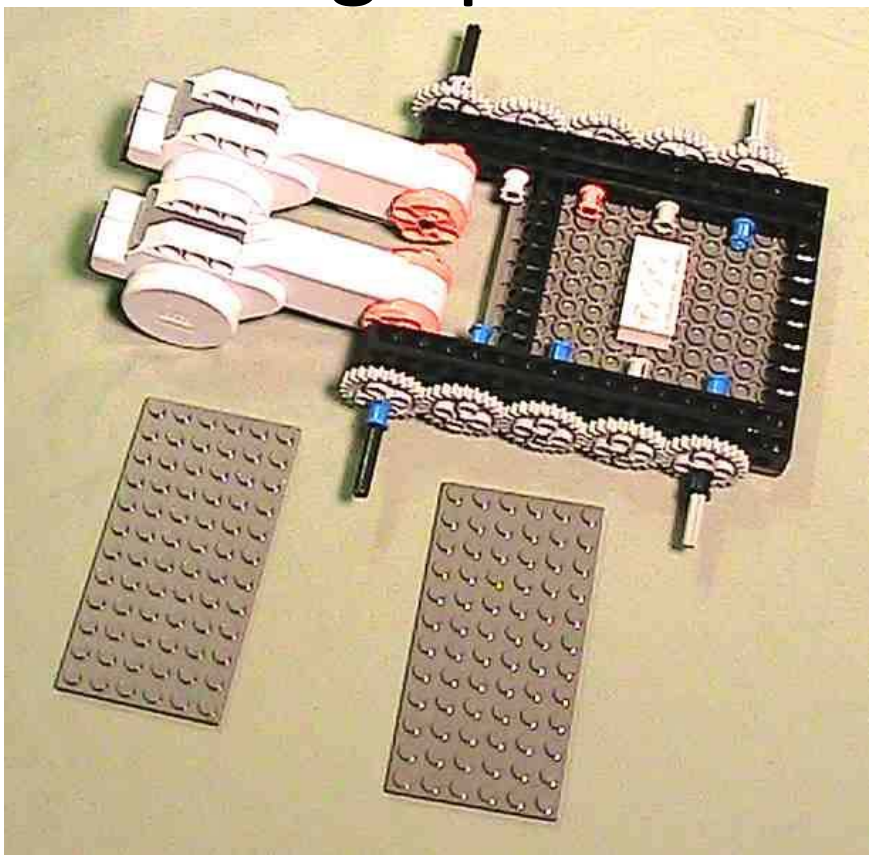
Attach motors to side opposite gears and in mirror to each other



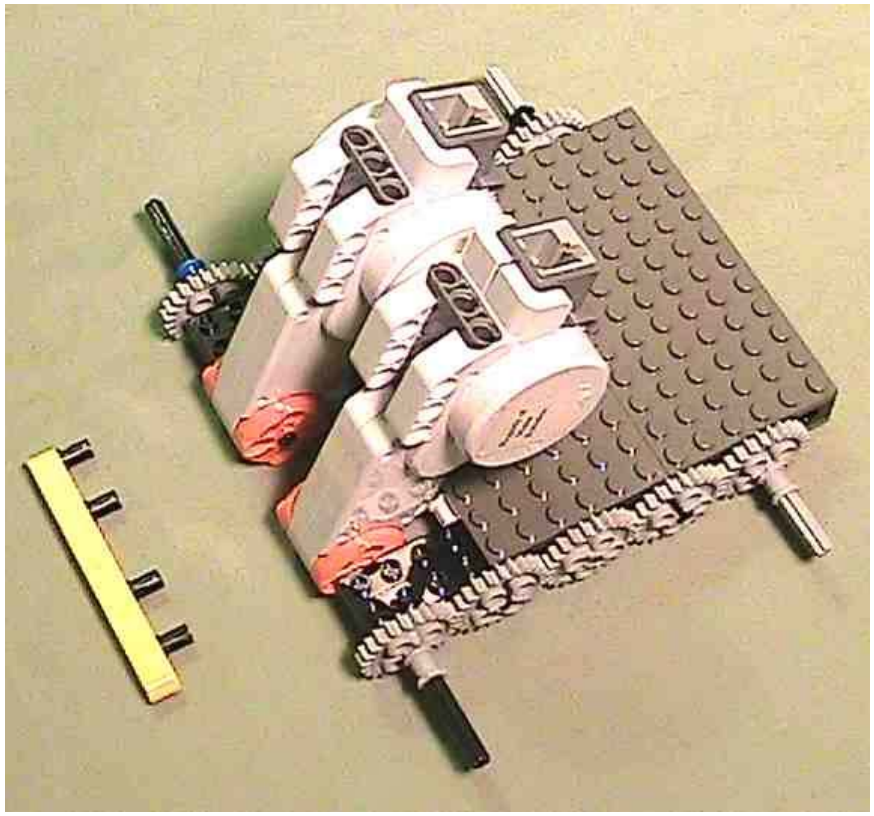


Frame top with large plates, put in braces, and add lower large plates

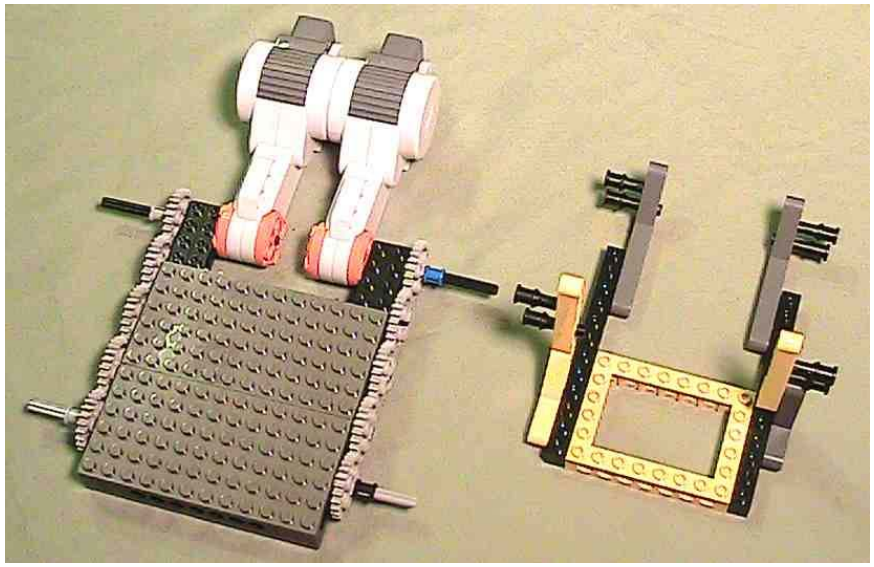


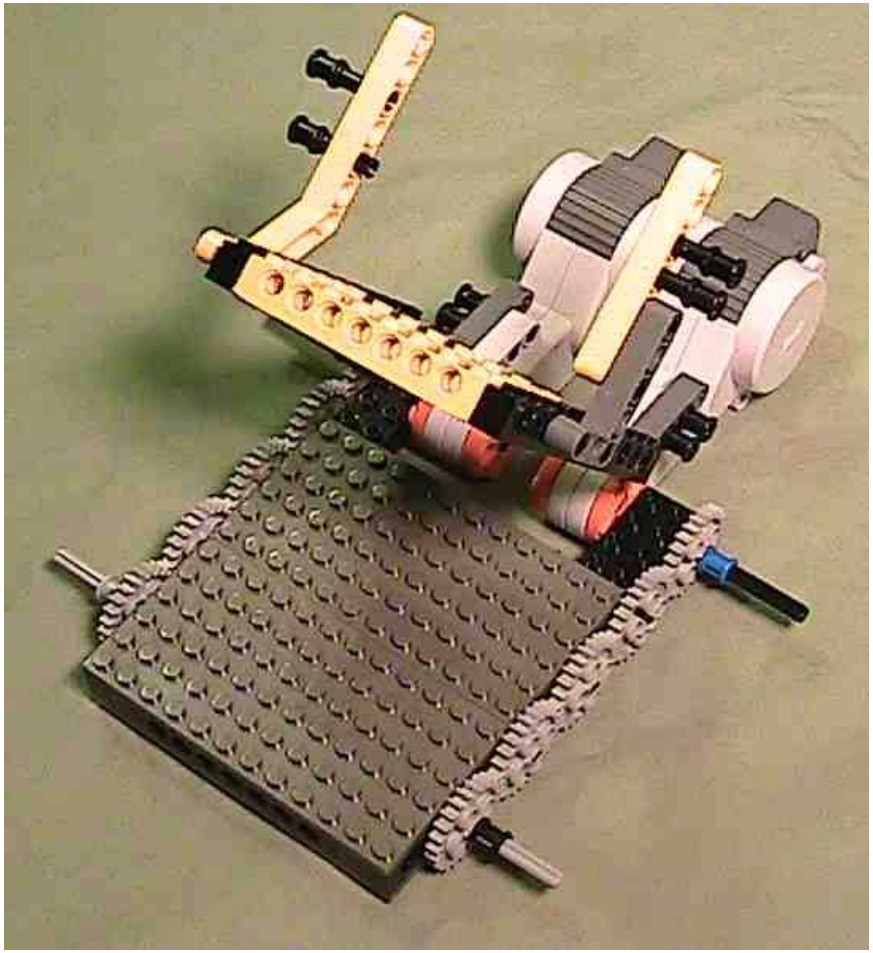


Add back stabilizer to motors



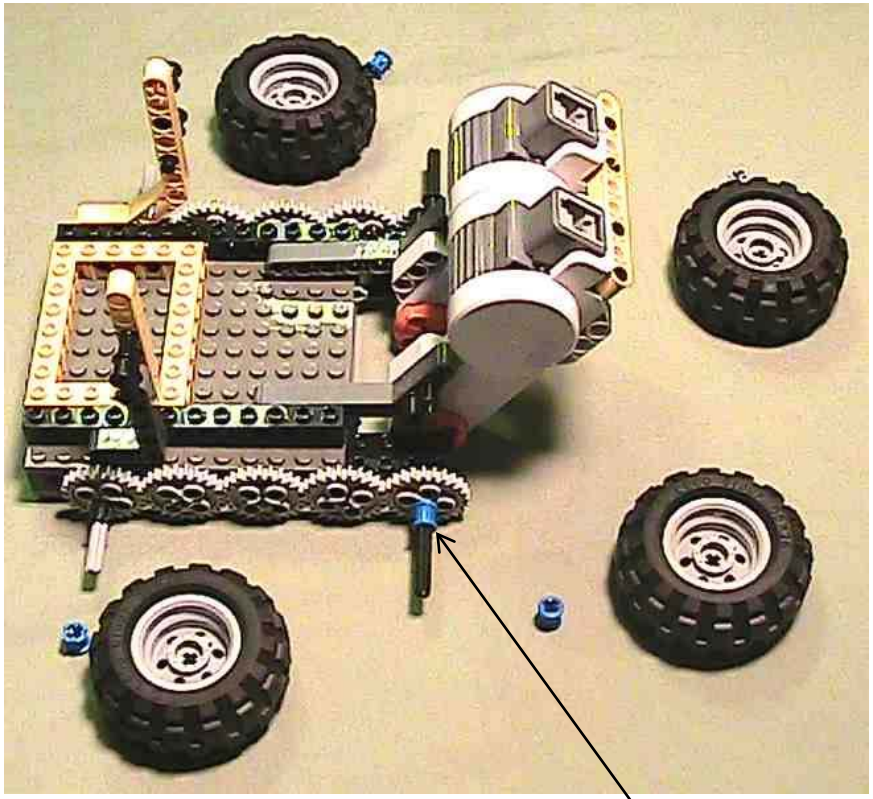
Build the NXT and Motor Support



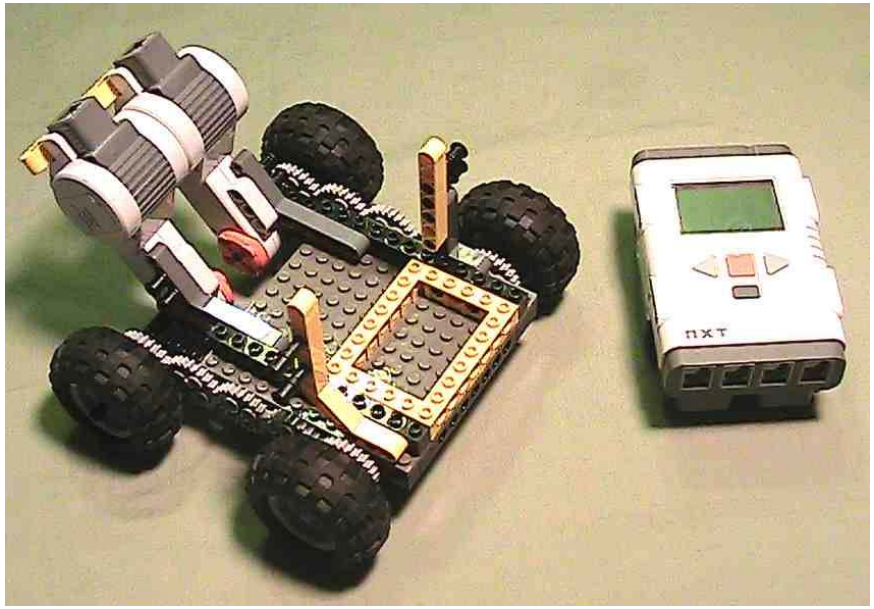


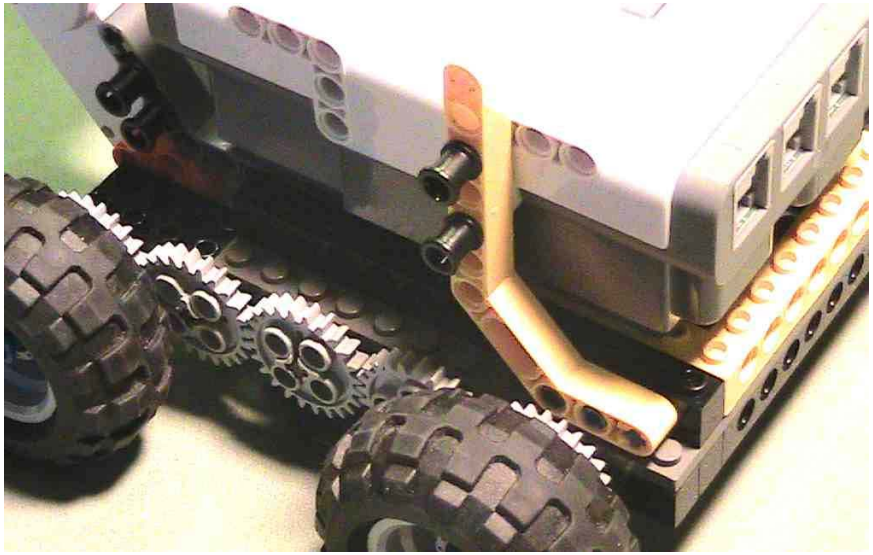
Add the Wheels

(Note, use bushings between wheels and gears and you may need bushings outside the wheel to hold it on)



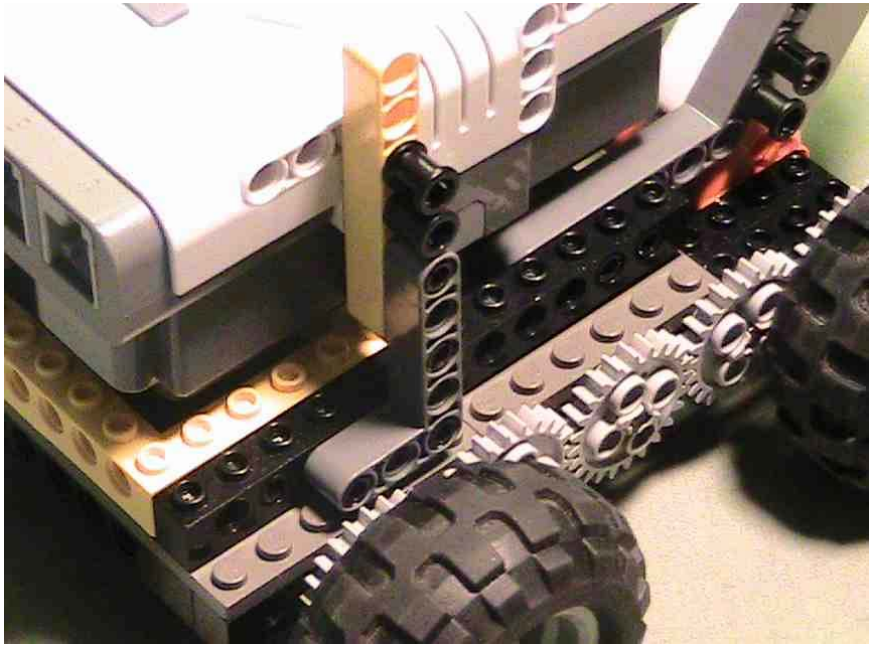
Use long Technic pins with Stop Bushings to attach Motors and NXT to support

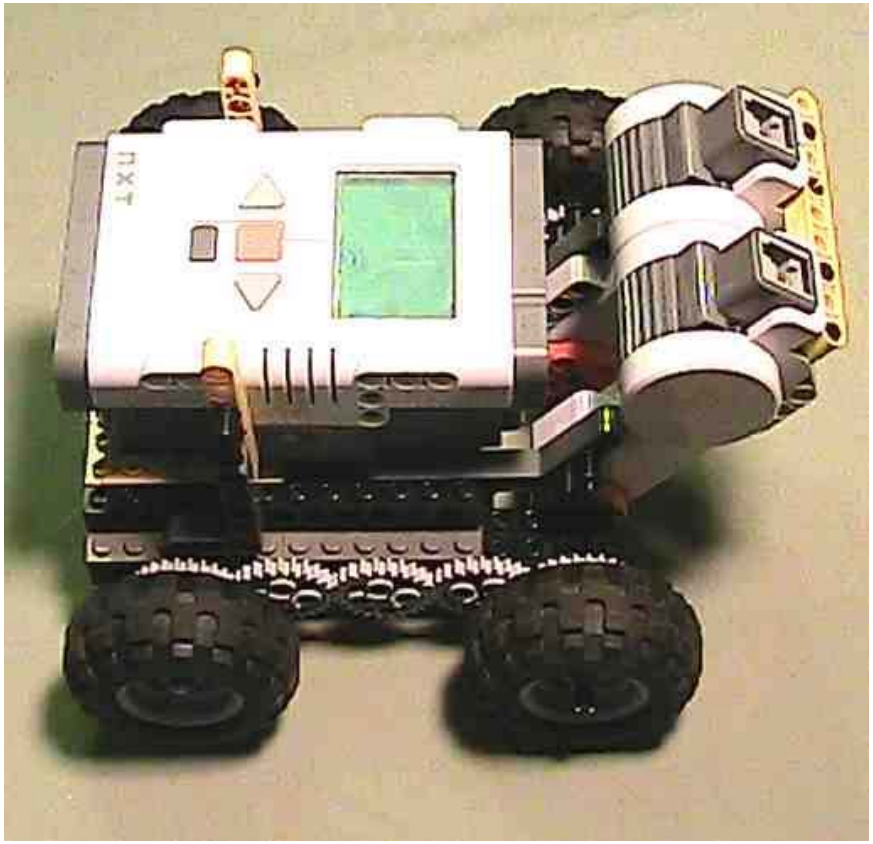




Note: Using long Technic pins with stop bushings allows you to pull the pins out Without taking much apart. Easier on the robot and the fingers.

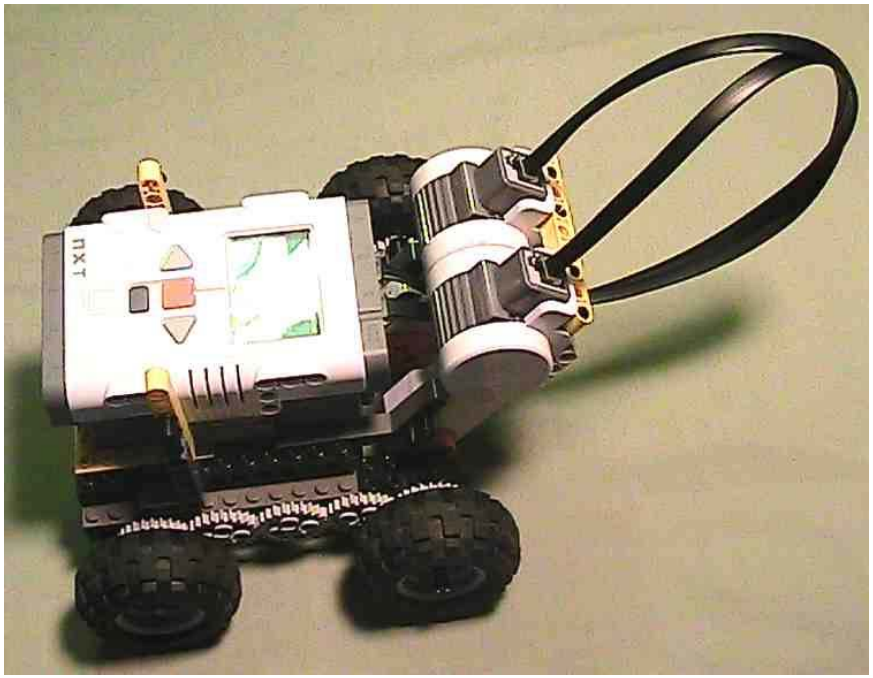
Showing attachment





Note: The robot chassis is an even number wide and the NXT is an ODD number of Studs wide, so you have to put a spacer in to “fill the gap” as shown above.

Add the wires and you are done.



With modification, you can have the motors go straight up, angled back (shown) or straight out the back. Just modify the base used to hold the motors and the NXT together.

You may need to adjust the base with a layer of plates to get the holes to align properly.