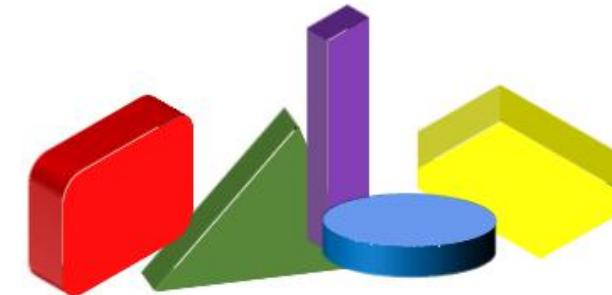
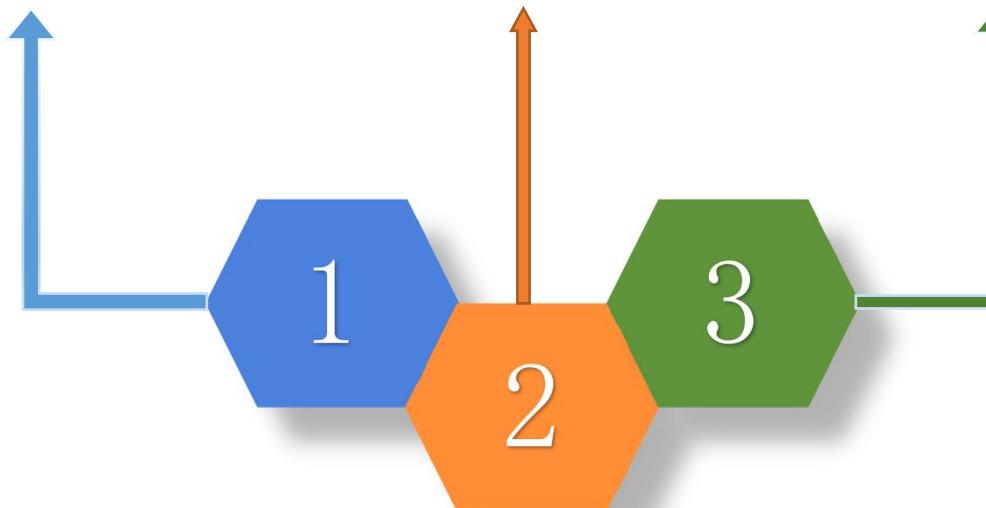


Yahboom Building:bit blocks

No.3 Hexapod robot

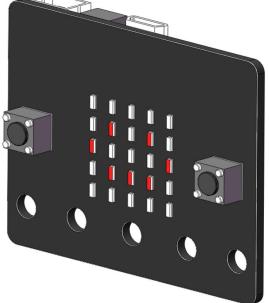
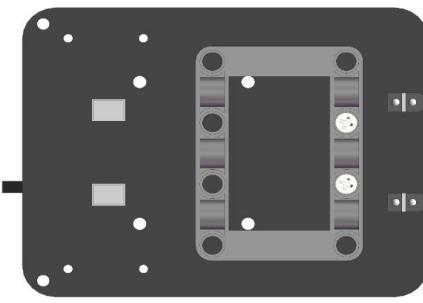
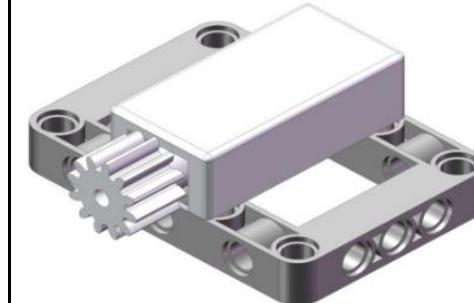
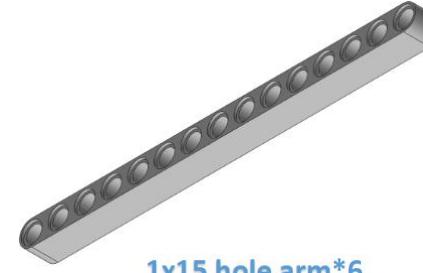
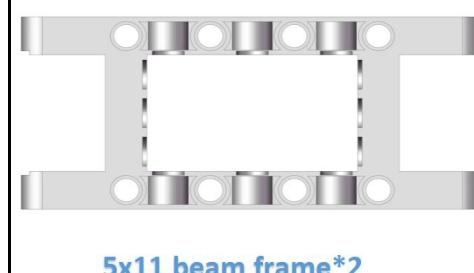
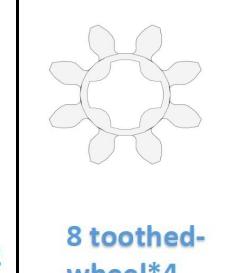
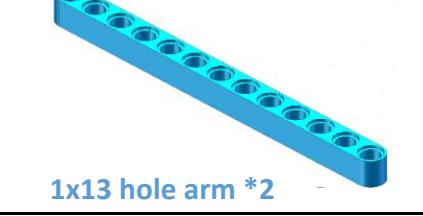
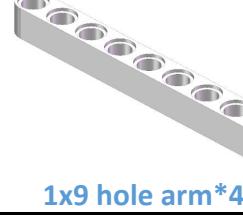
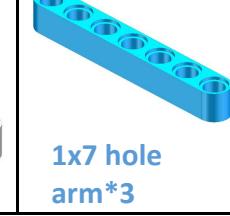


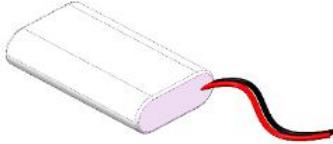
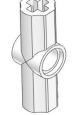
DIY Thinking Creativity



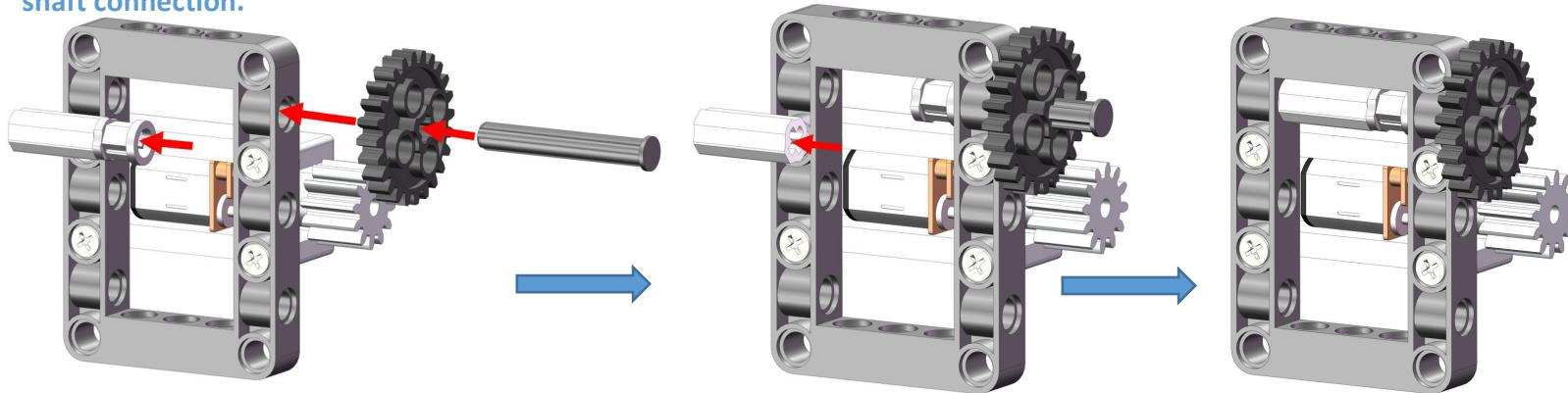
DIY: This session is mainly to teach you to assemble a hexapod robot with building blocks.

Prepare the following blocks and we will assemble a cute building block hexapod robot. 

				
Micro:bit*1	Micro:bit expansion board*1	Motor module*2	40 toothed-wheel *6	5x7 beam frame*5
				
1x4 Shaft cutoff*8	1x15 hole arm*6	5x11 beam frame*2	24 toothed-wheel*2	8 toothed-wheel*4
				
1x3 hole arm*2	1x13 hole arm *2	1x11 hole arm*4	1x9 hole arm*4	1x7 hole arm*3

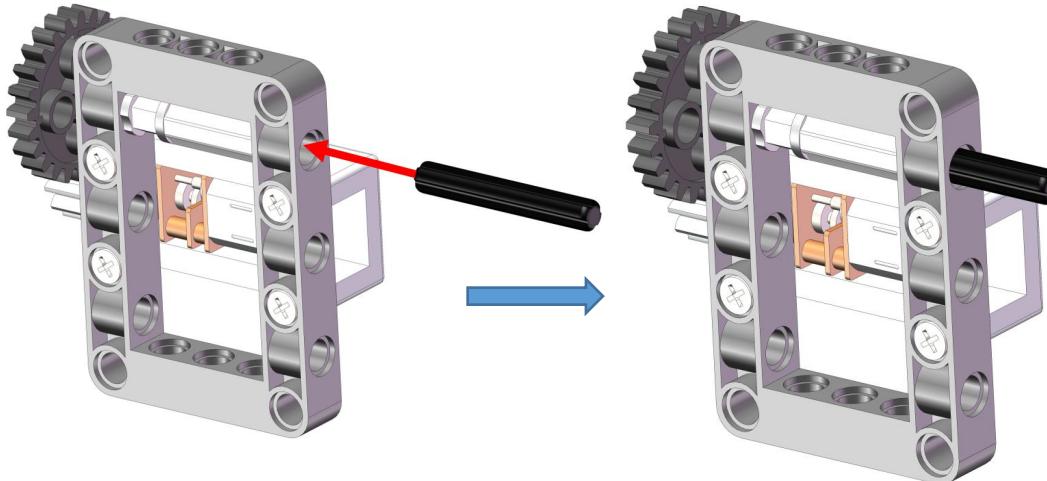
				
				
				

Step 1: Find a motor module, a 1*4 shaft cutoff, a bushing, a 1*2 shaft connection and a 24-tooth wheel. Pass the shaft cutoff through the 24-toothed wheel, the corresponding hole position of the motor module, the bushing and one end of the 1*2 shaft connection.



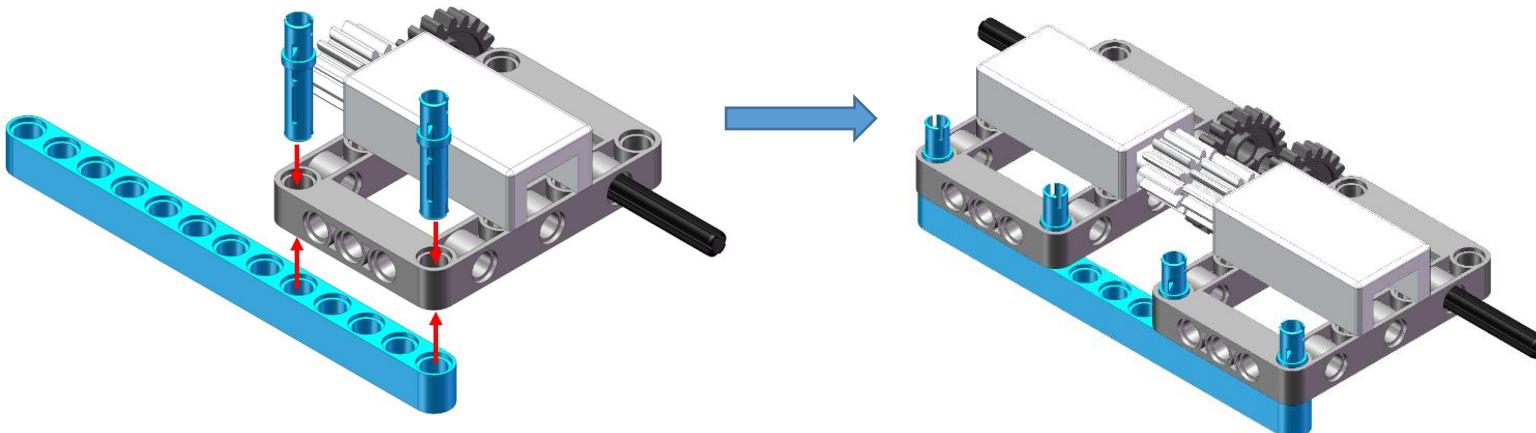


Step 2: Locate a 1x4 cross shaft and pass it through the corresponding hole on the side of the motor module and the other end of the 1x2 shaft connection.

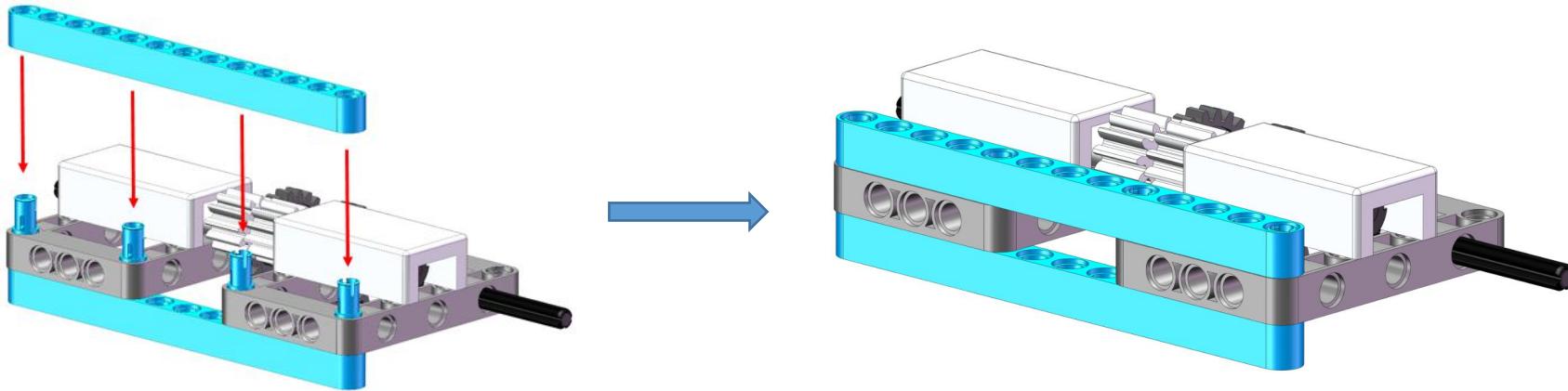


Tip: There are two motor modules that need to be assembled. Please install the other one in the same way.

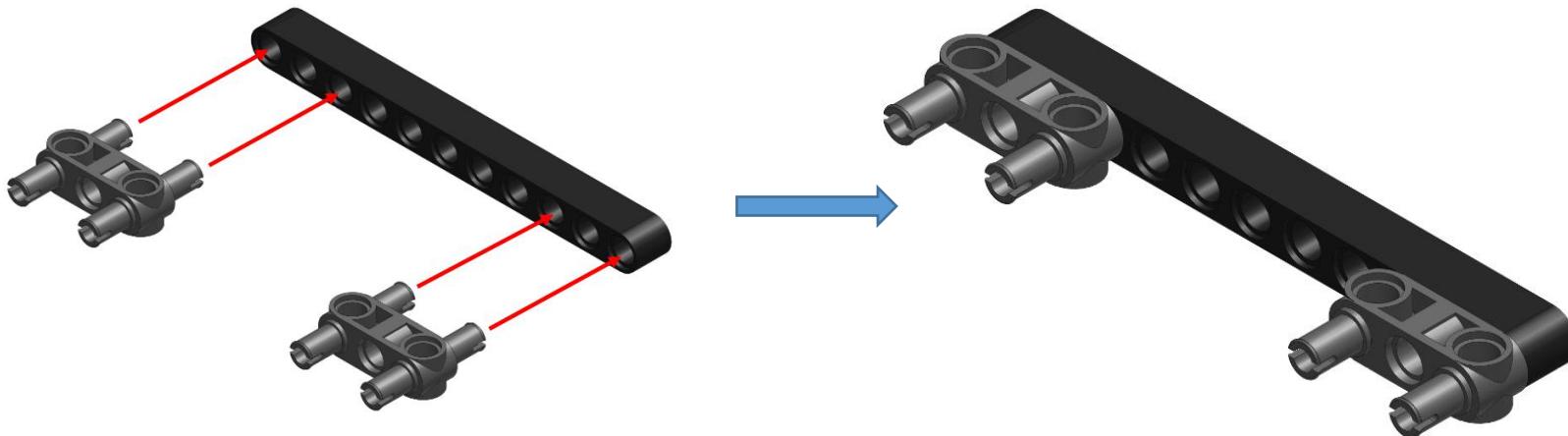
Step 3: Find a 1x13 hole arm and four 1x3 bolts and assemble them.



Step 4: Locate a 1x13 hole arm and insert the four 1x3 pins into the holes No. 1, 5, 9, and 13 of the hole arm.

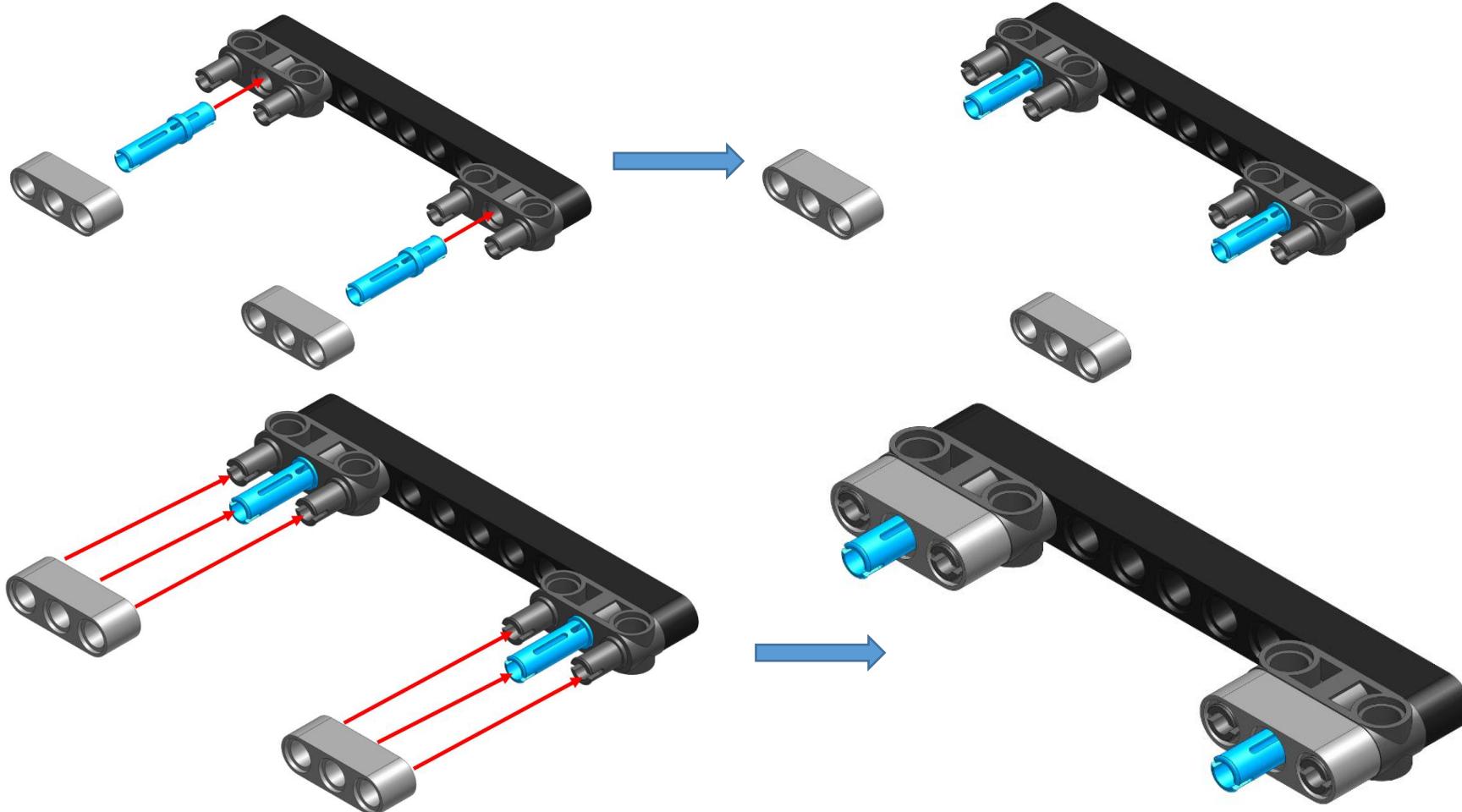


Step 5: Find a 1x11 hole arm , two 3x3 bolts and assemble them.

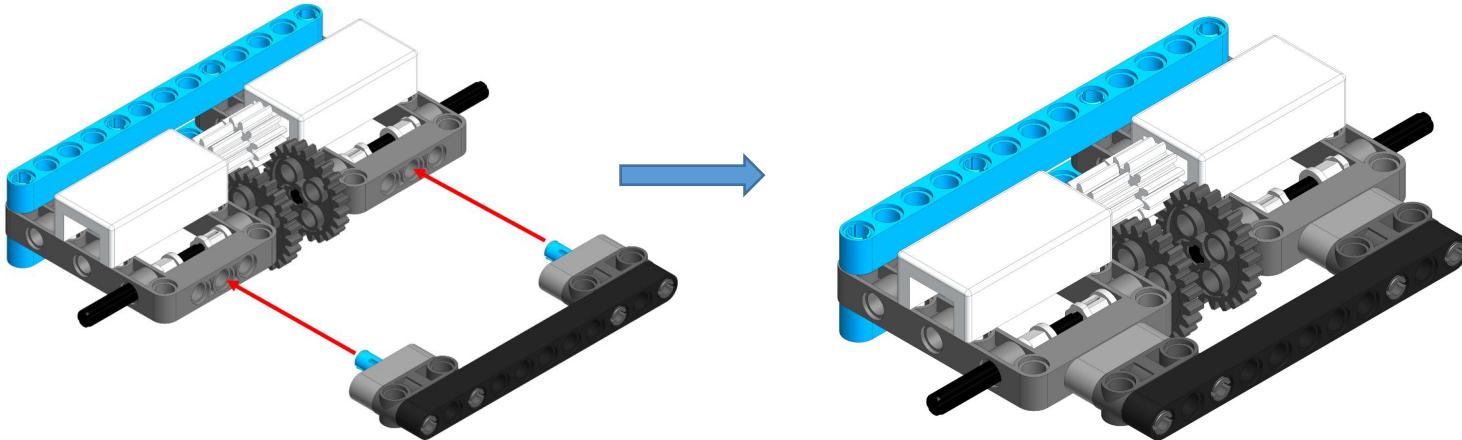




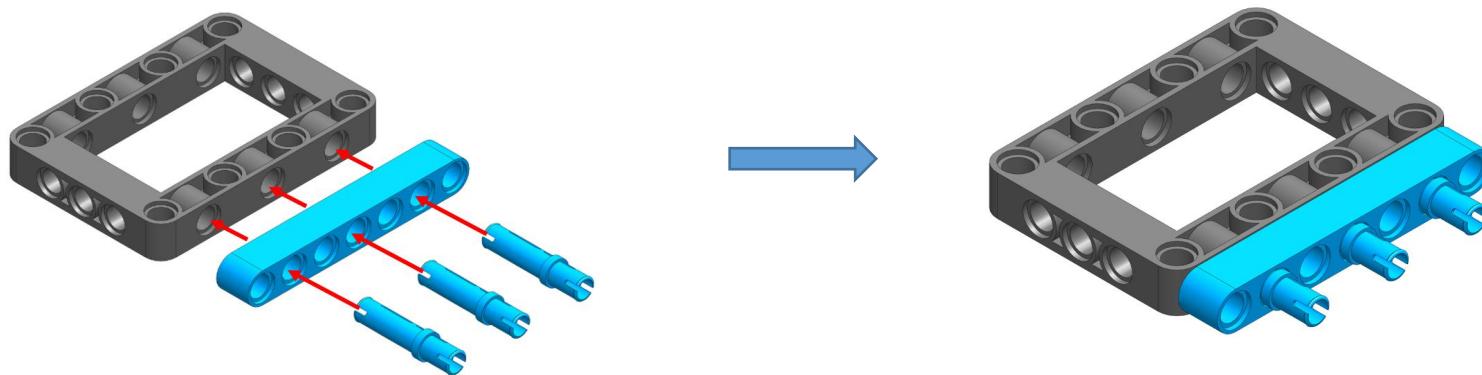
Step 6: Find two 1x3 hole arms and two 1x3 bolts. And assemble them.

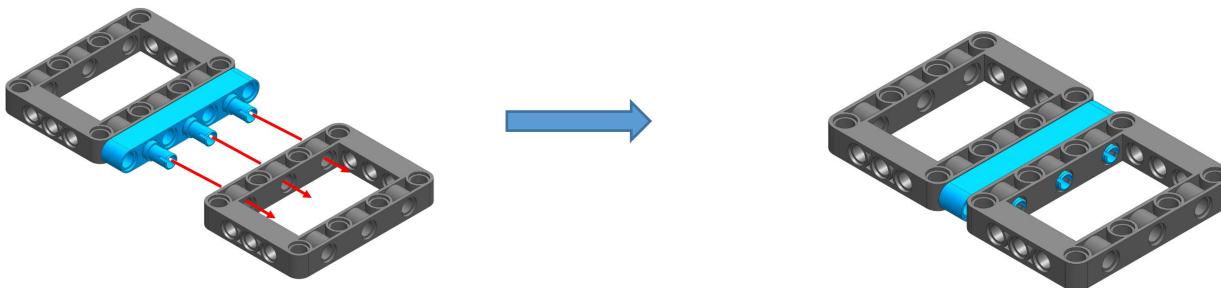


Step 7: Combine the two parts of the building blocks that we have assembled in Step 3 and Step 6

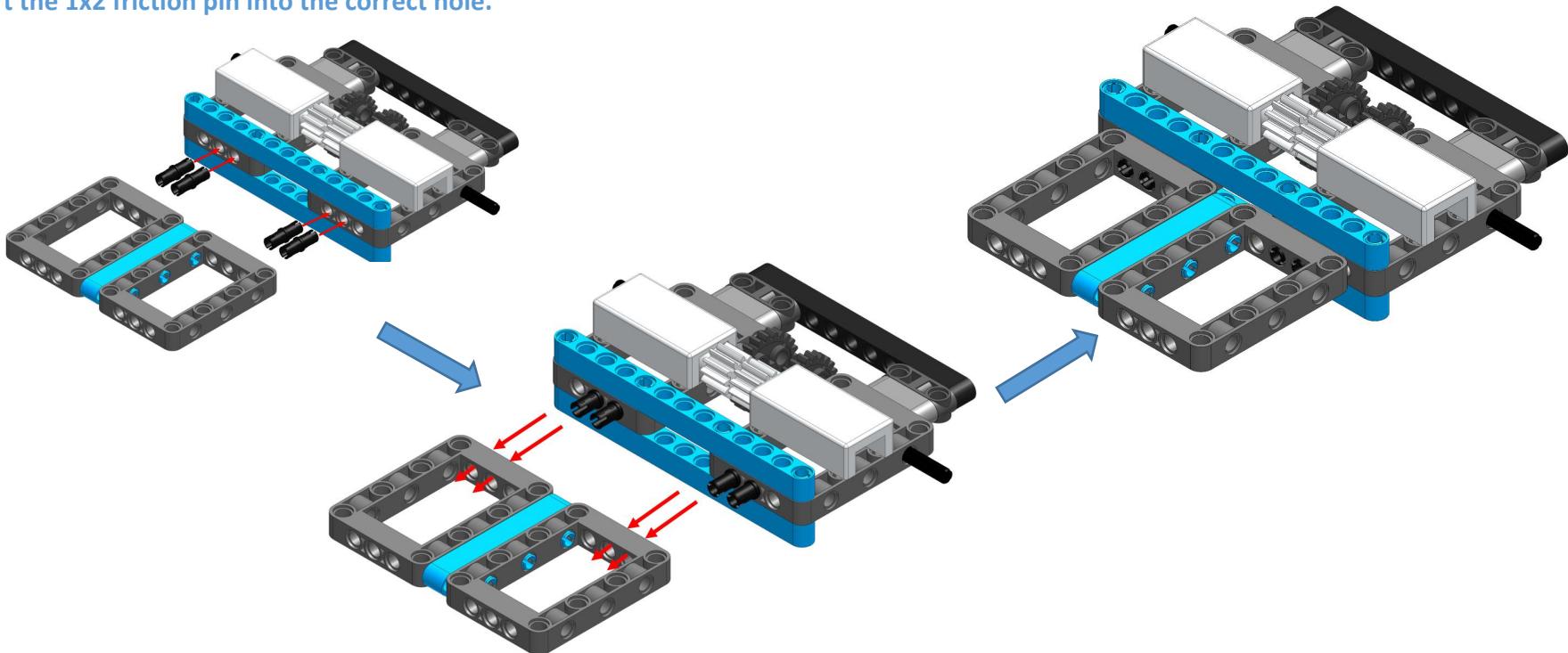


Step 8: Continue to find three 1x3 bolts, a 1x7 hole arm and a 5x7 beam frame and assemble them.





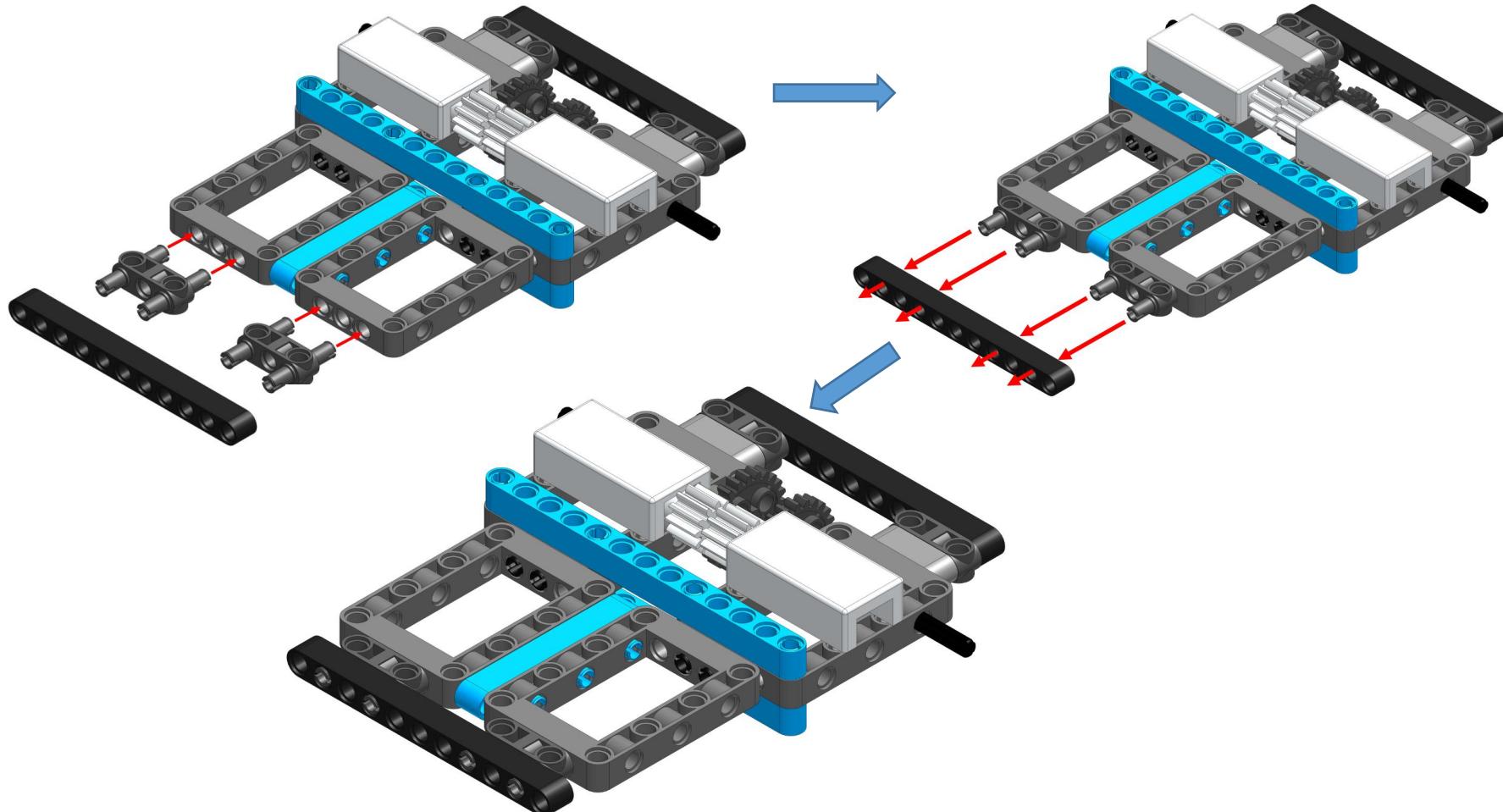
Step 9: Find four 1x2 friction pins and combine the two parts of the blocks that we have assembled in steps 7 and 8. You must insert the 1x2 friction pin into the correct hole.





Step 10: Look for two 3x3 bolt connections and a 1x11 hole arm. First insert the 3x3 bolts into the 5x7 beam frame and then install the 1x11 hole arms onto the two 3x3 bolt connections.

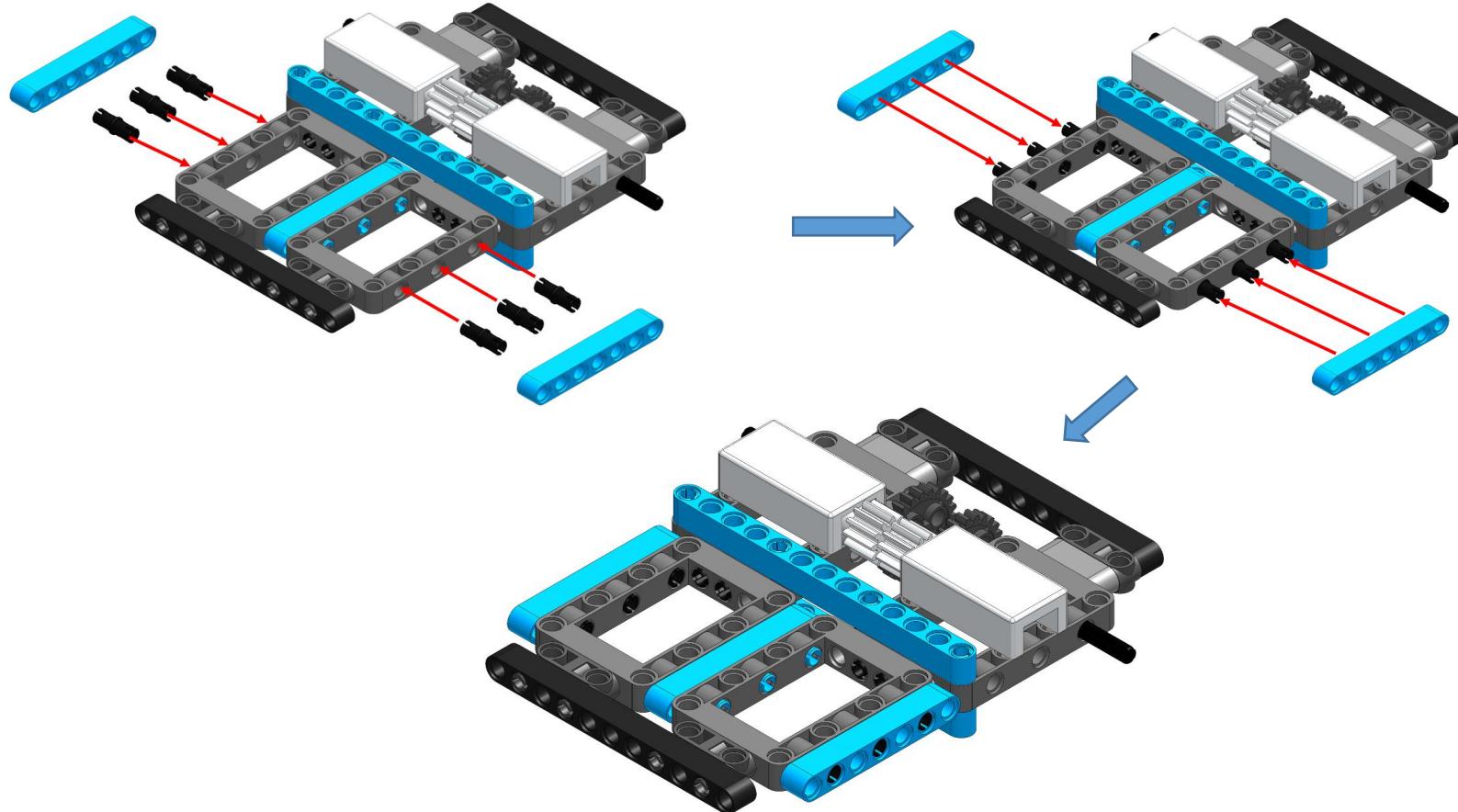
Note: Two 3x3 bolt connections are inserted in holes 2nd, 4th, 8th, and 10th of the 1x11 hole arm.





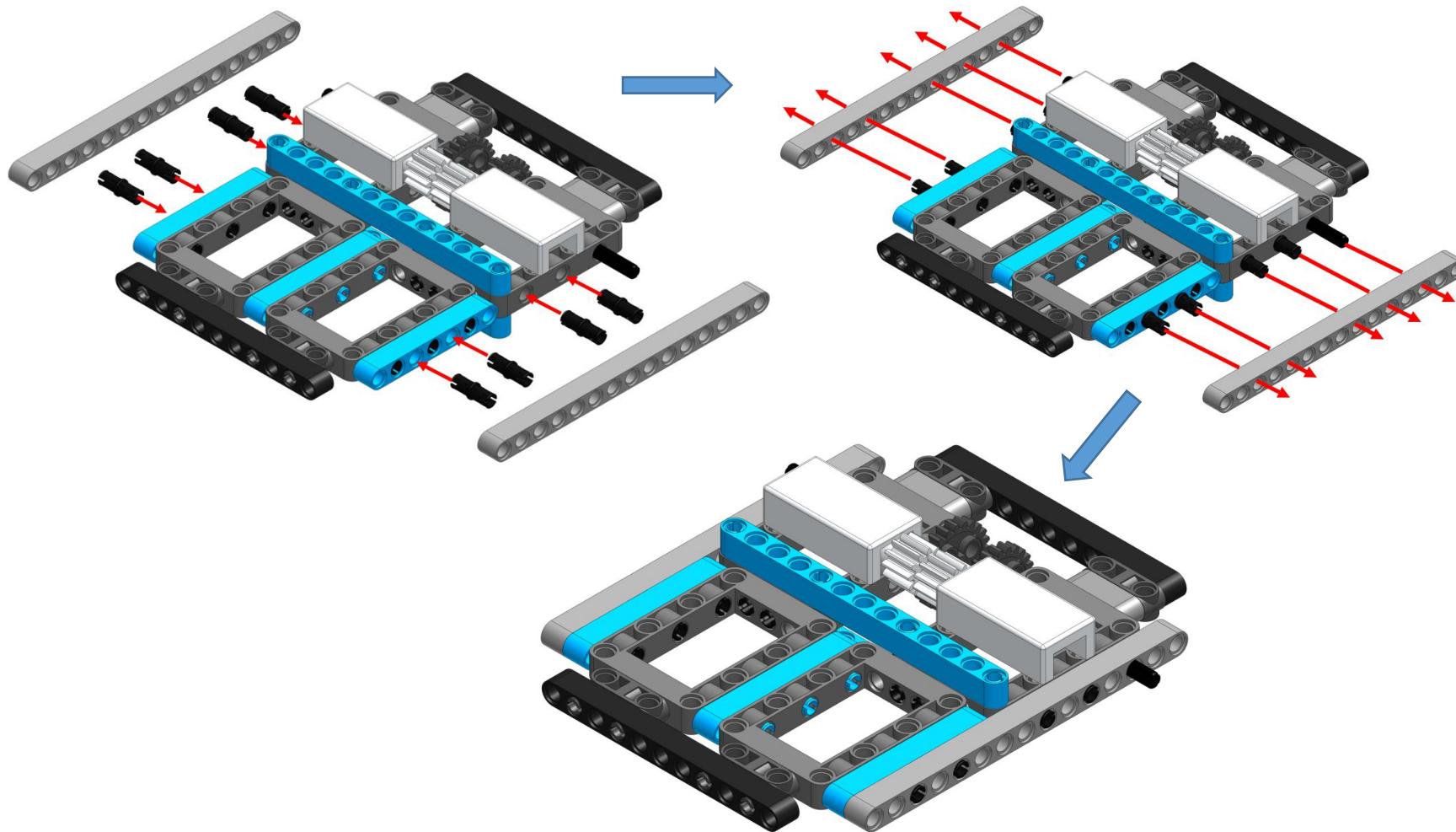
Step 11: Locate the six 1x2 friction pins and the two 1x7 hole arms. First insert the 1x2 friction pin into the hole on the side of the 5x7 beam frame and insert the 1x7 hole arm into the friction pin.

Note: The 1x2 friction pin is inserted into the 2nd, 4th, and 6th holes of the 1x7 hole arm.



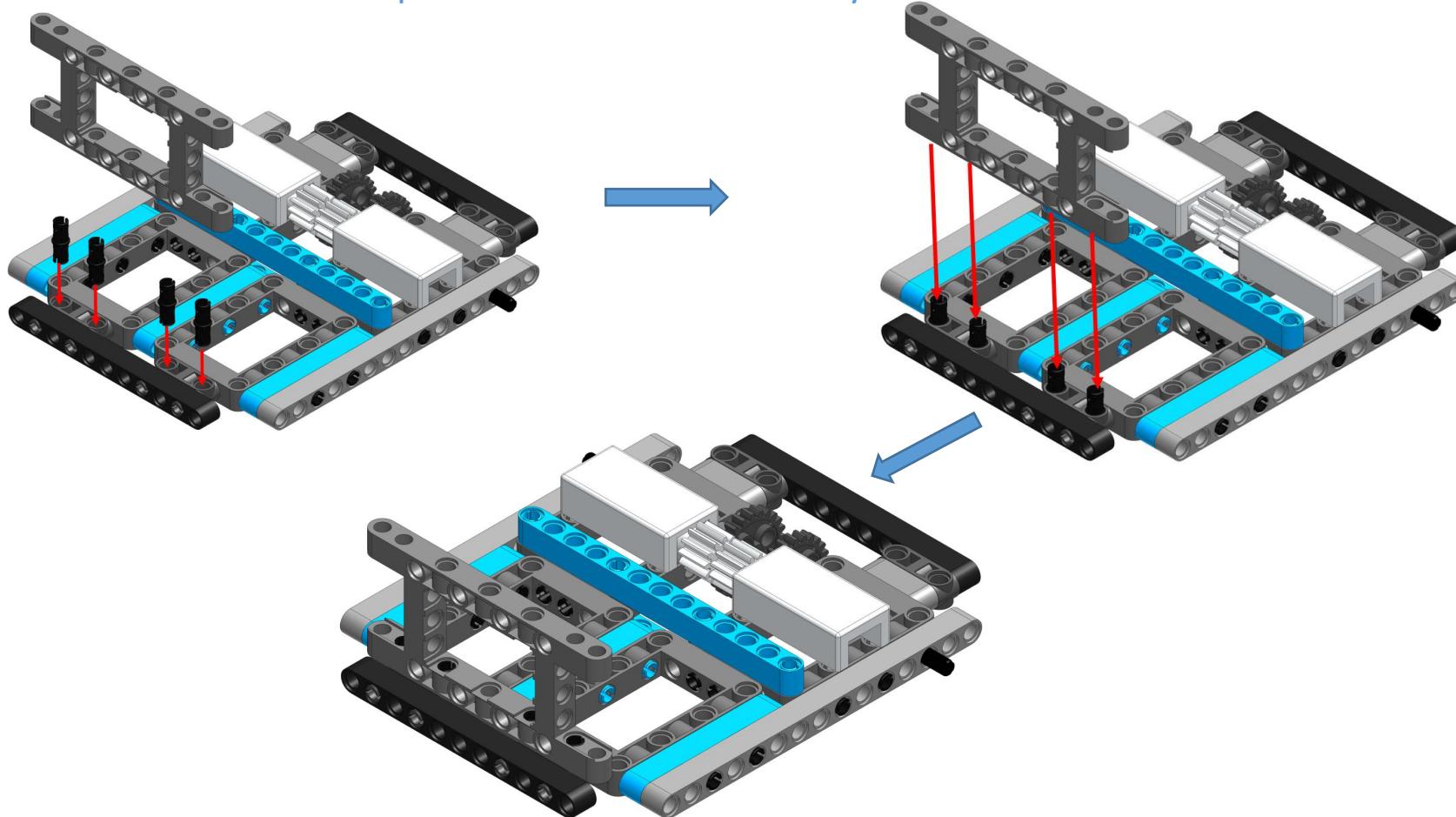


Step 12: Locate the eight 1x2 friction pins and the two 1x15 hole arms and assemble them with symmetrical sides. Each hole must be inserted correctly.

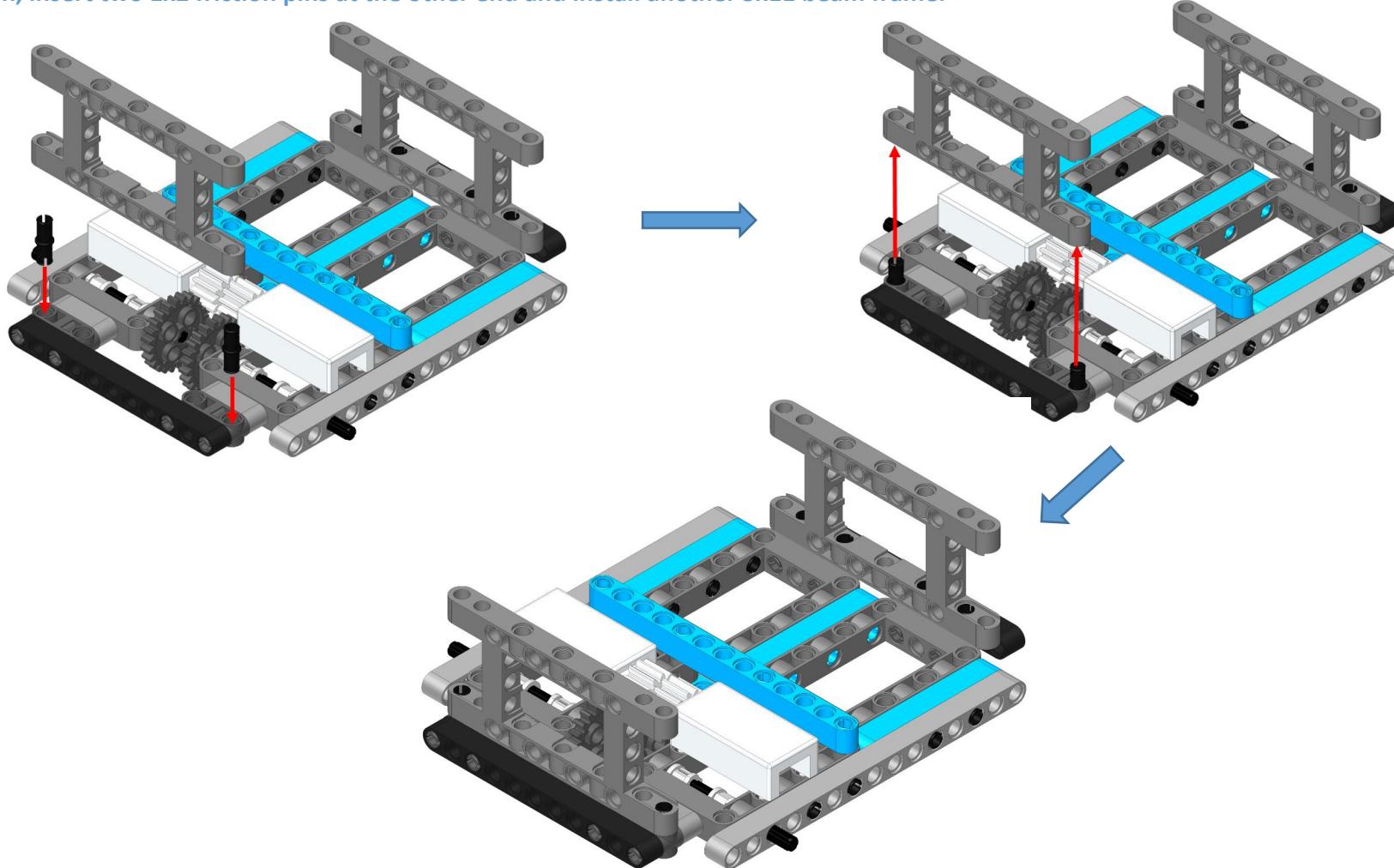




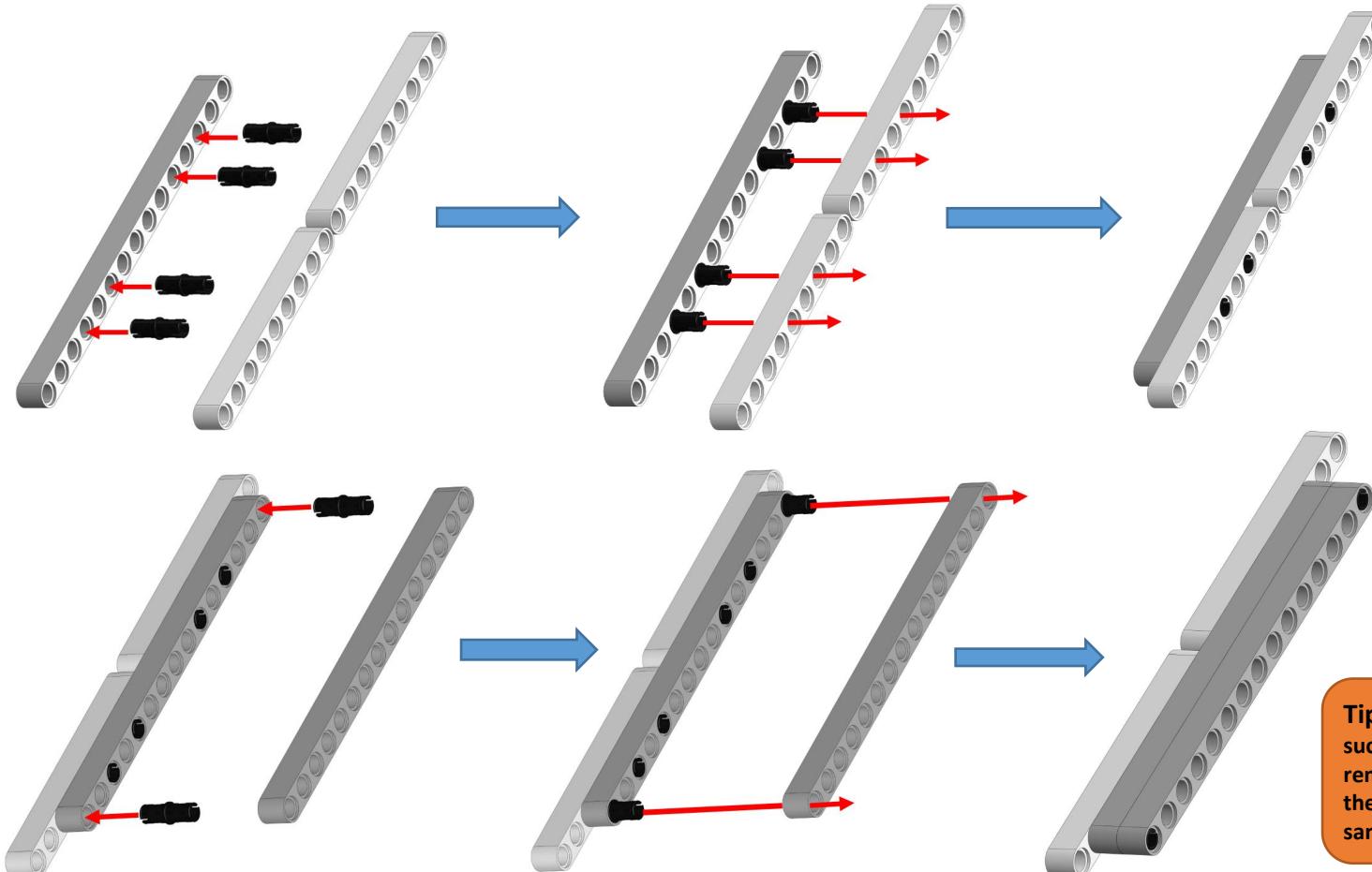
Step 13: Locate the six 1x2 friction pins and the two 5x7 beams. First, insert the four 1x2 friction pins into the appropriate positions and insert a 5x11 beam into the friction pin. Each hole must be inserted correctly.



Then, insert two 1x2 friction pins at the other end and install another 5x11 beam frame.

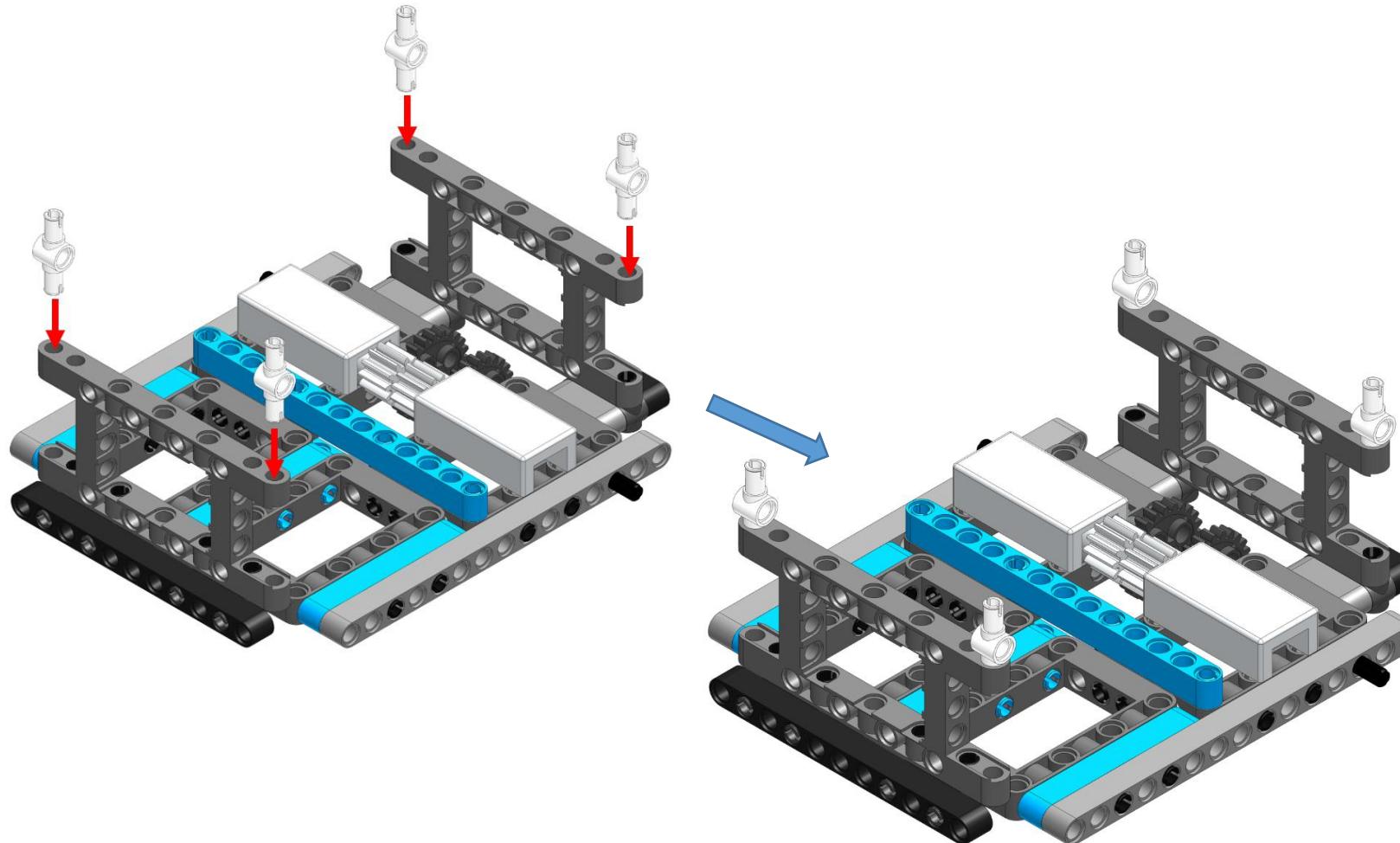


Step 14: Locate the six 1x2 friction pins, two 1x15 hole arms and two 1x9 hole arms for assembly.



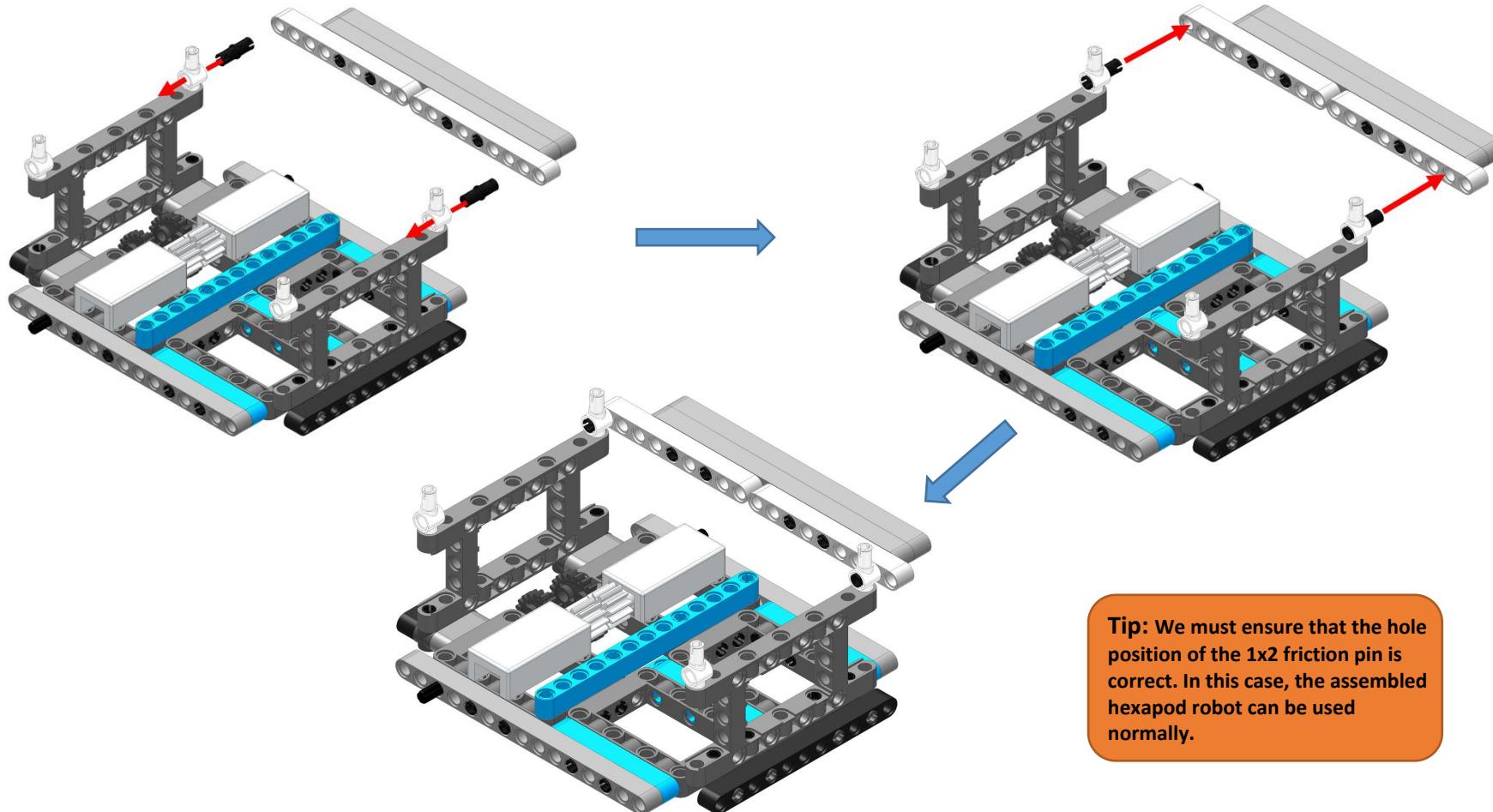
Tip: We need two such blocks. Please remember to assemble the other one in the same way.

Step 15: Locate the four 1x3 bolt connectors and install them on top of the building blocks we have assembled in step 13.





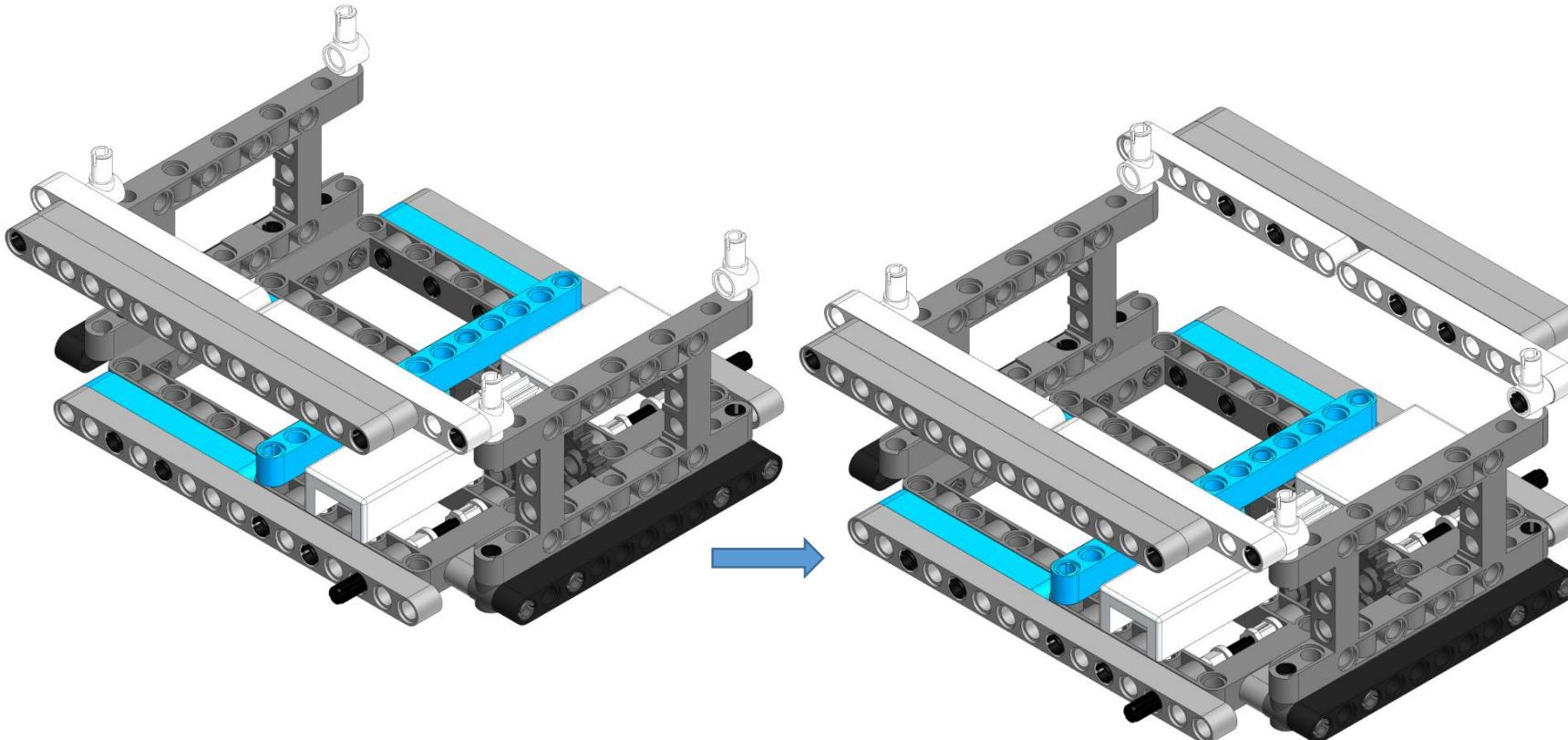
Step 16: Find two 1x2 friction pins, and use them to combine the blocks that we have assembled in step 14 and step 15.



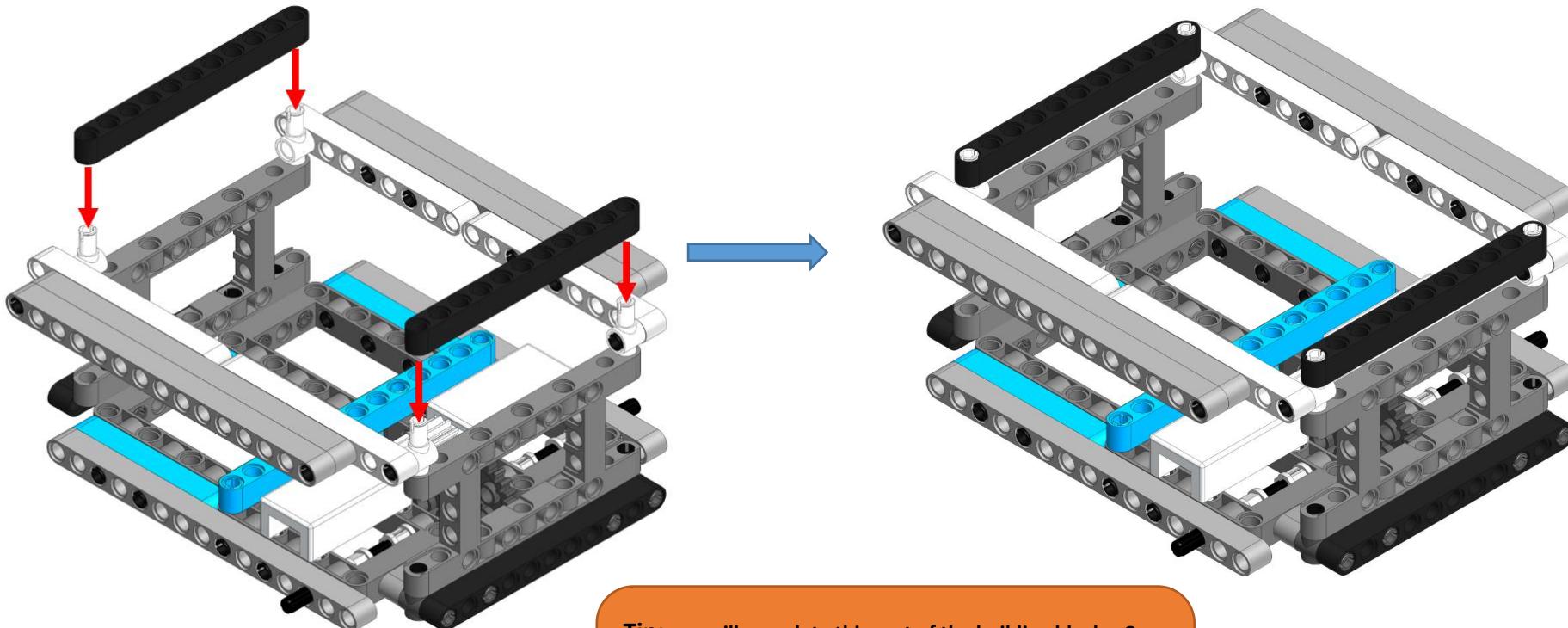
Tip: We must ensure that the hole position of the 1x2 friction pin is correct. In this case, the assembled hexapod robot can be used normally.

Step 17: Install the other side in the same way.

Tip: The orientation of the picture in this step is different from the previous step. When you install the other side. The hole position must also be correct. If you do not know the specific orientation of the building blocks, you can judge according to the direction of the motor in the diagram. Therefore, every time you install, you should carefully check which side of the motor is on to ensure the correctness of the installation position.

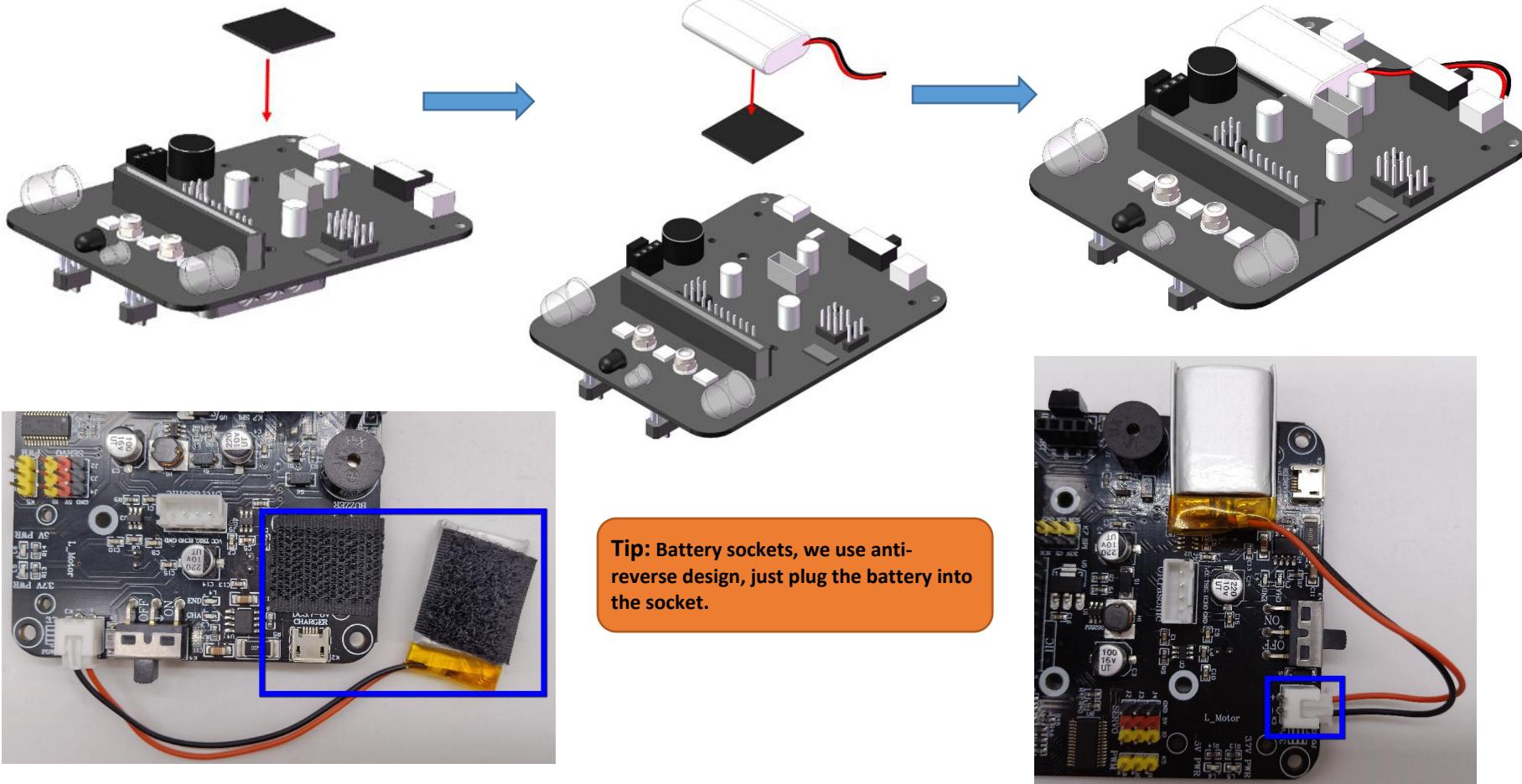


Step 18: Locate the two 1x11 hole arms and install them on the top of the four 1x3 bolt connectors on the top of the frame. The 1x3 bolt connectors are inserted into the hole at the most ends of the 1x11 hole arm.

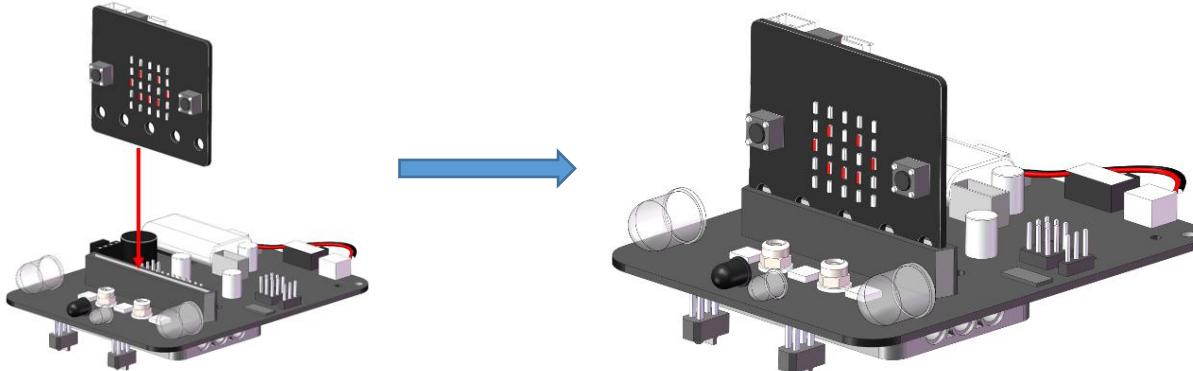


Tip: we will complete this part of the building blocks. Can you compare the blocks that you have stitched together with the pictures? If it is not the same, then you have to go back and carefully check our assembly steps to see if you have made a mistake. Put the assembled blocks aside and let's move on to the next steps.

Step 19: Find the Velcro and micro:bit expansion board, remove the protective film on the back of the Velcro, and attach the two Velcro stickers to the lower right corner of the micro:bit expansion board and one side of the battery.

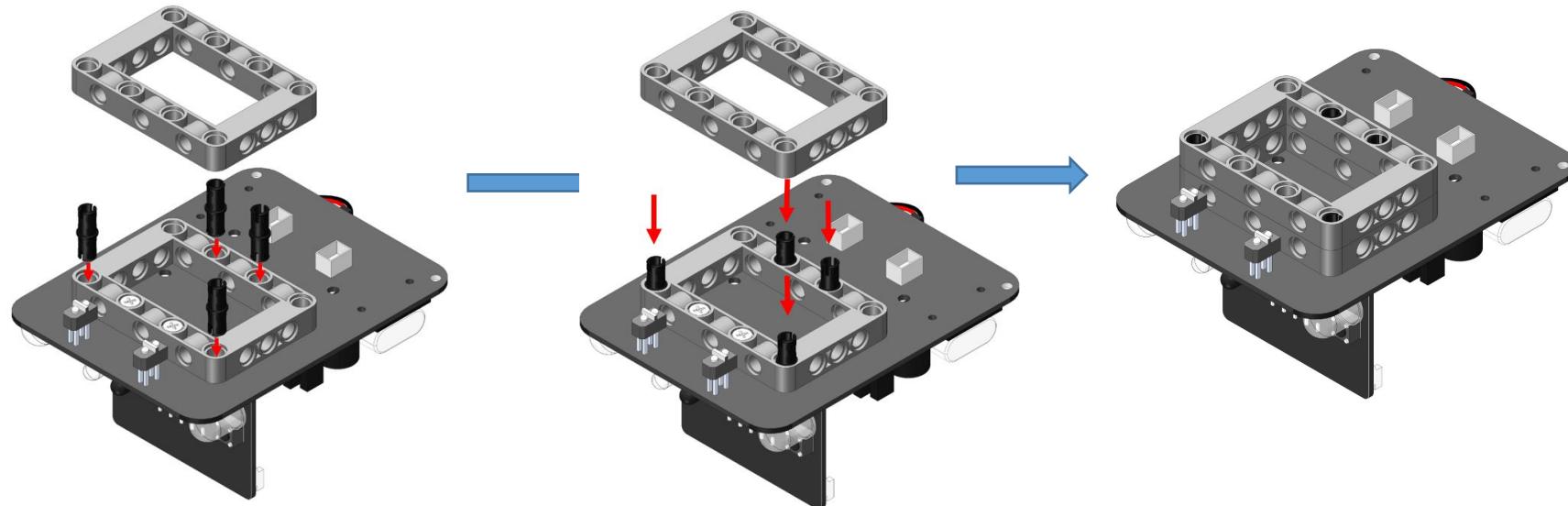


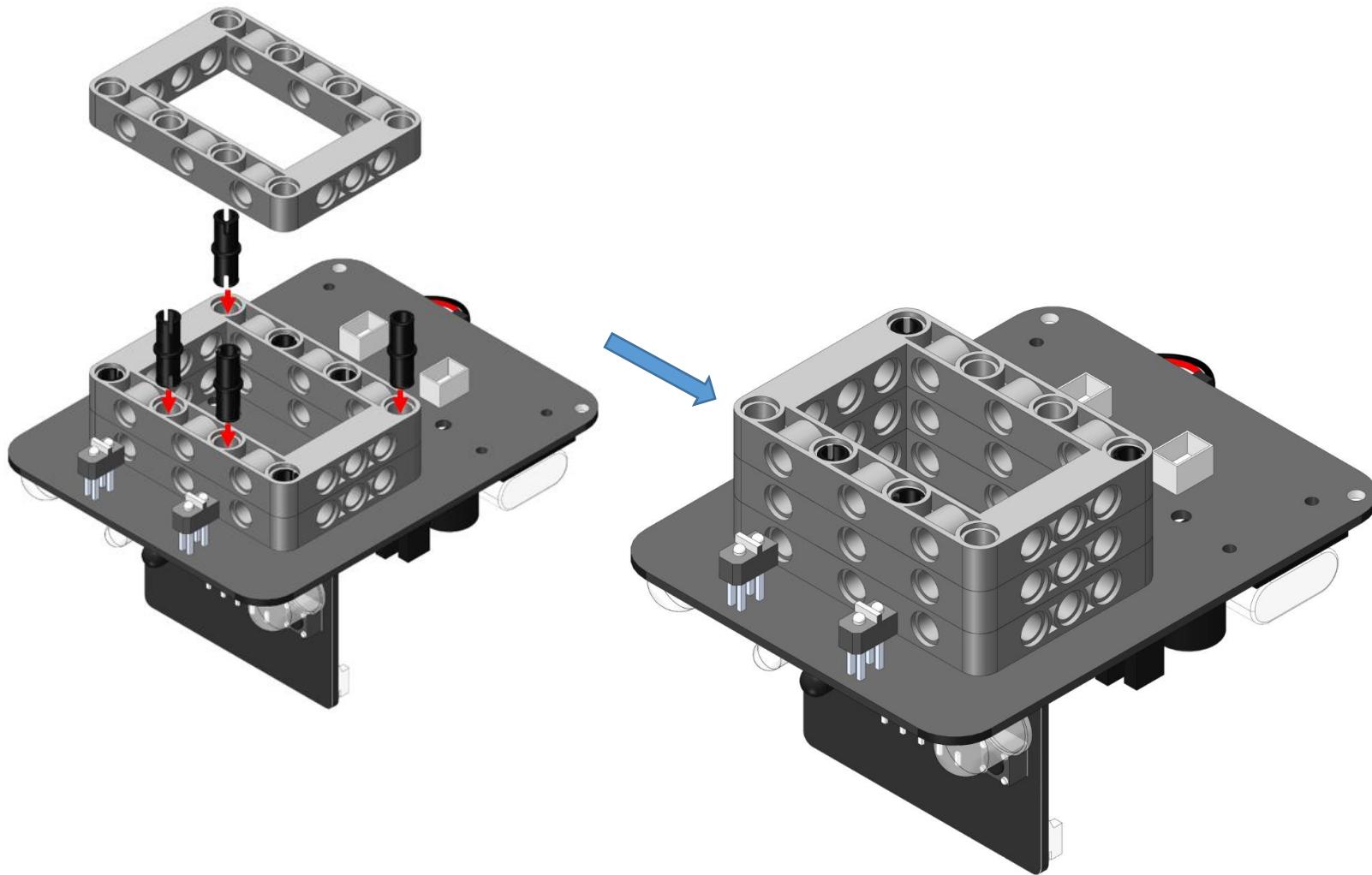
Step 20: Locate the micro:bit motherboard and insert the board into the expansion board correctly.

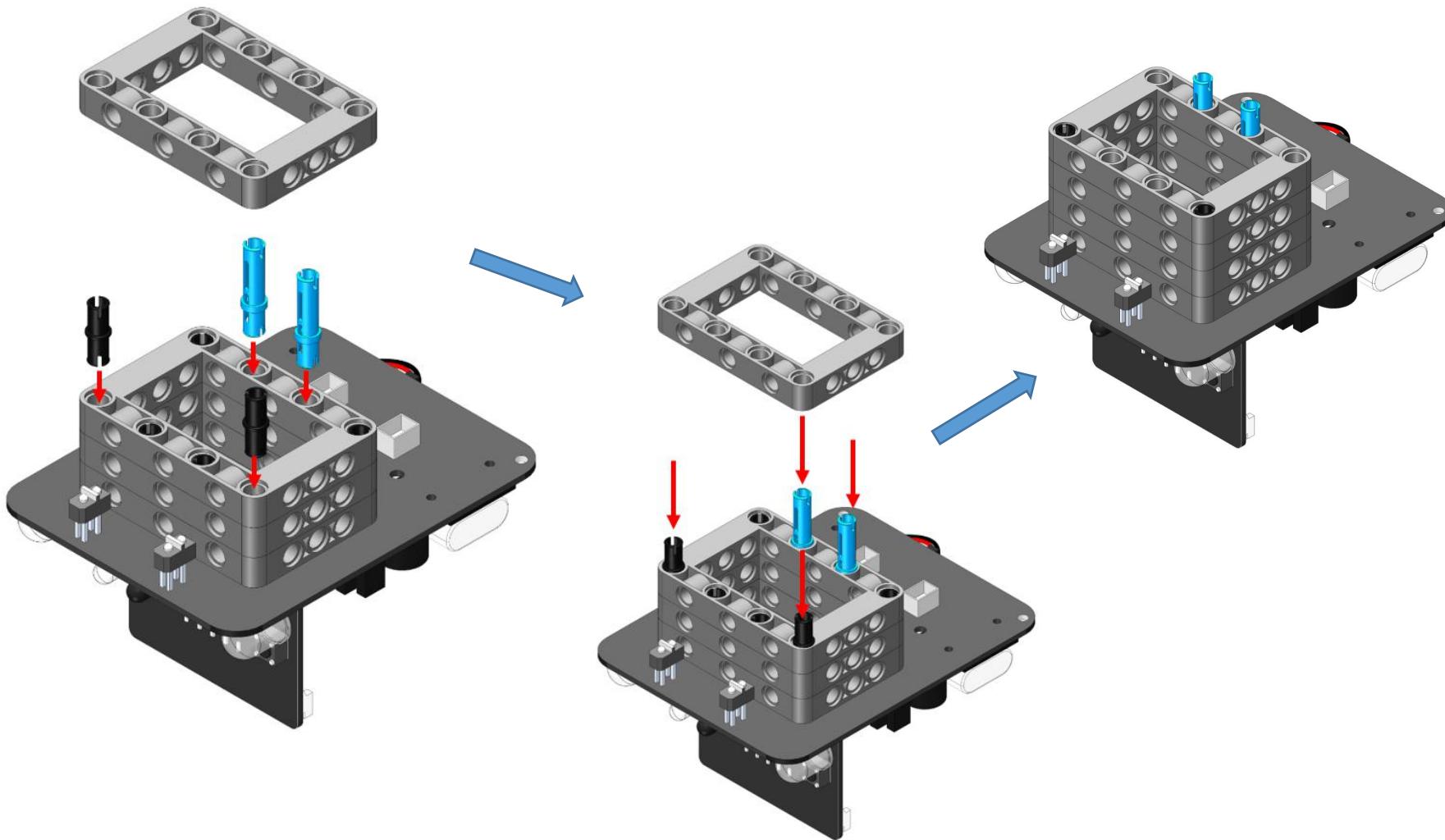


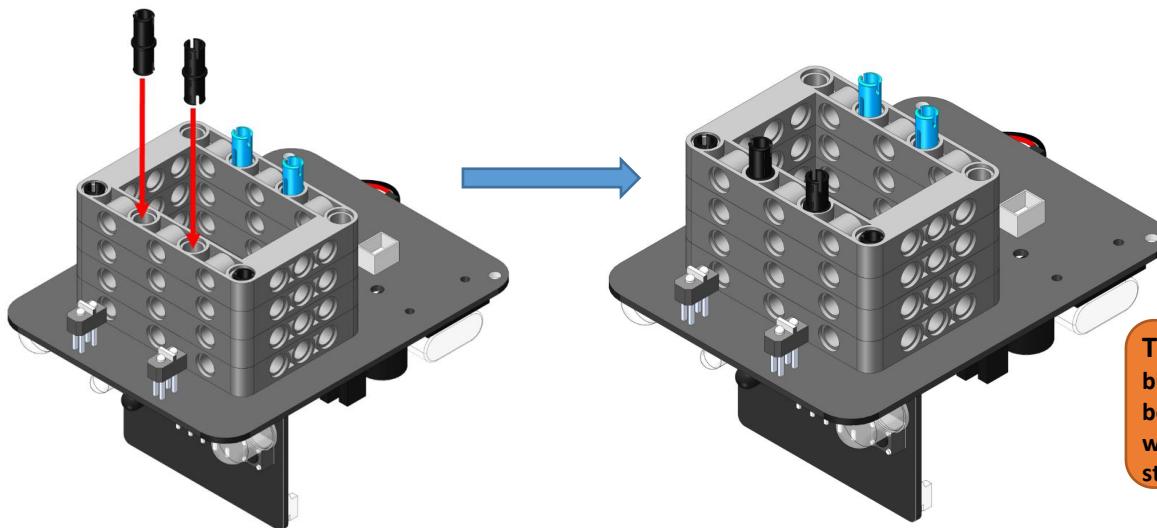
Tip: The micro:bit board is equivalent to the "brain" of the hexapod robot, so we need to make sure it is installed correctly. In this case, the hexapod robot will work properly.

Step 21: Find the micro:bit expansion board, twelve 1x2 friction pins, two 1X3 bolts and three 5x7 beam frames to assemble them.



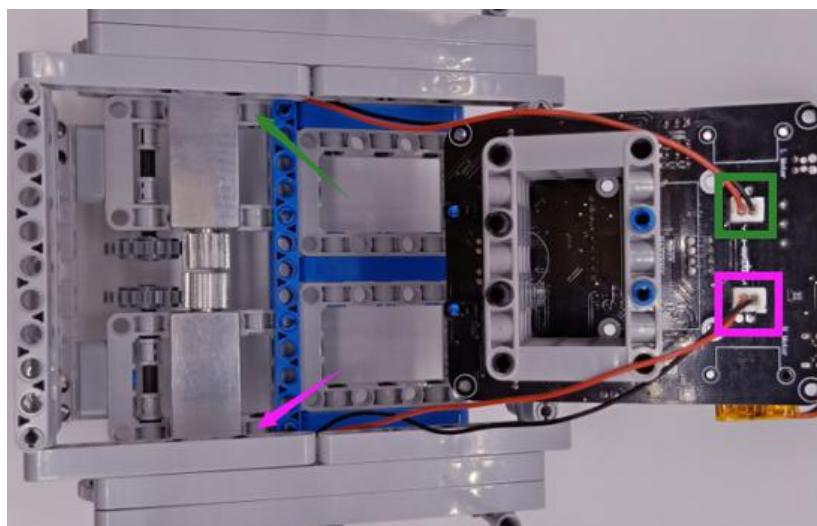






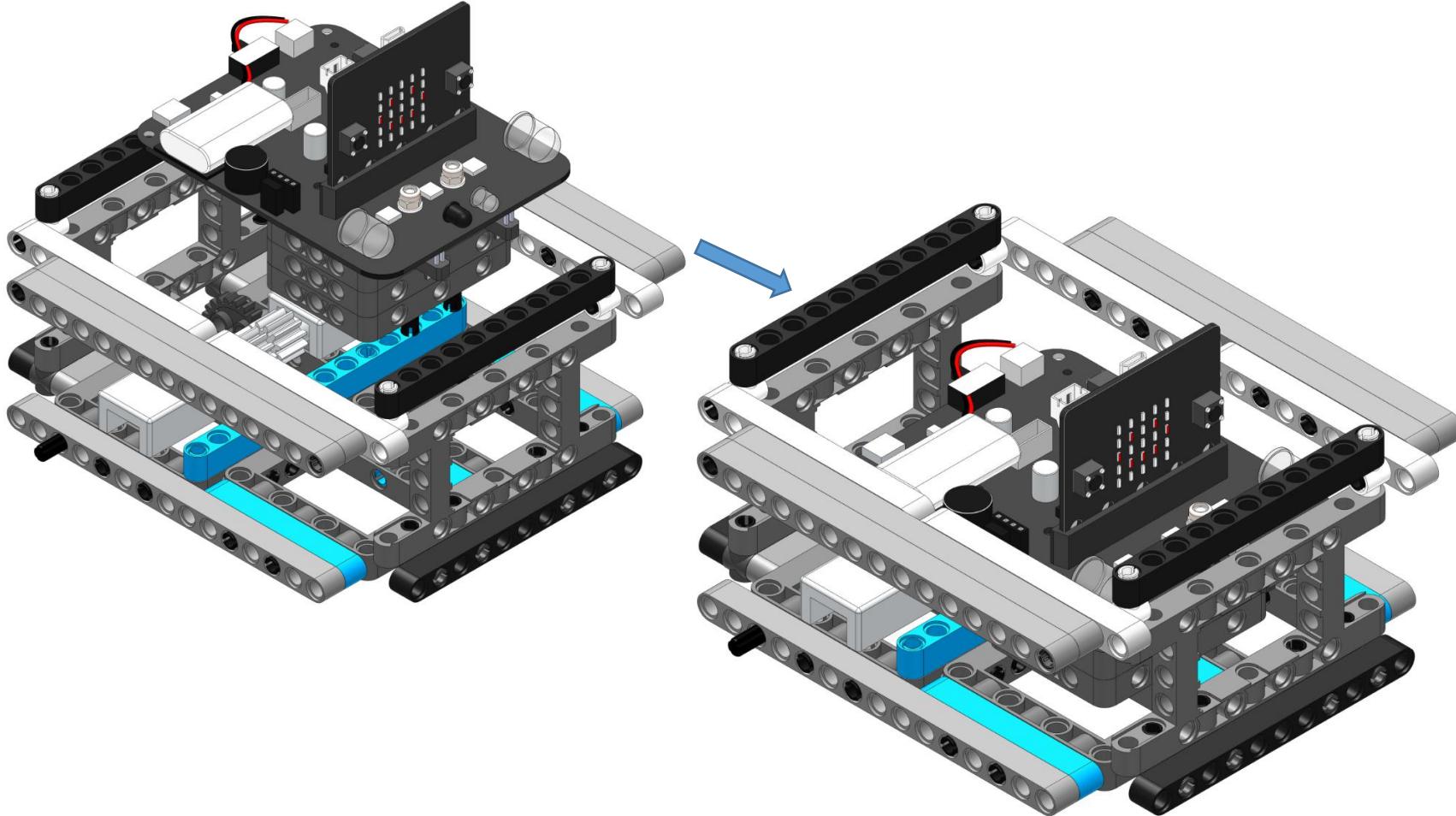
Tip: Go here, we will complete the building blocks of this part of the micro:bit expansion board. Next we need to combine this part with the blocks we have completed in the step 18.

Step 22: Connect the line of the left motor to the motor interface on the left side of the expansion board, and the line of the right motor to the motor interface on the right side of the expansion board.

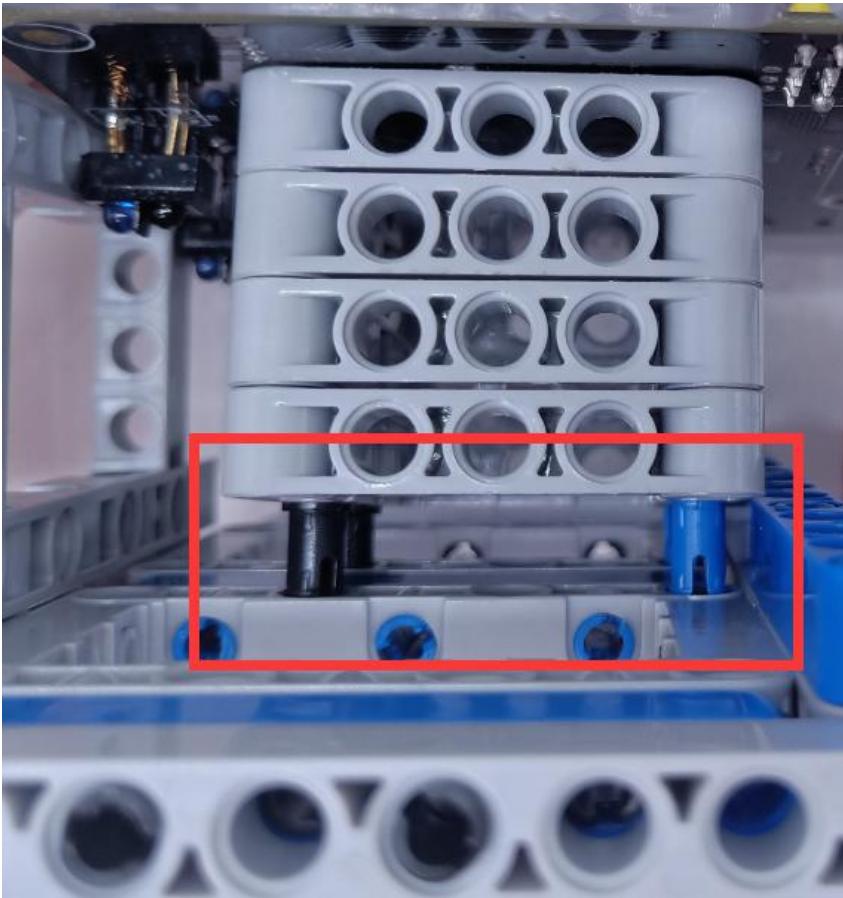


Tip: Be sure to follow the instructions shown in the figure. In this case, the hexapod robot can walk normally.

Step 23: Combine the two pieces of building blocks that we have assembled in steps 17 and steps 21.

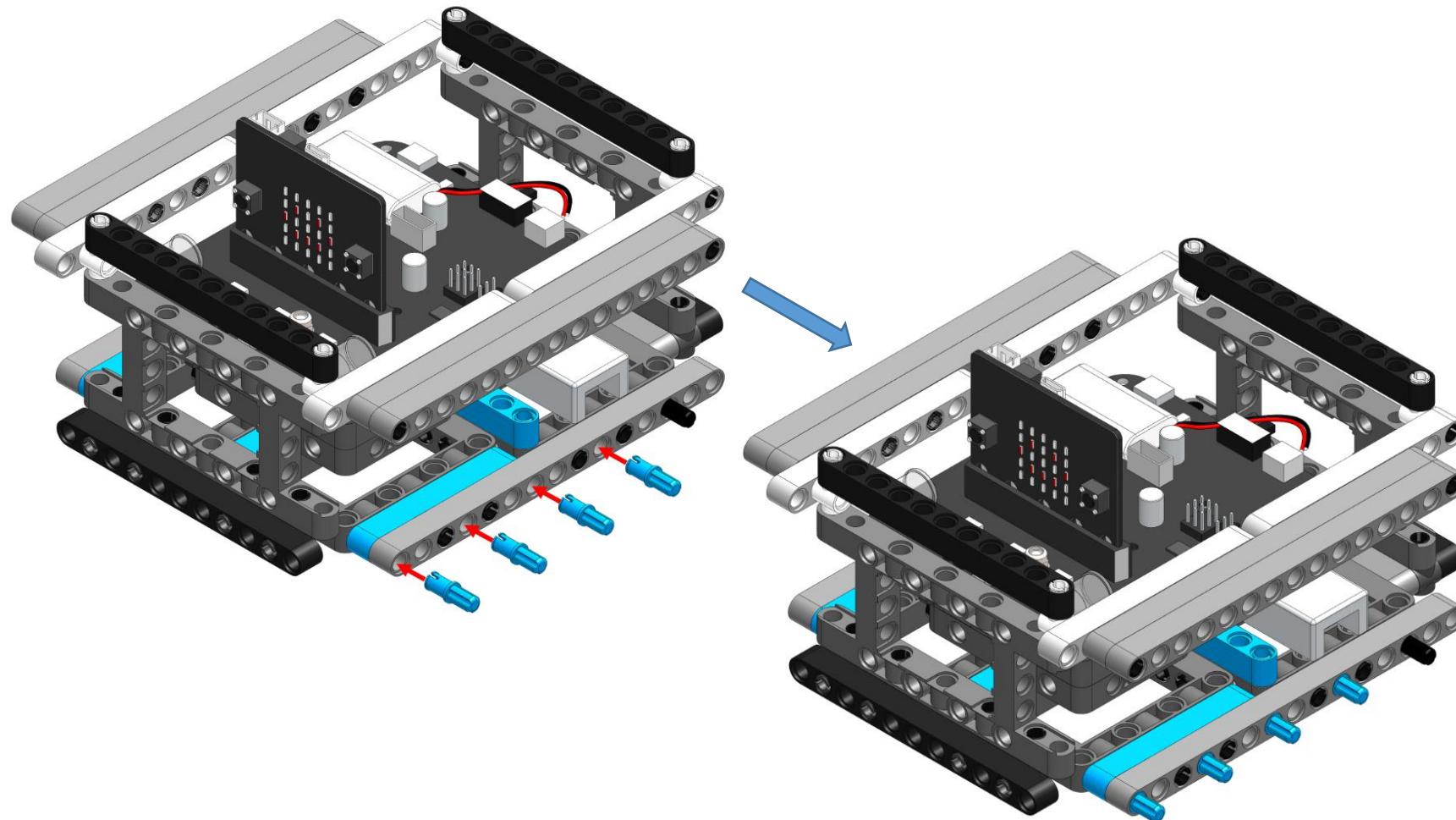


The side view of the joint part of the building block in step 23 is shown in the figure below.

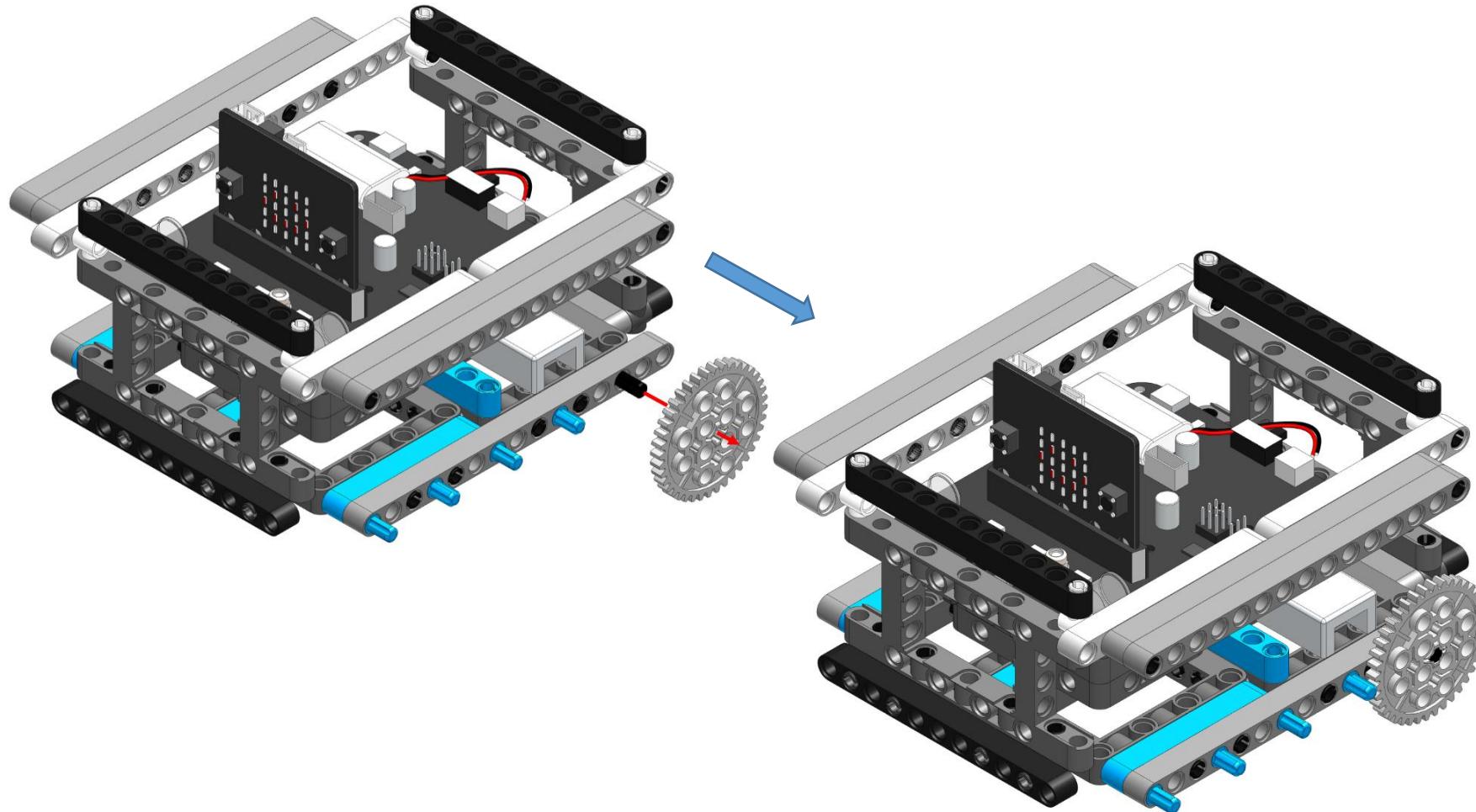


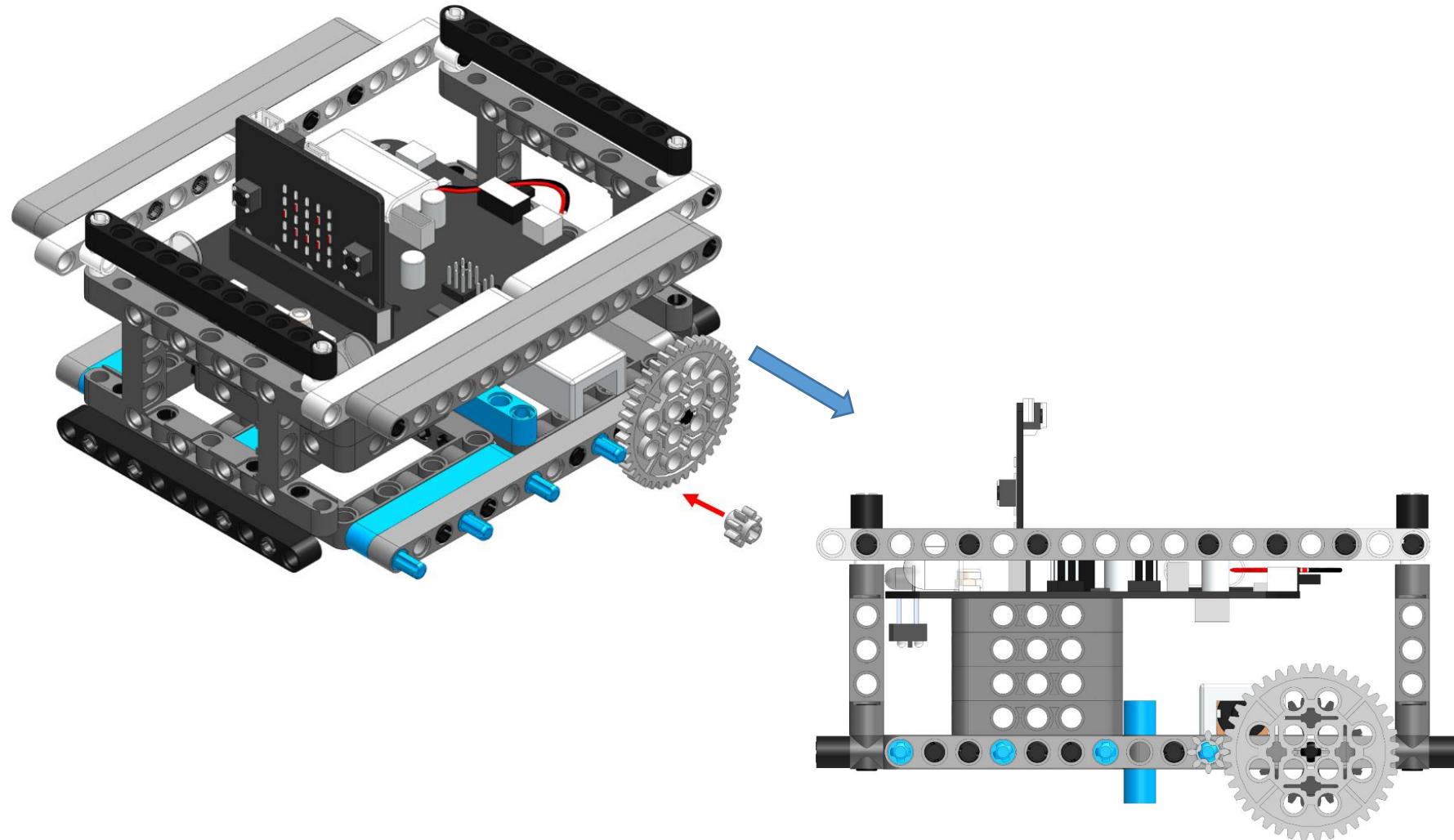
Tip: To get here, the overall frame of this hexapod robot has been assembled. Next we will assemble the six "foot" of the hexapod robot.

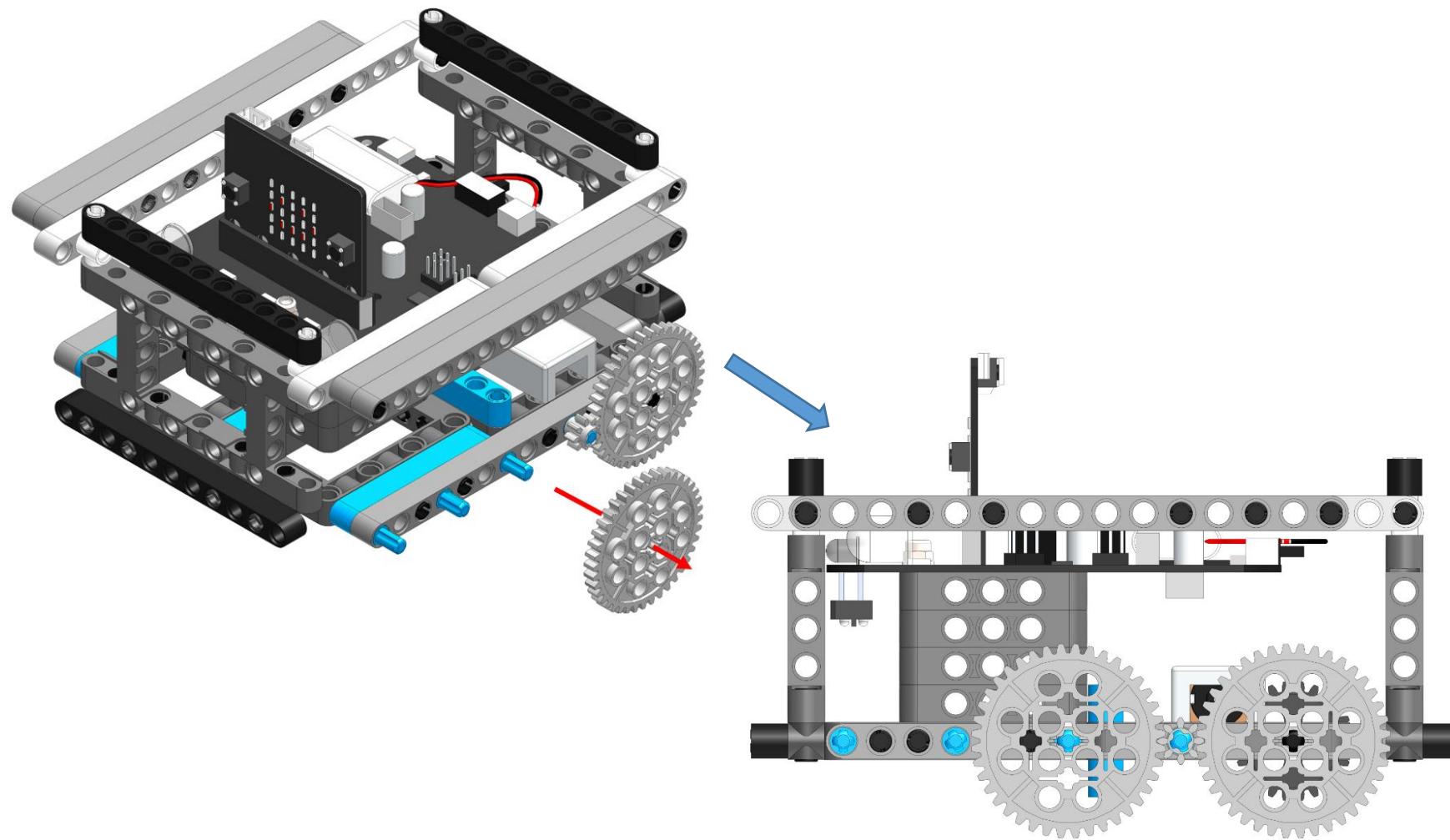
Step 24: Look for four 1x2 shaft couplings and insert them into the corresponding holes on the side 1x15 hole arms.

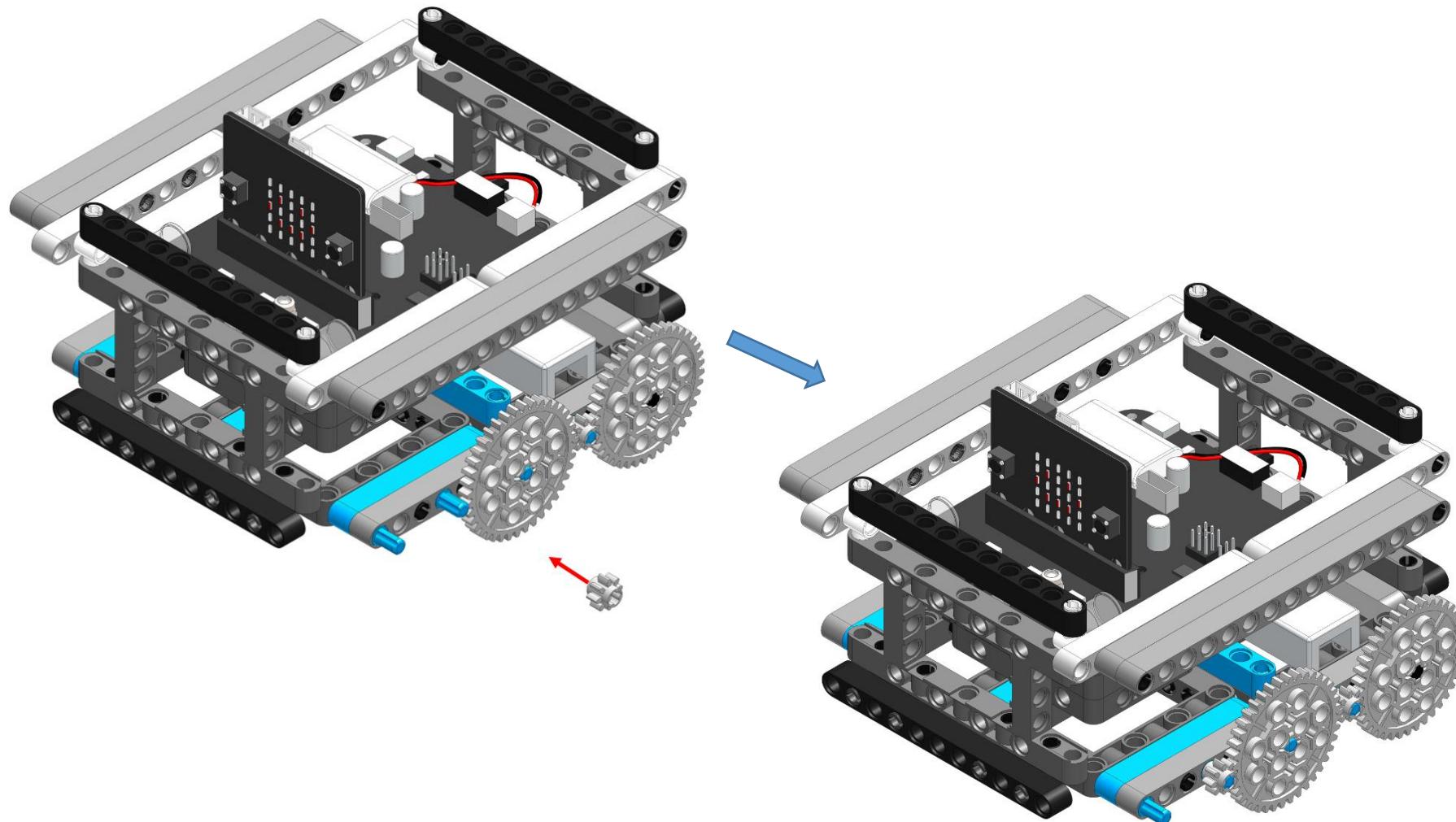


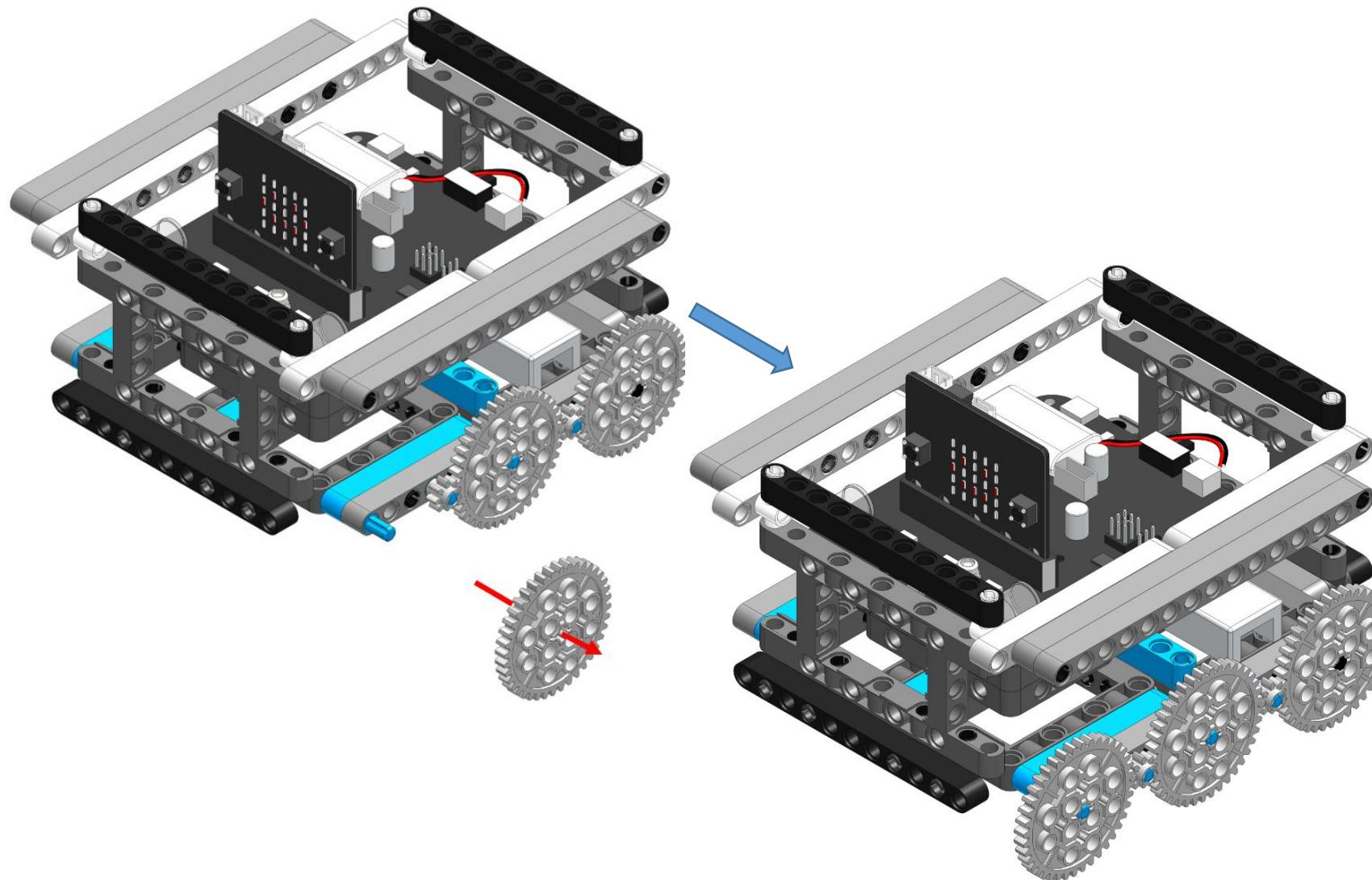
Step 25: Look for three 40-toothed, two 8-toothed wheel, and install them. As shown in the figure below.

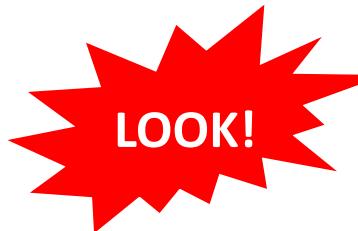




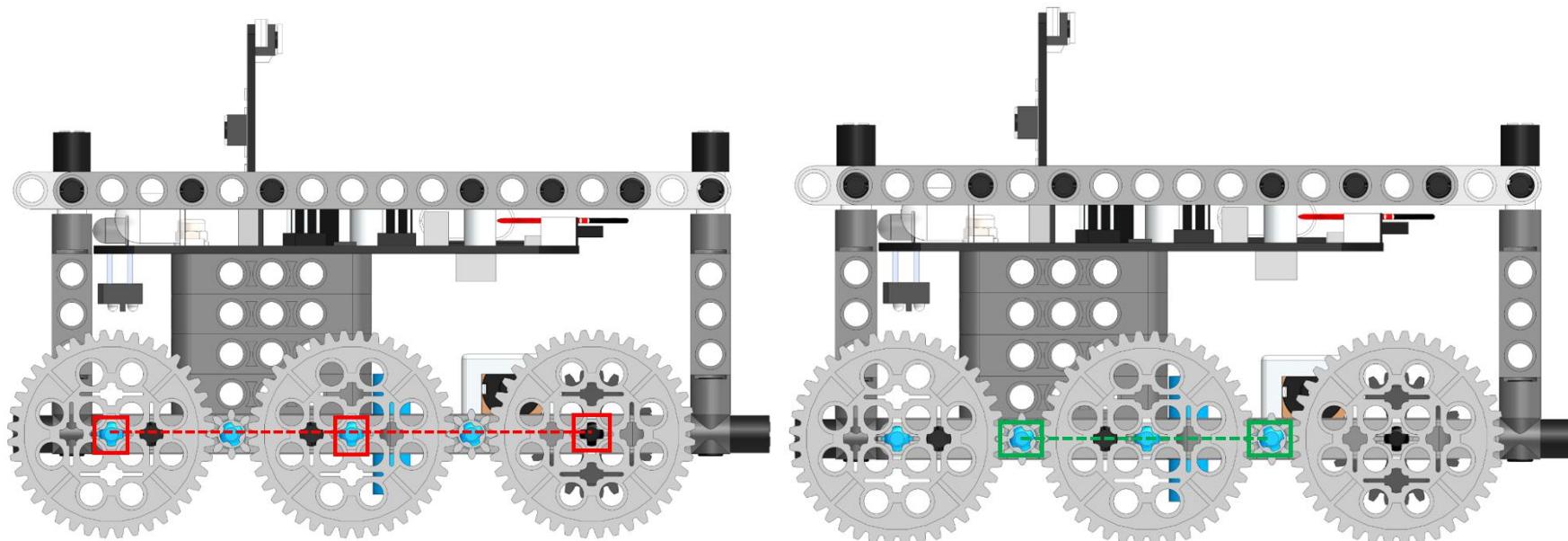






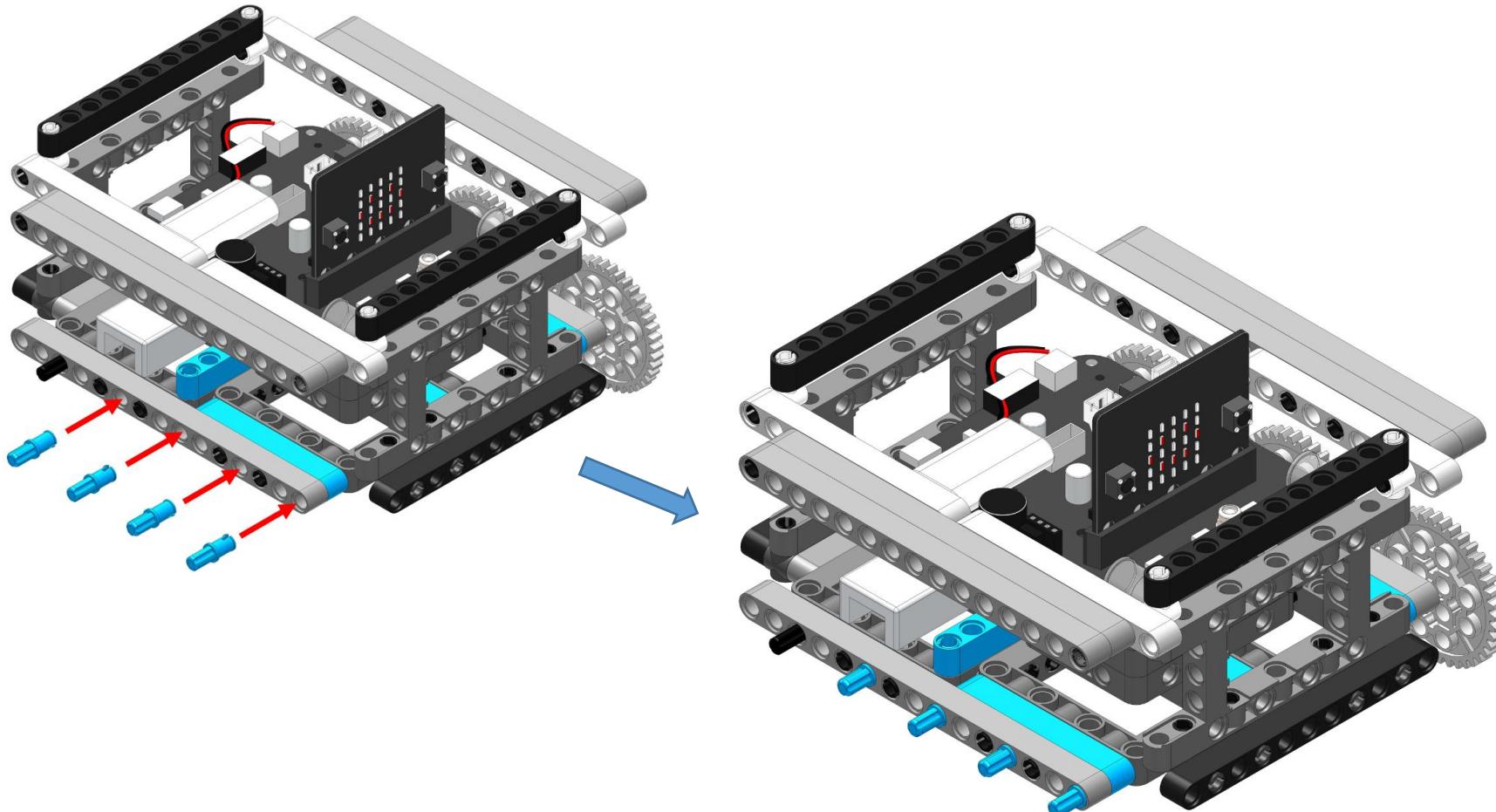


In order to ensure that the wheel is installed, the robot can walk normally. We need to adjust the direction of the central axis of each gear to the same direction on the same horizontal line. Here we need to adjust the direction of the central axes of the three 40-toothed wheels (a small cross) to the same direction on the same horizontal line, and adjust the central axis of the eight 8-toothed wheel (a small cross) to the same direction on the same horizontal line. You can also install directly according to the picture.



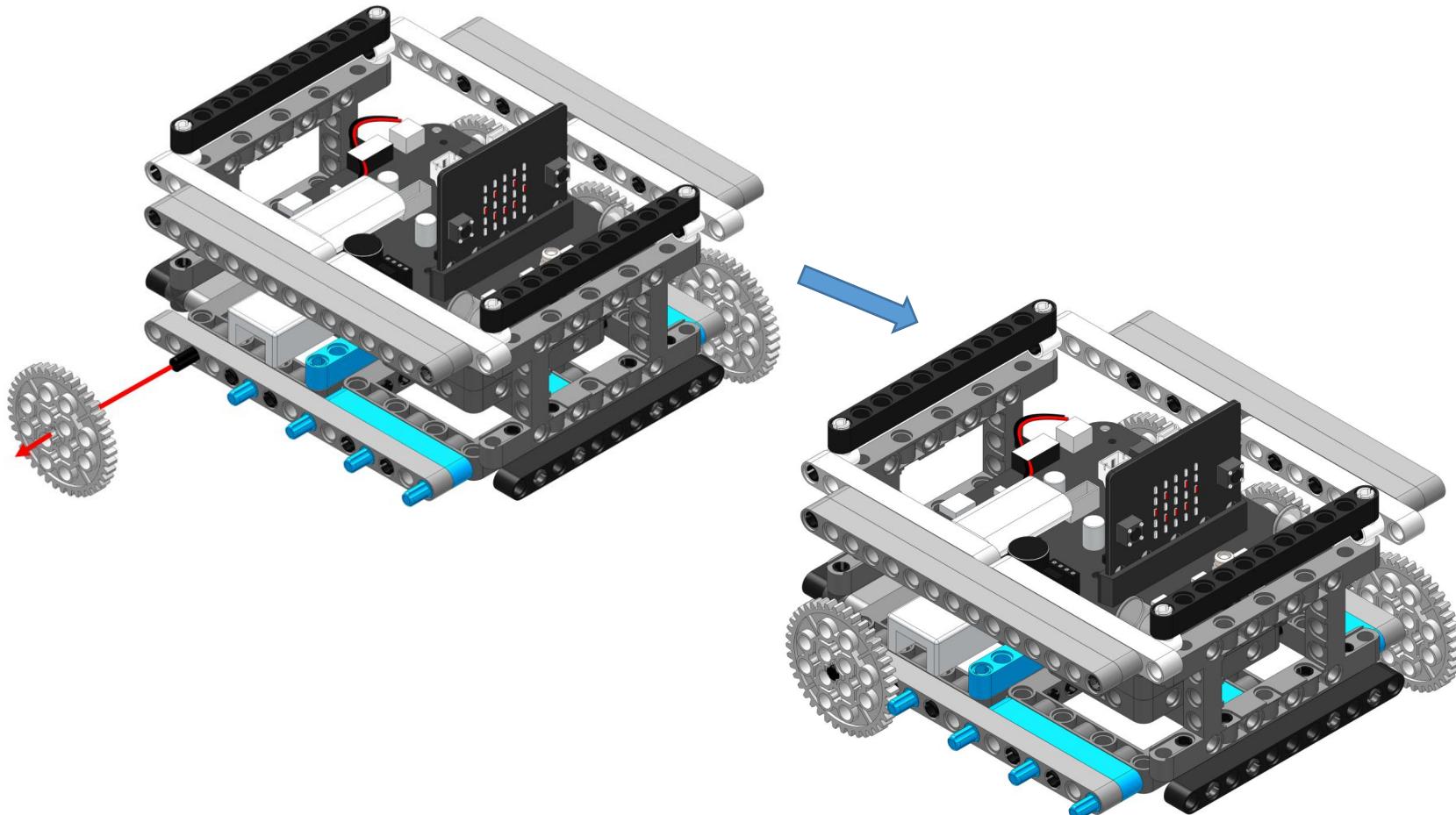


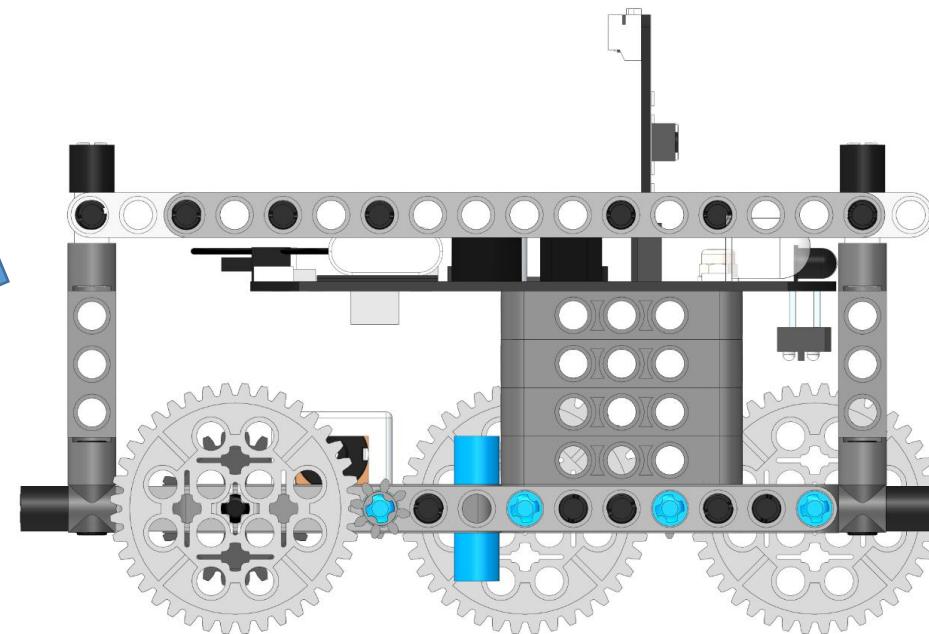
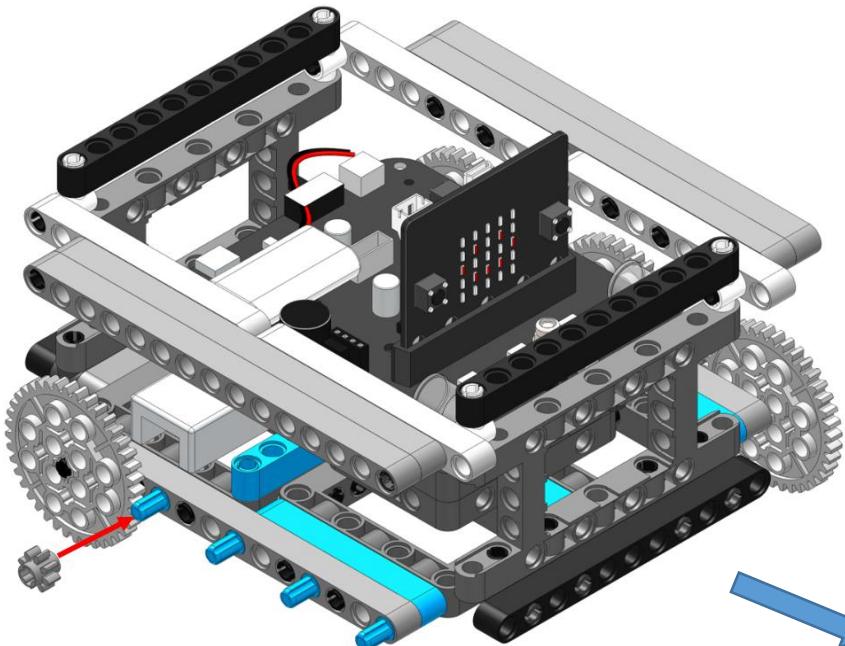
Step 26: Look for four 1x2 shaft bolts and insert them into the corresponding holes on the 1x15 hole arm on the other side of the frame.

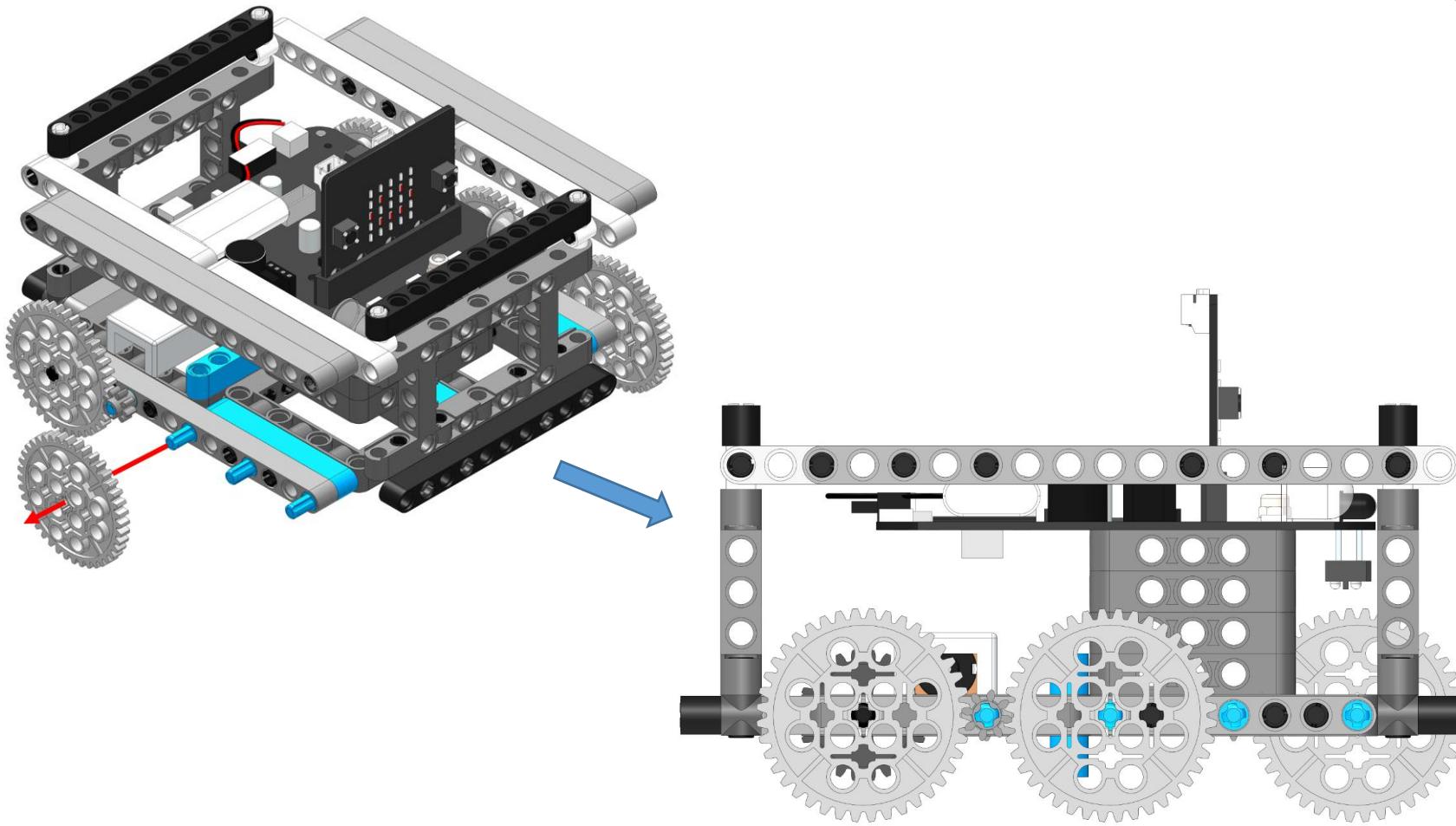


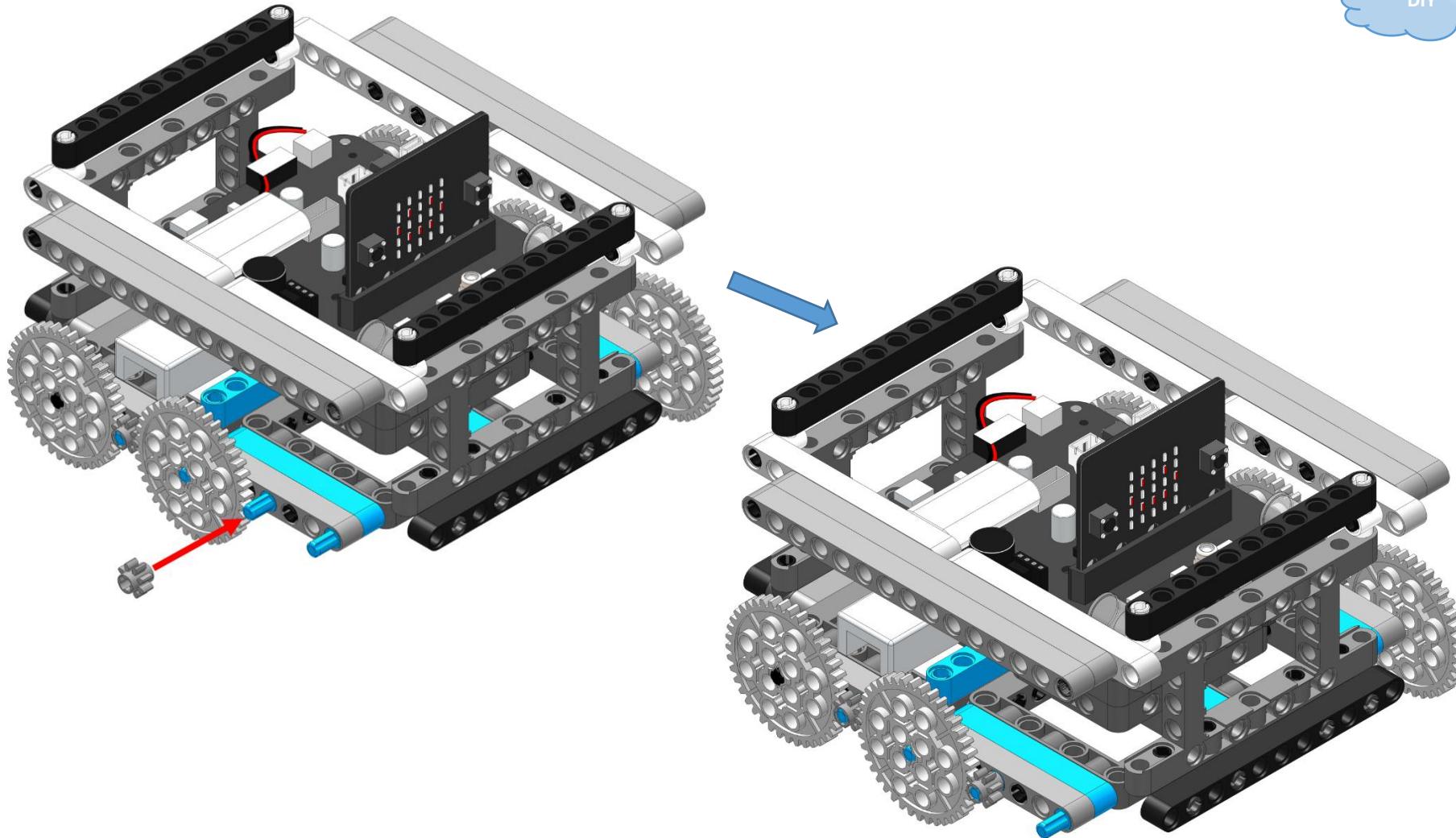


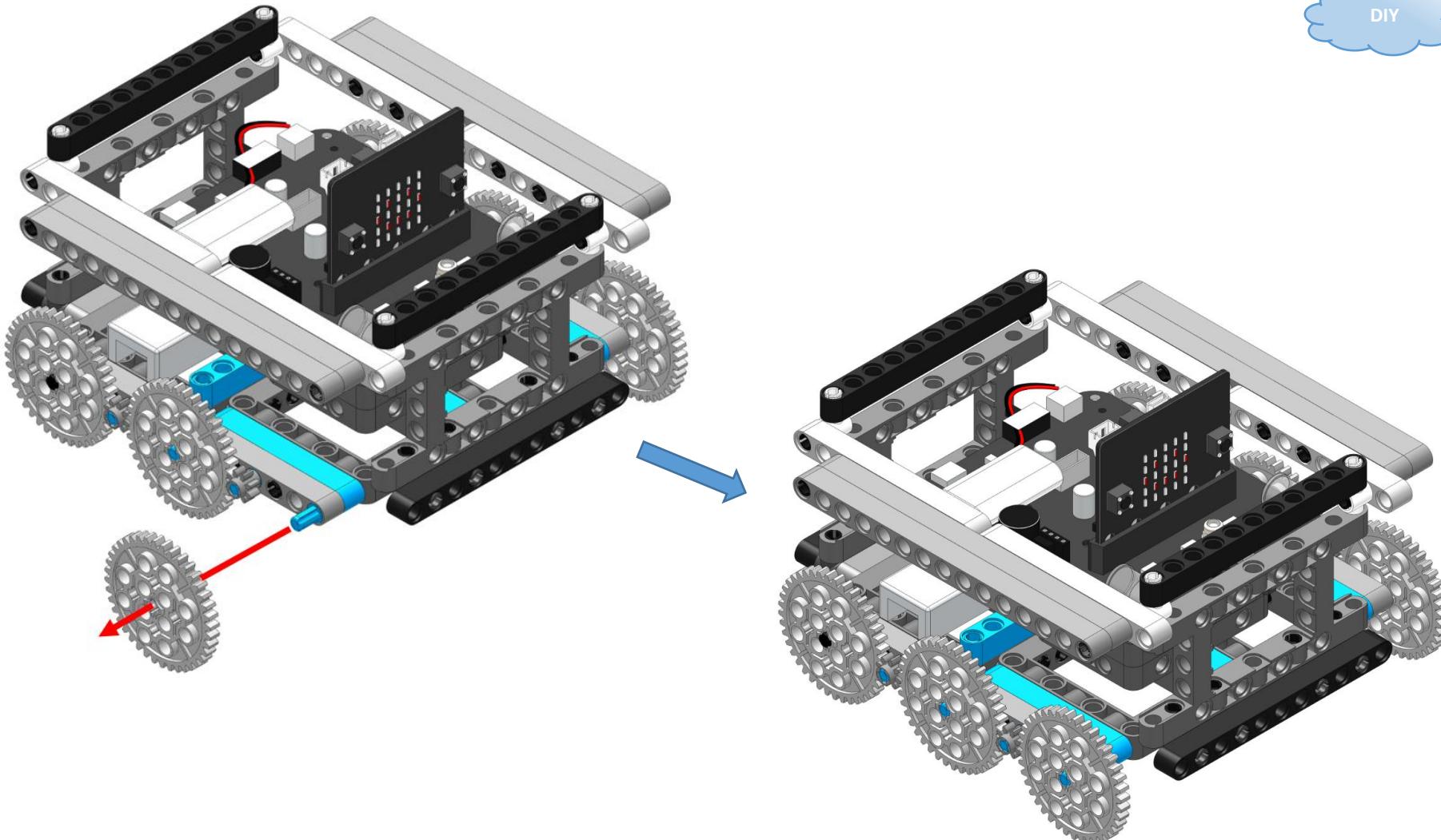
Step 27: Install the wheel on the other side of the hexapod robot. Look for four 1x2 shaft bolts, three 40-toothed wheel, and two 8-toothed wheel to mount them. As shown in the figure below.









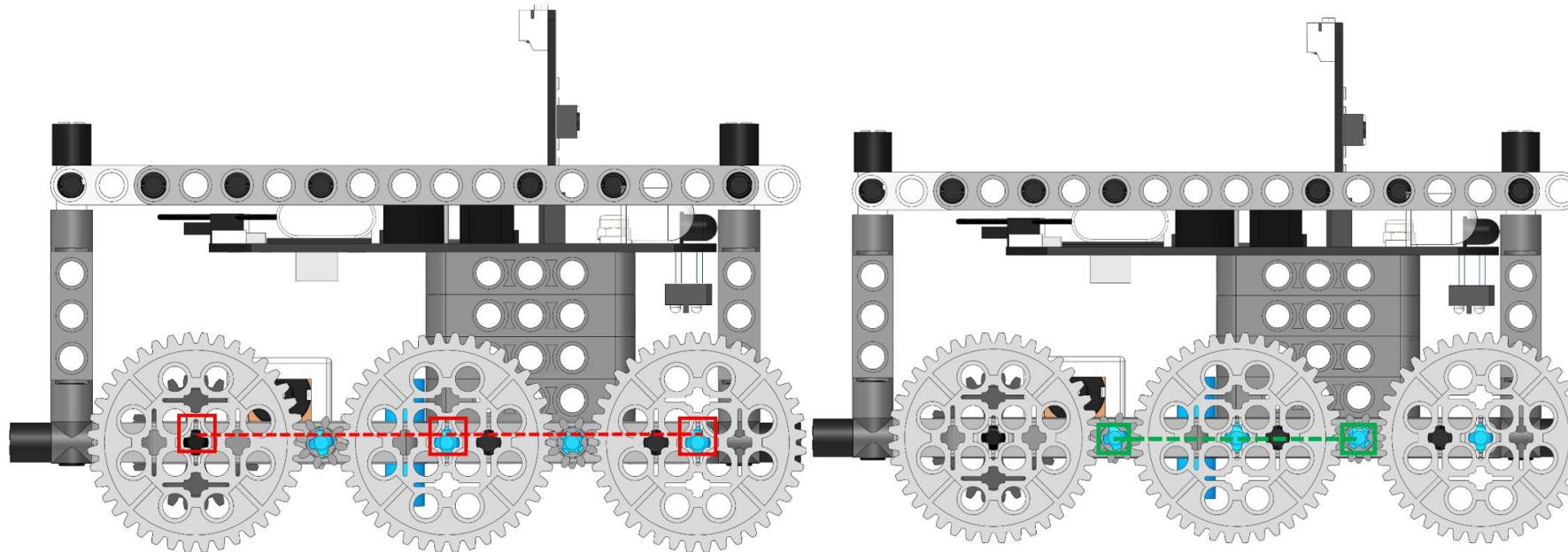




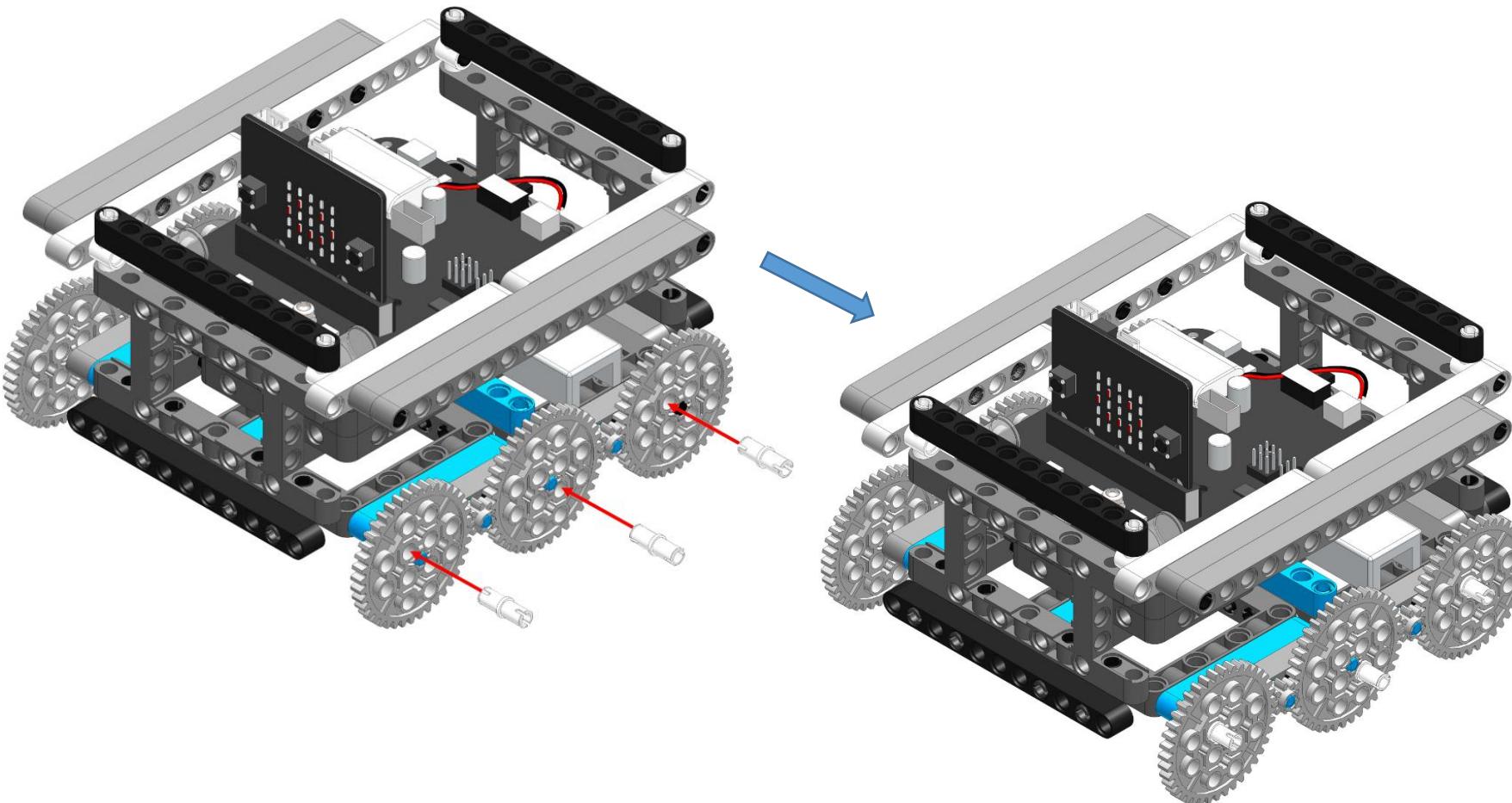
In order to ensure that the wheel is installed, the robot can walk normally. We need to adjust the direction of the central axis of each gear to the same direction on the same horizontal line.

Here we need to adjust the direction of the central axes of the three 40-toothed wheels (a small cross) to the same direction on the same horizontal line, and adjust the central axis of the eight 8-toothed wheels (a small cross) to The same direction on the same horizontal line.

You can also install directly according to the picture.

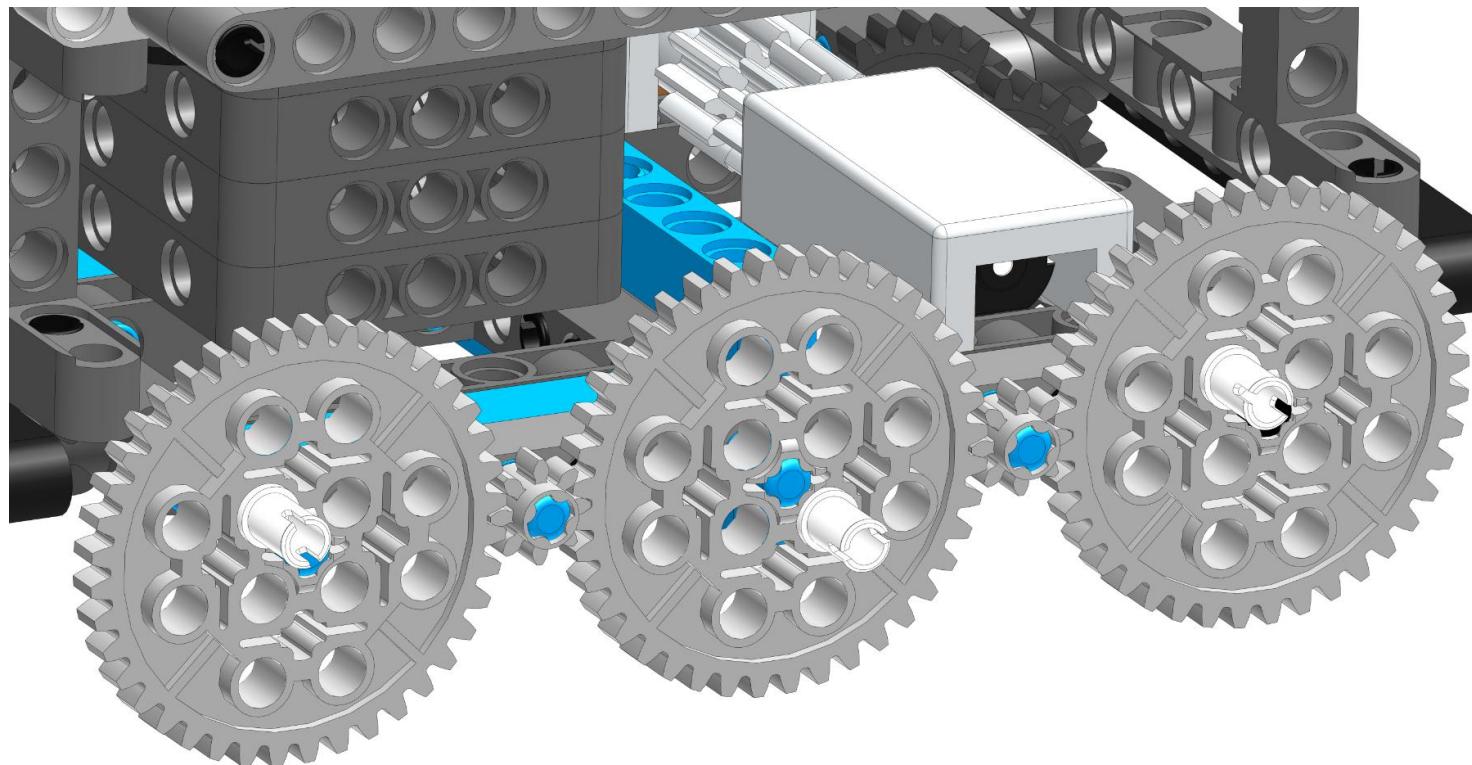


Step 28: Look for three smooth pins and insert them into the corresponding positions of the side 40-toothed wheel.



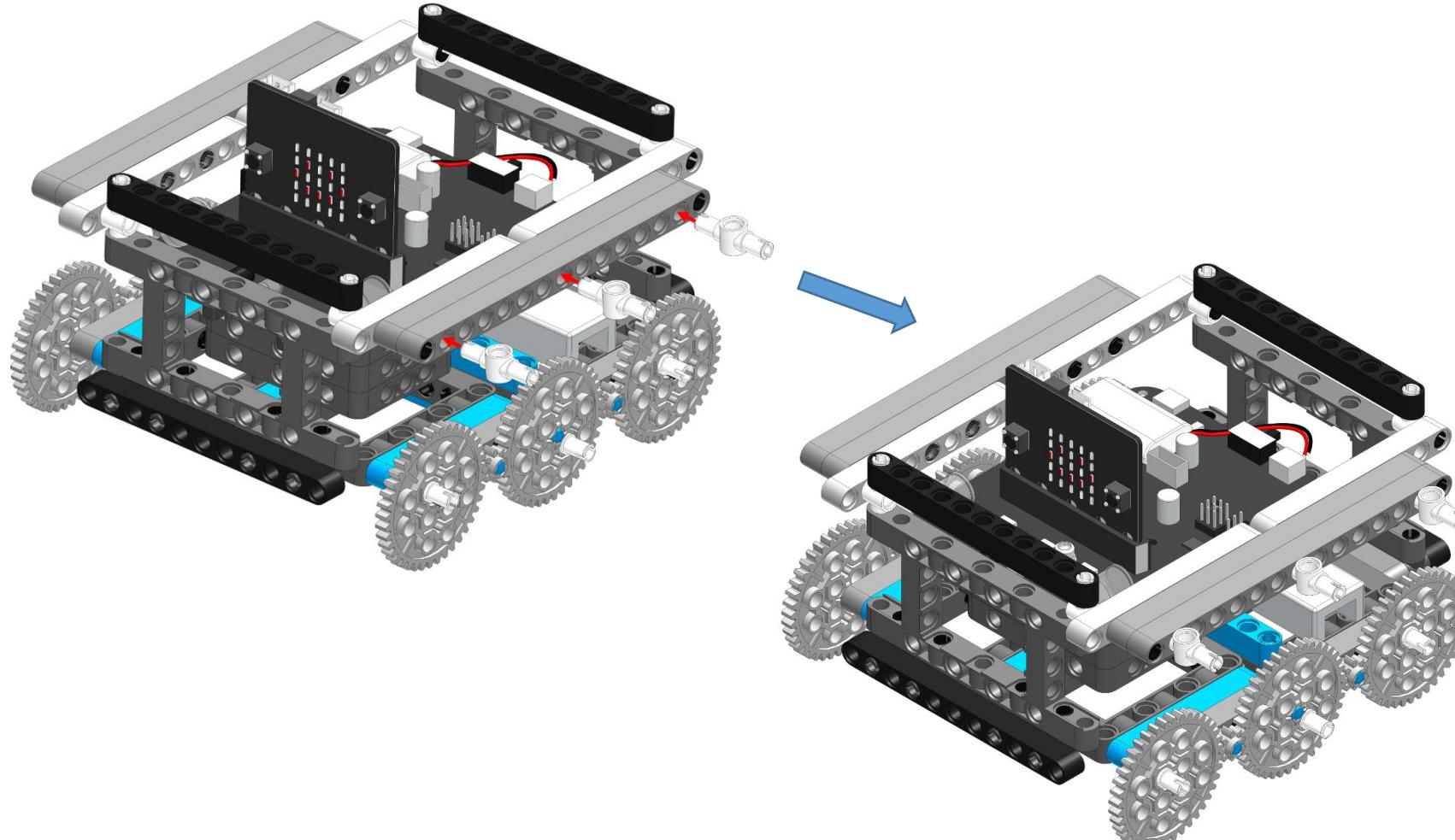


The three smooth pins must be inserted into the position shown in the figure below.
If the installation position is wrong, the hexapod robot cannot "walk" normally.

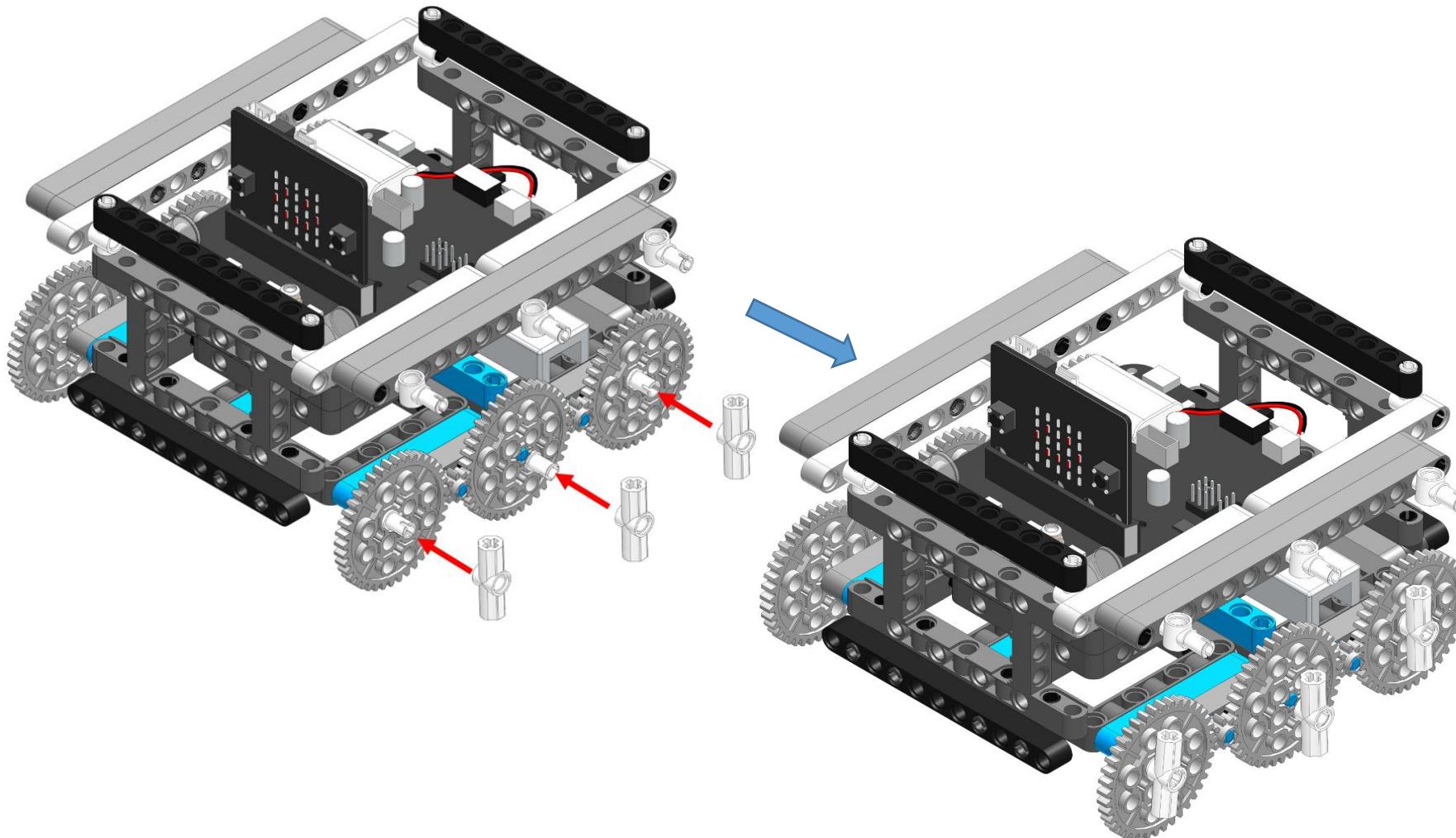




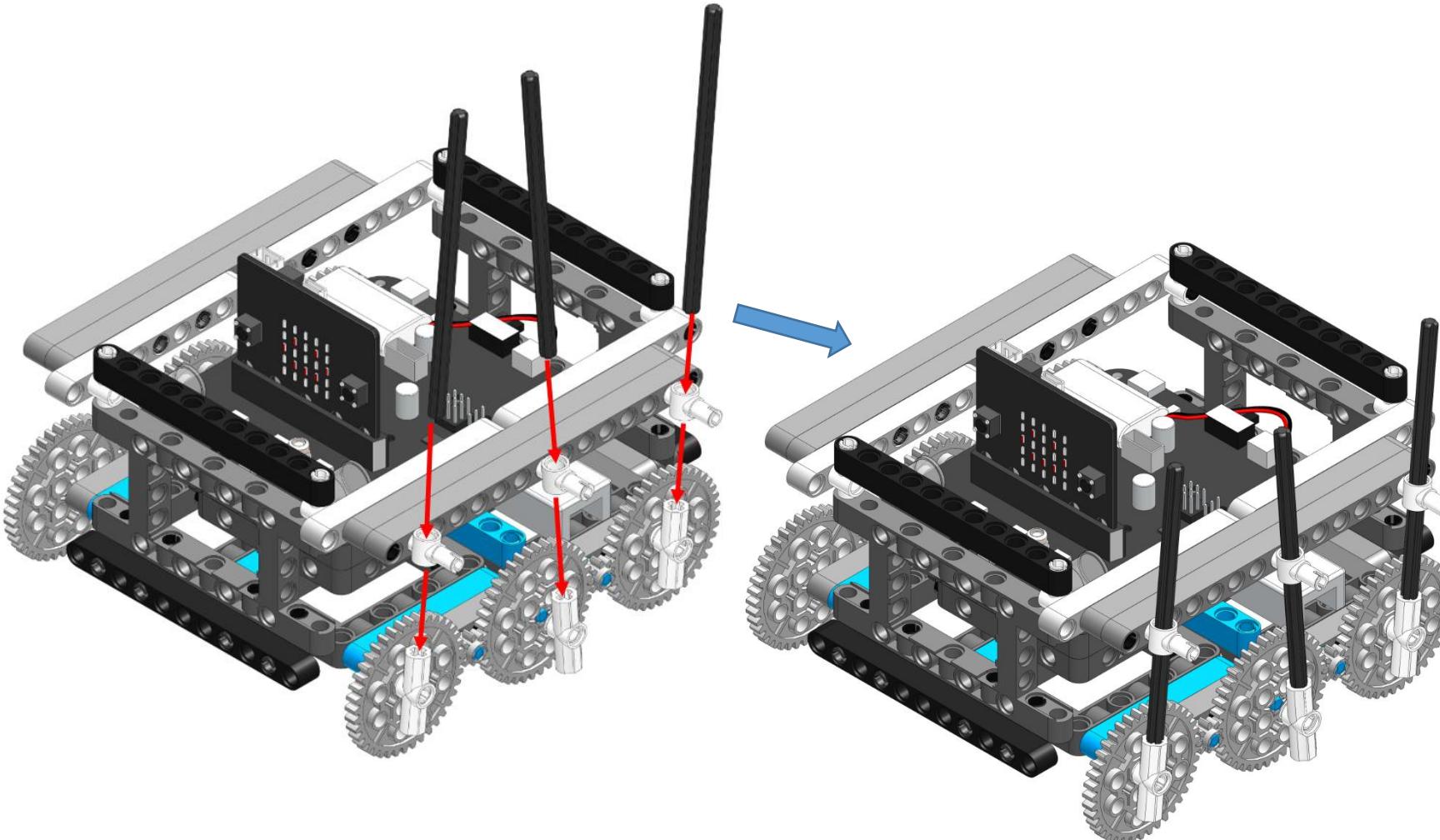
Step 29: Look for three 1x3 bolt connectors, which are installed in the 2nd, 8th and 14th holes of the 1x15 hole arm on the side of the frame.



Step 30: Look for three 2# bolt connections that are mounted on the side of the three 1x2 smooth pins.

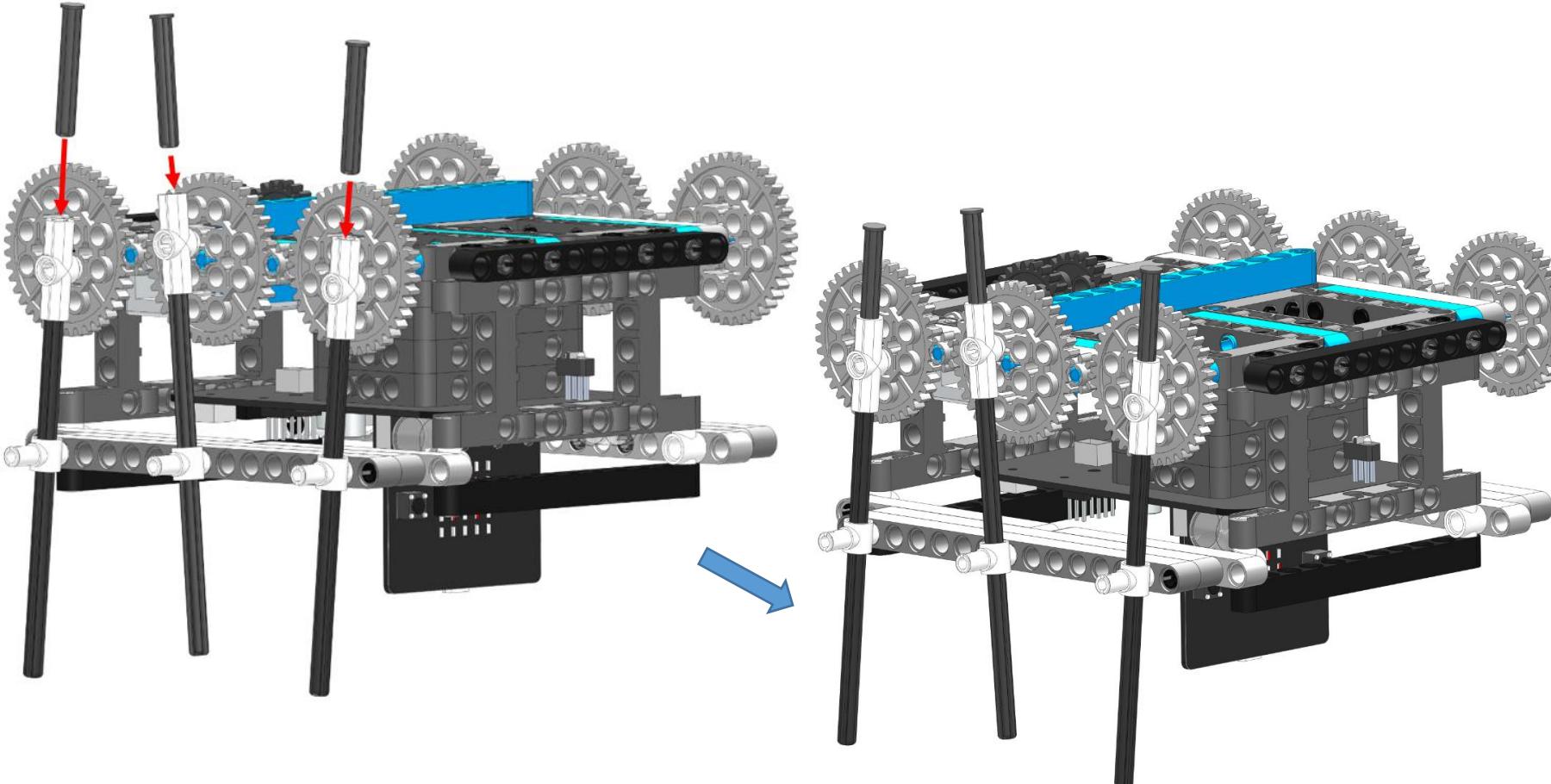


Step 31: Look for three 1x12 cross shafts, pass them through the upper 1x3 bolt connector, and insert the 2# bolt connection below.

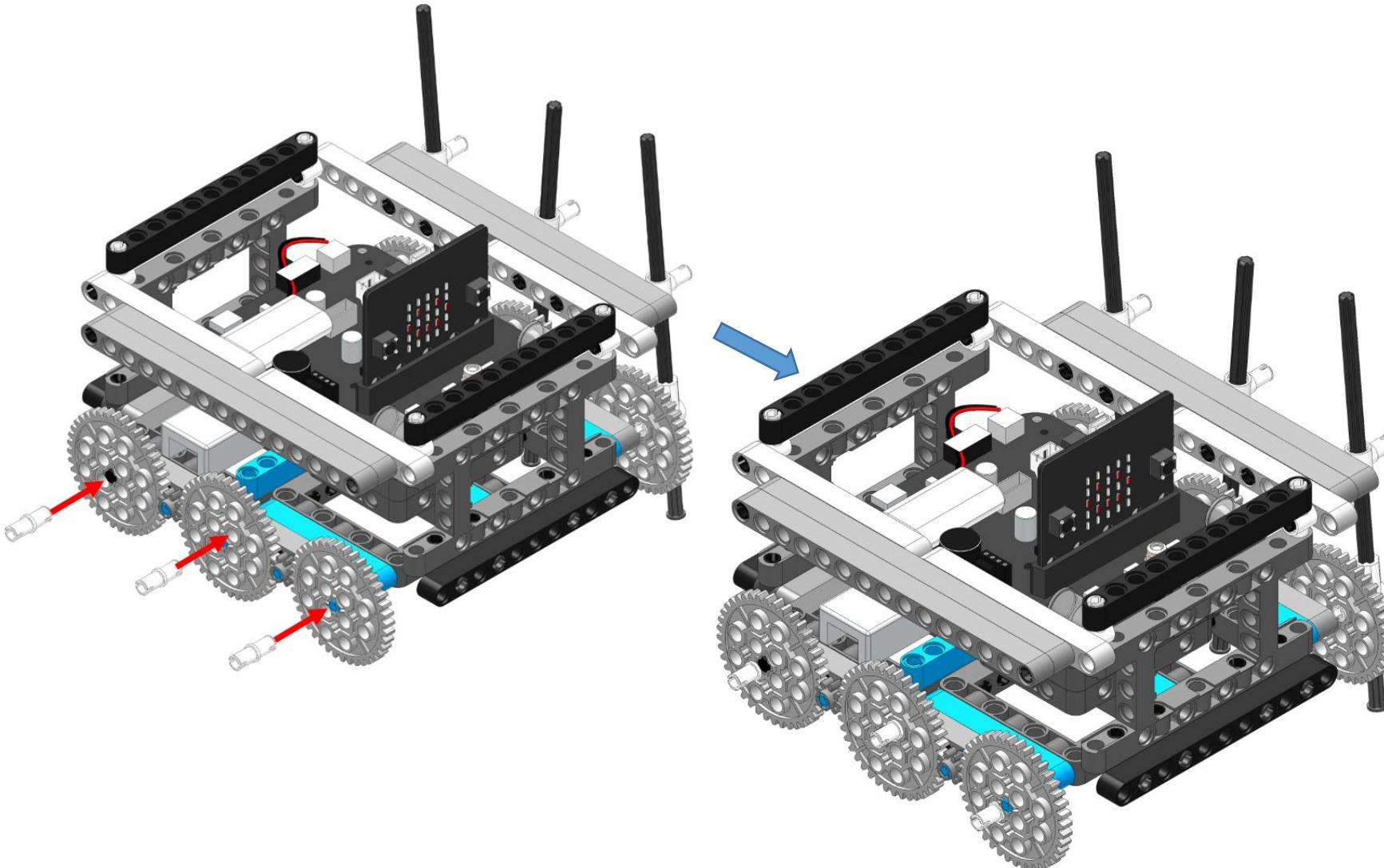


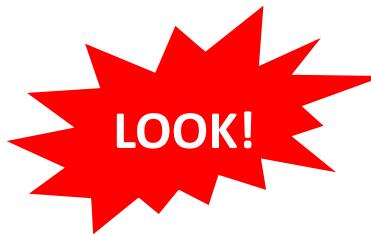
Step 32: Look for three 1*4 shafts with cut-offs and insert them into the 2# bolt connection.

Tip: When doing this, we need to invert the hexapod.

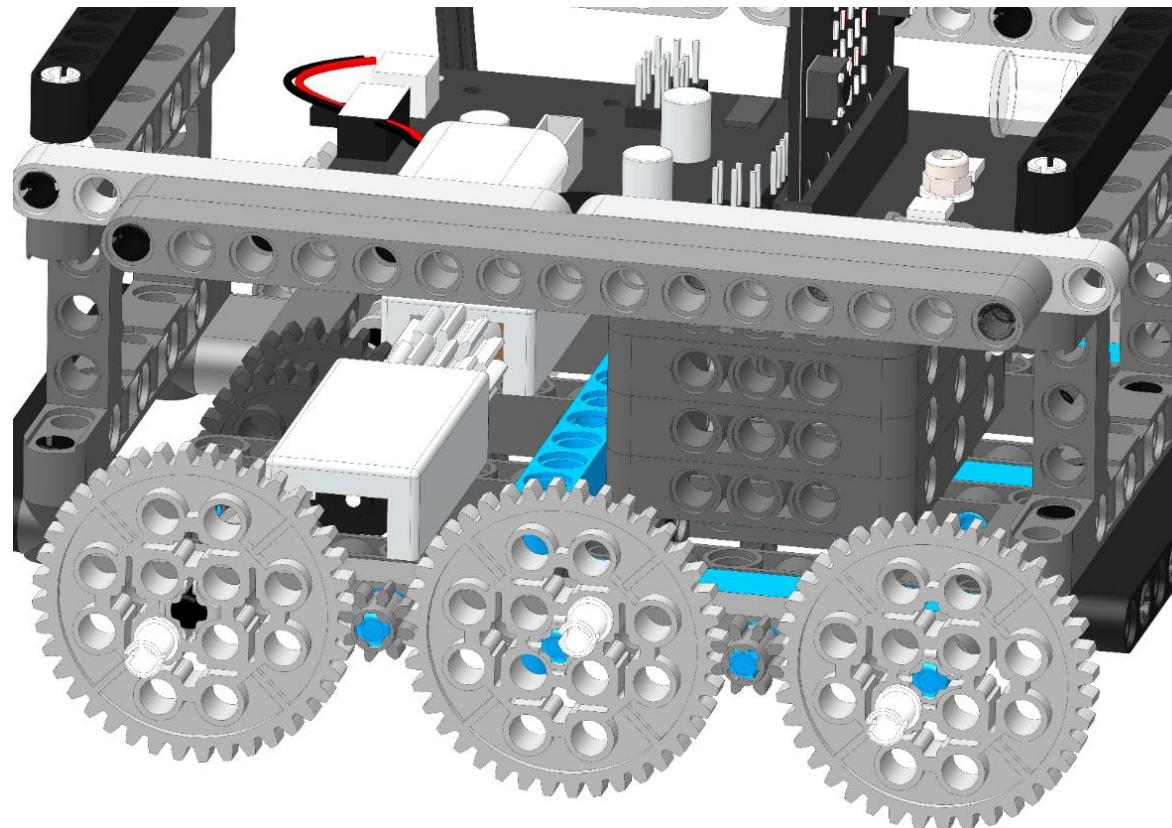


Step 33: Look for three smooth pins and insert them into the corresponding positions of the side 40-toothed wheels.

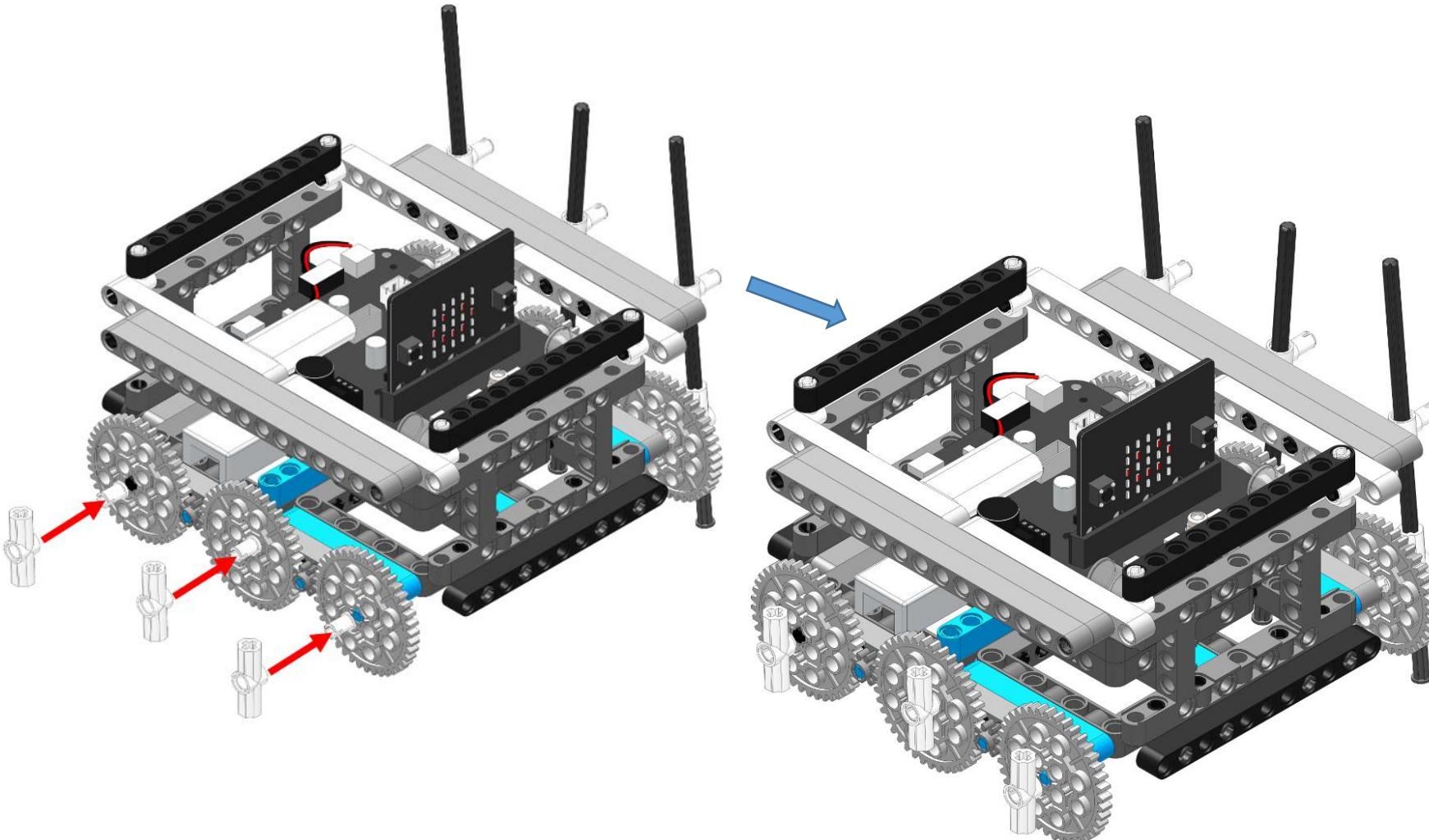




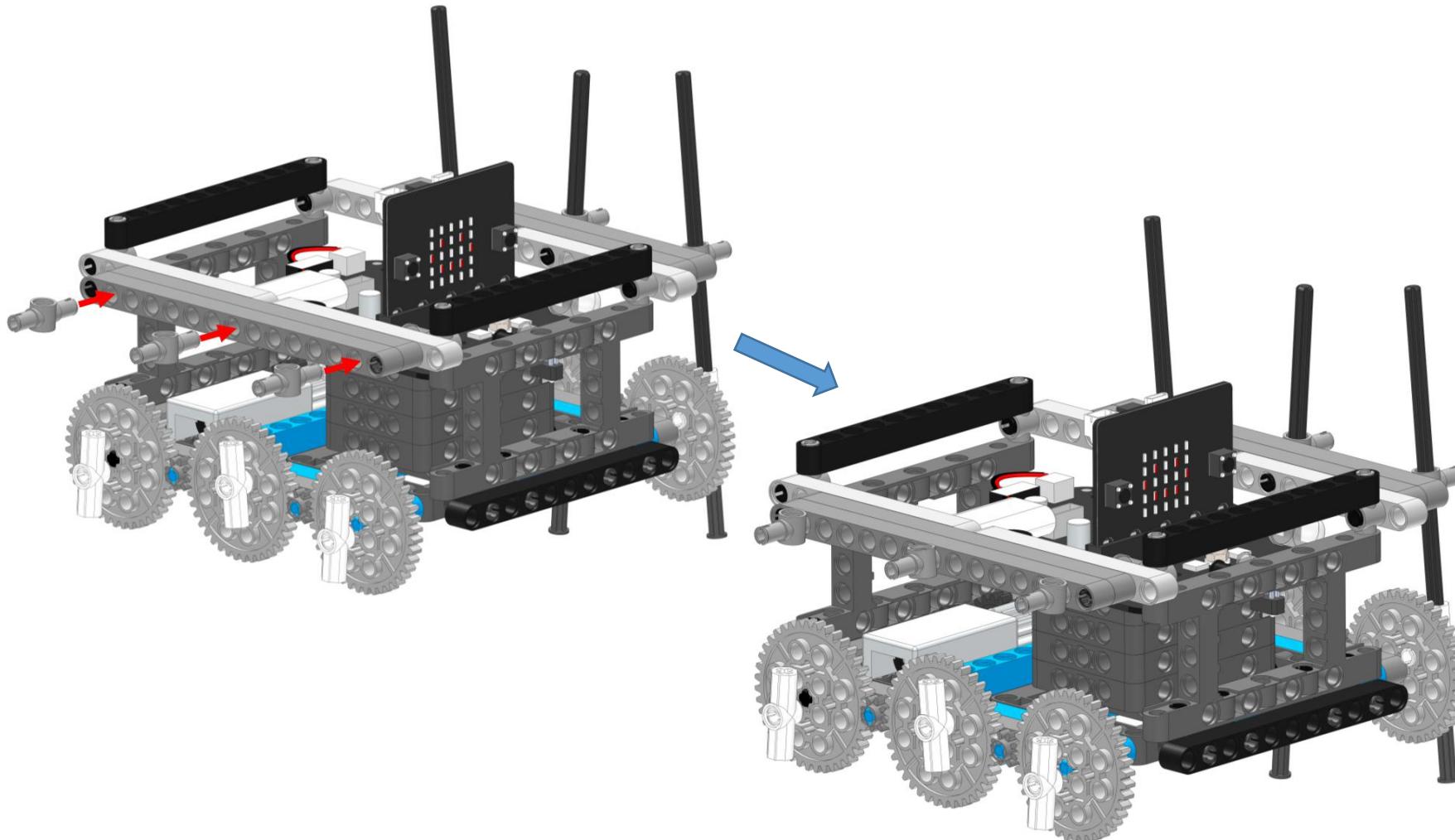
The three smooth pins must be inserted into the position shown in the figure below.
If the installation position is wrong, the hexapod robot cannot "walk" normally.



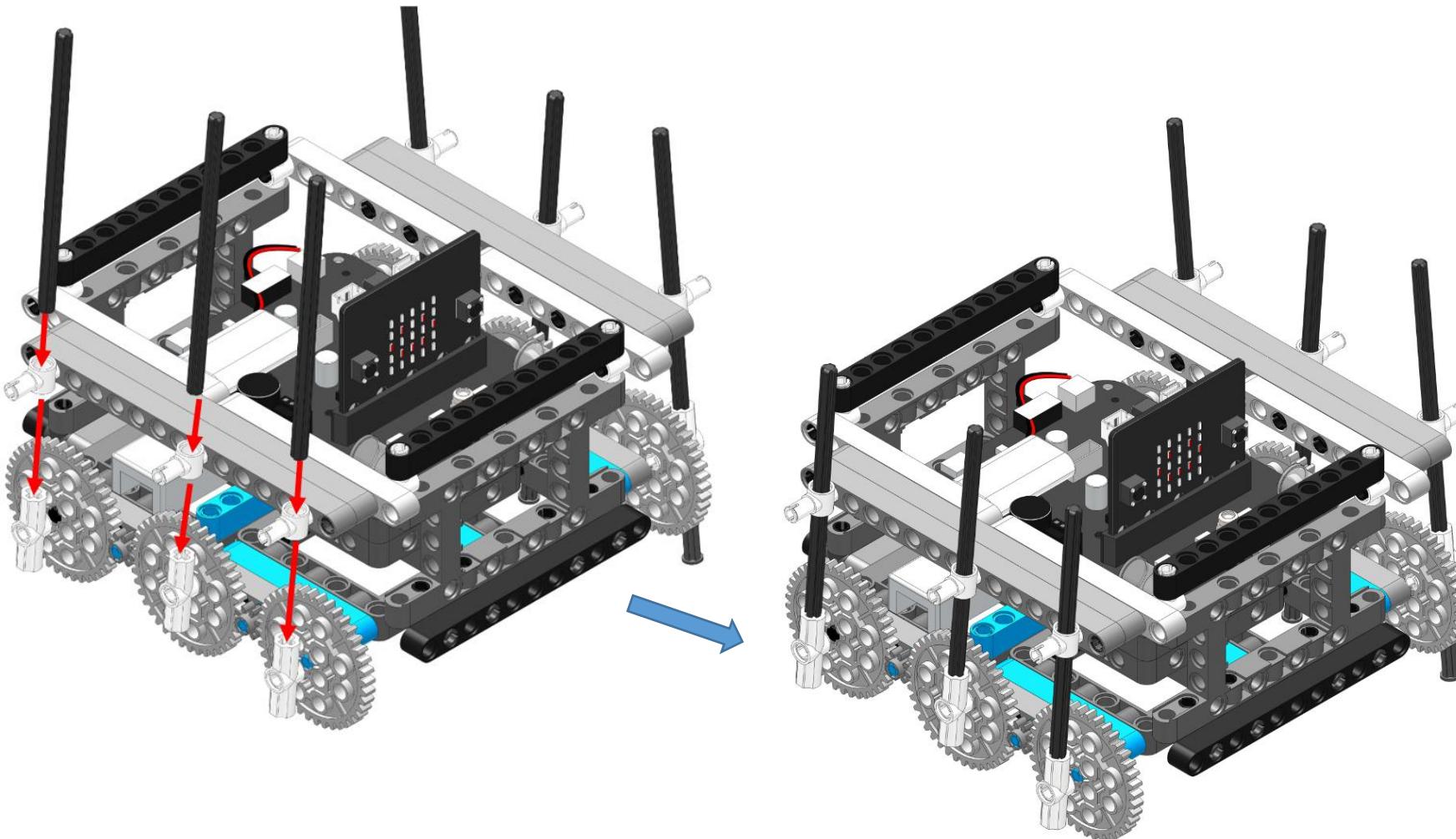
Step 34: Look for three 2# bolt connections that are mounted on the side of the three 1x2 smooth pins.



Step 35: Find three 1x3 bolt connectors, which are installed in the 2nd, 8th and 14th holes of the 1x15 hole arm on the side of the frame.

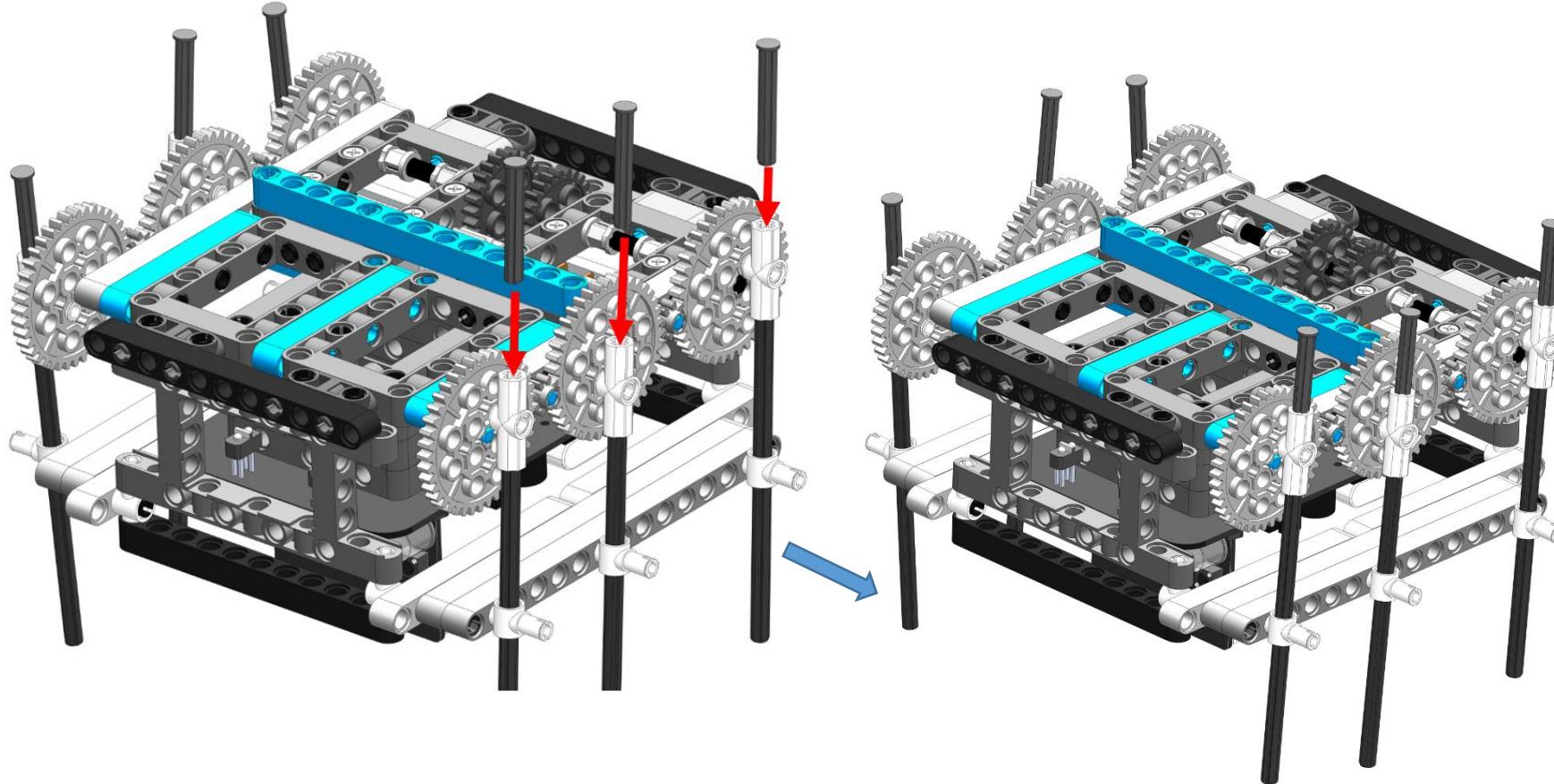


Step 36: Look for three 1x12 cross shafts, pass them through the upper 1x3 bolt connector, and insert the 2# bolt connection below.

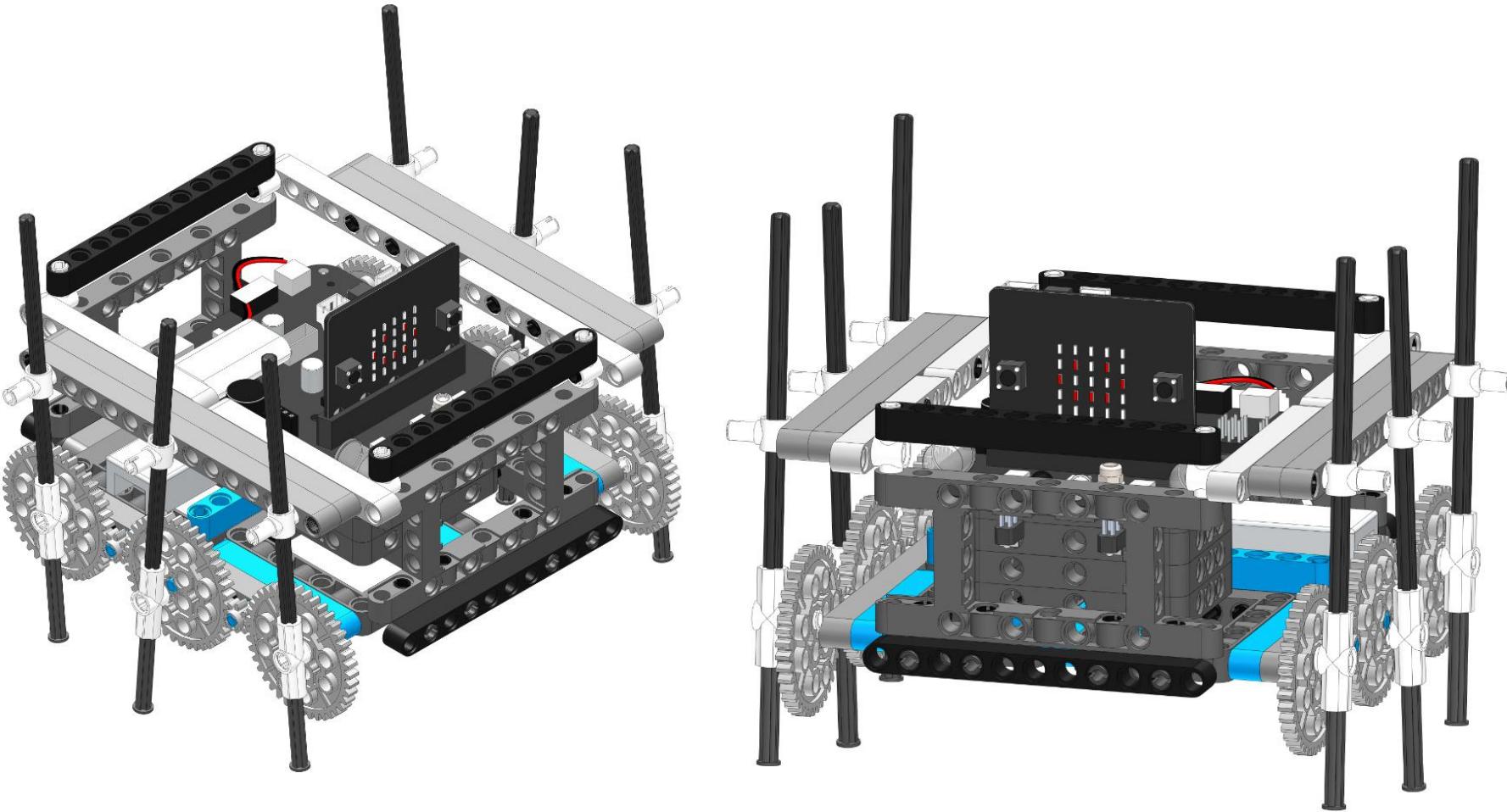


Step 37: Look for three 1*4 shafts with cut-offs and insert them into the 2# bolt connection.

Tip: When doing this, we need to invert the hexapod.



The hexapod robot after assembly is the one shown below.

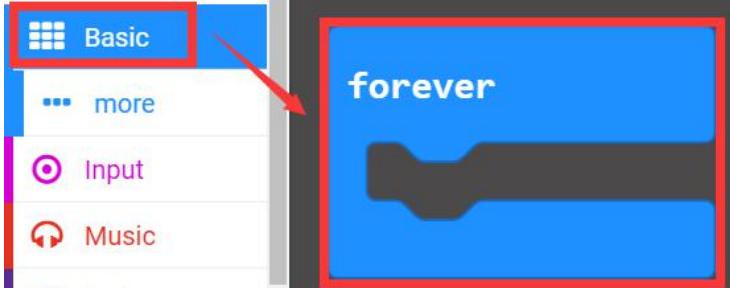
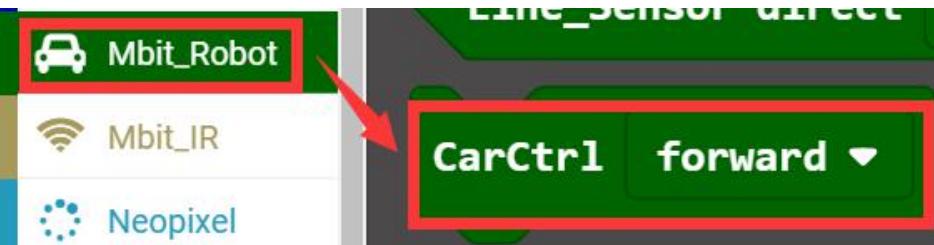


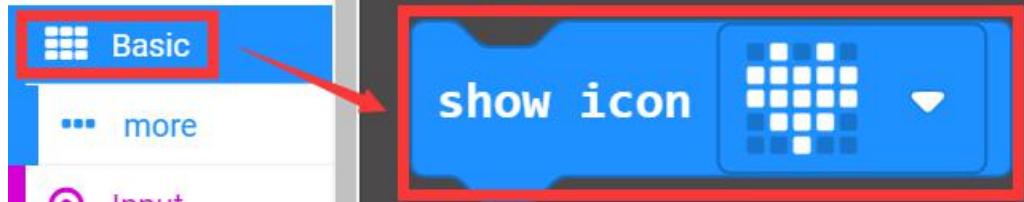
Thinking: This session is mainly to teach you how to use graphical programming to control the hexapod robot.

Preparation

- USB cable *1
- Hexapod robot *1

Blocks

Block	Instruction
 A screenshot of the Scratch blocks editor. On the left, there's a vertical stack of blocks categorized by color: blue (Basic), green (Mbit_Robot), purple (Input), and orange (Music). A red box highlights the 'Basic' category. To its right, a horizontal slot contains a blue 'forever' control block. A red arrow points from the 'Basic' category to this 'forever' block.	The code inside is executed after booting.
 A screenshot of the Scratch blocks editor. On the left, there's a vertical stack of blocks categorized by color: green (Mbit_Robot), purple (Mbit_IR), and orange (Neopixel). A red box highlights the 'Mbit_Robot' category. To its right, a horizontal slot contains a green 'CarCtrl' motion block with the word 'forward' and a dropdown menu icon. A red arrow points from the 'Mbit_Robot' category to this 'CarCtrl' block.	The car's motion state selection: forward, back, turn left , turn right , rotate left, rotate right and stop.

Block	Instruction
	Display the pattern on the micro:bit dot matrix.

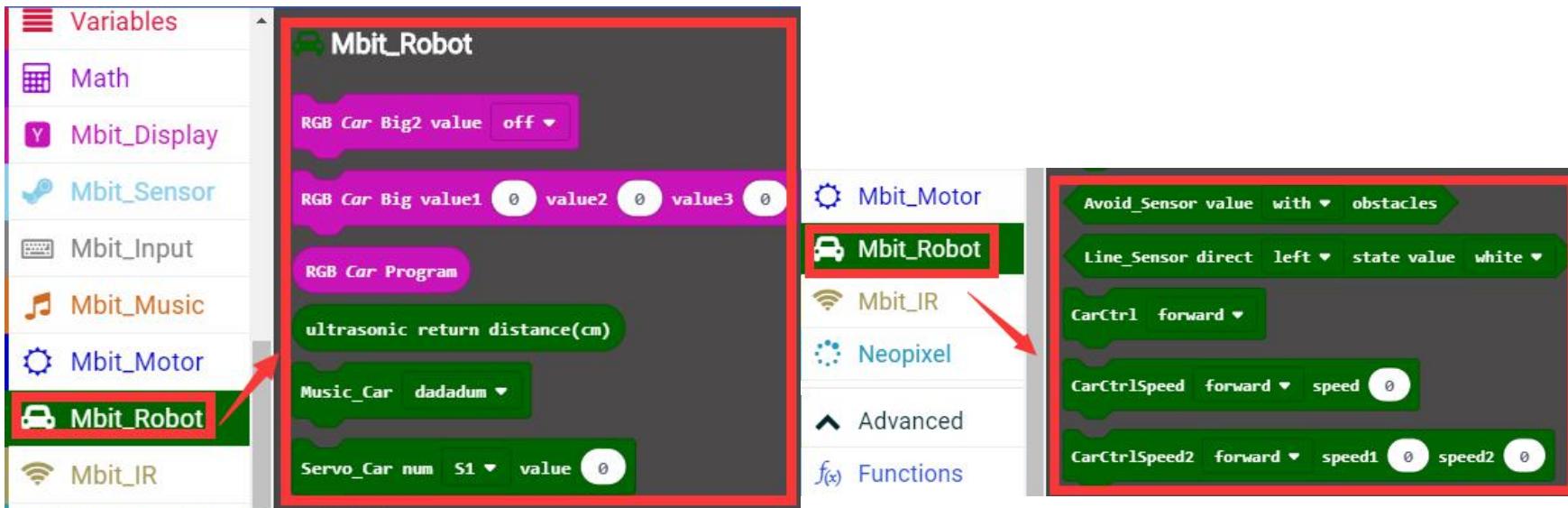
Programming

The program of this course is shown in the figure below. After downloading the program, open the power switch of the hexapod robot, it will automatically advance and display a smile on the dot matrix.



This experimental program file has been provided, you can download and use it directly according to the steps in “Instruction” .
Program path:Building bit starter kit\2. Experimental course\C.Hexapod robot\2.Hexapod robot advance\Hexapod-robot-advance.hex

We have packaged the blocks for the hexapod as shown in the two figures below.



If you see these blocks, you can definitely think of more gameplay, so don't hesitate to try it bravely.
Drag these blocks and play with our building block hexapod robot.



On our official website, we also provides other tutorial: [Hexapod robot Infrared remote control](#), [Hexapod robot bit handle remote control](#).

Official website learning website: www.yahboom.net/study/Building_bit