

11

building the SUP3R CAR

In this chapter, you'll build the SUP3R CAR, an evil-looking armored vehicle! You'll also build the R3MOTE, a handy two-lever remote control. Both models are shown in Figure 11-1. Like a real rear-wheel-drive car, the SUP3R CAR has front wheels that steer and rear wheels that drive. In this sense, it's different from ROV3R, which uses two motors running

at different speeds to change direction or turn on the spot. ROV3R's turning radius can be zero, while the SUP3R CAR has a larger turning radius.

The SUP3R CAR uses a Medium Motor for steering and two Large Motors for driving. You'll learn all about programming the SUP3R CAR in Chapter 12, but now, let's start building!

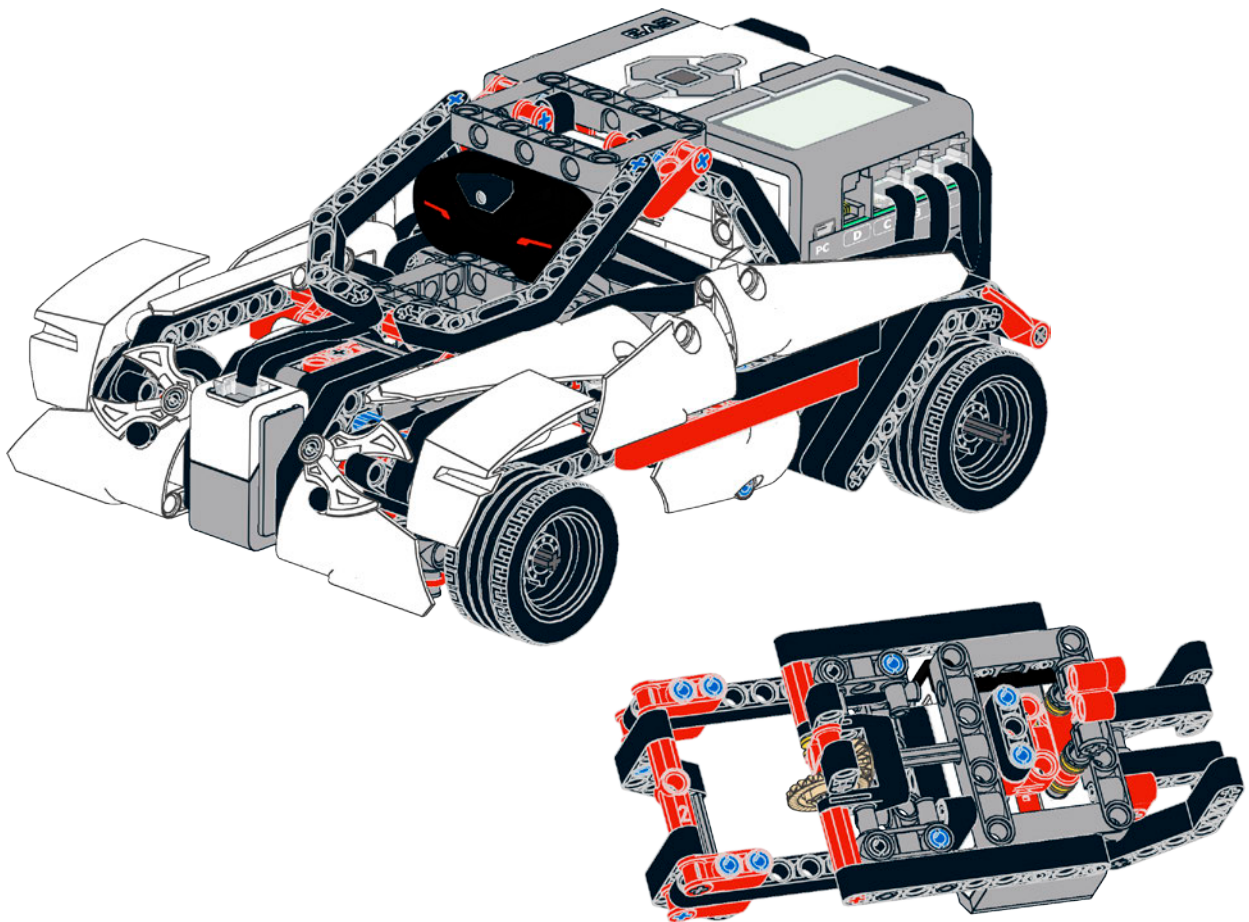
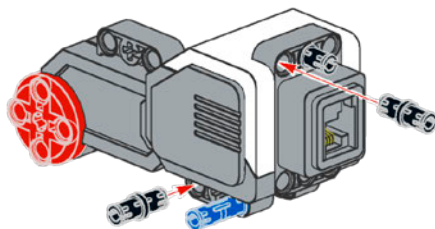
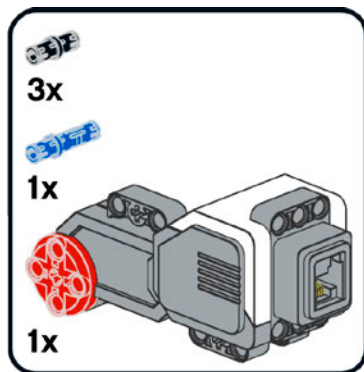


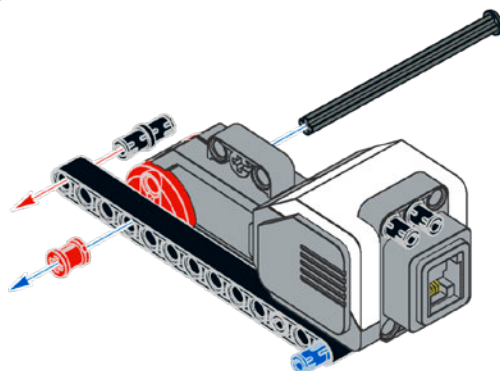
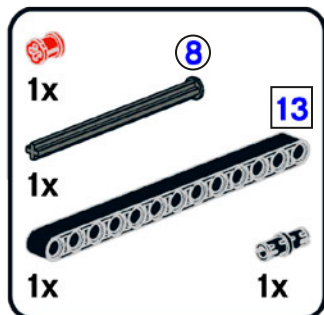
Figure 11-1: The SUP3R CAR and the R3MOTE

main assembly

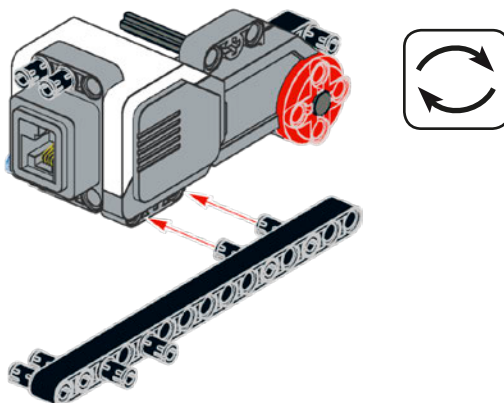
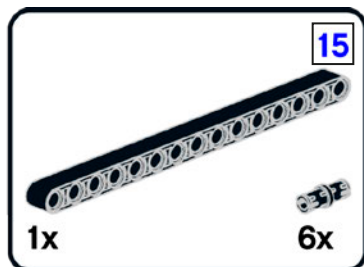
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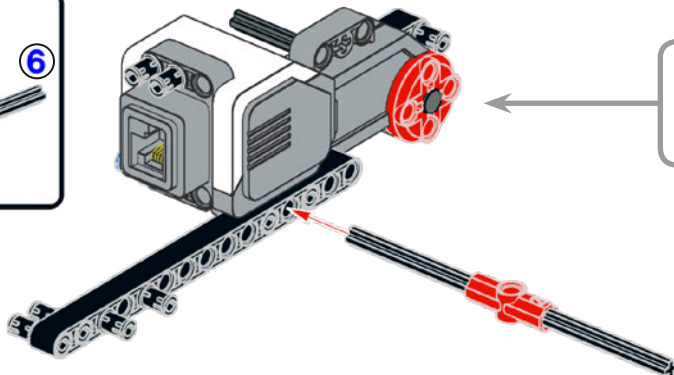
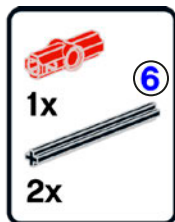
2



3



4



The 8M axle with stop will not come out if you pull on it from the other side.

1:1



13

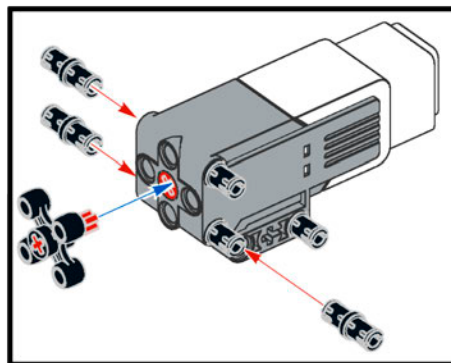
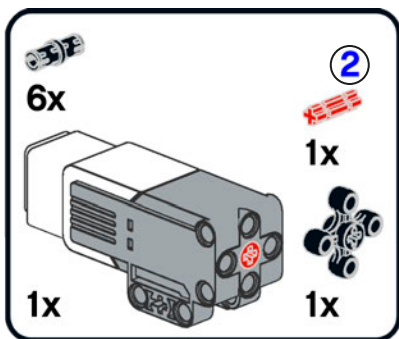


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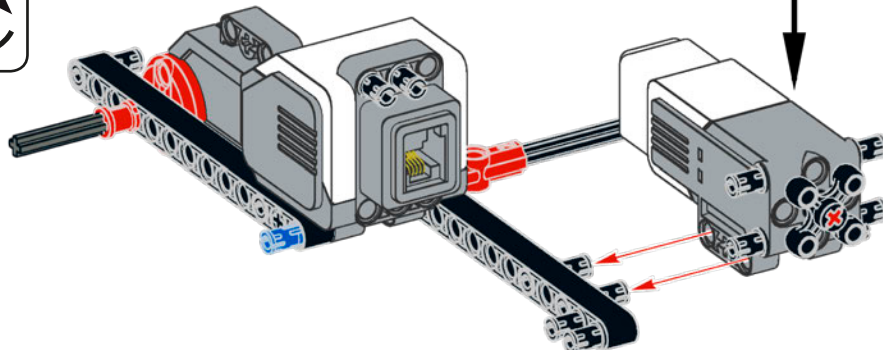


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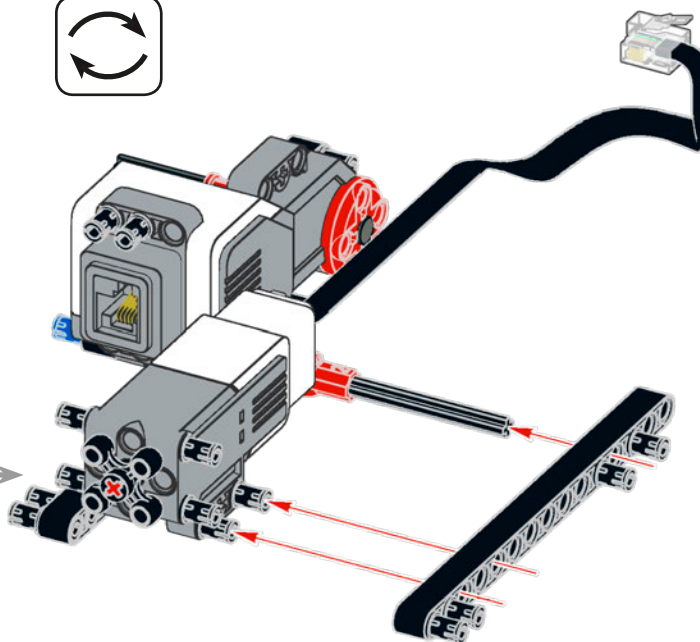
The Medium Motor is ideal for driving the steering because it's compact and fast enough for a low-torque application.



6



The knob wheel engages another knob wheel to steer the front wheels.

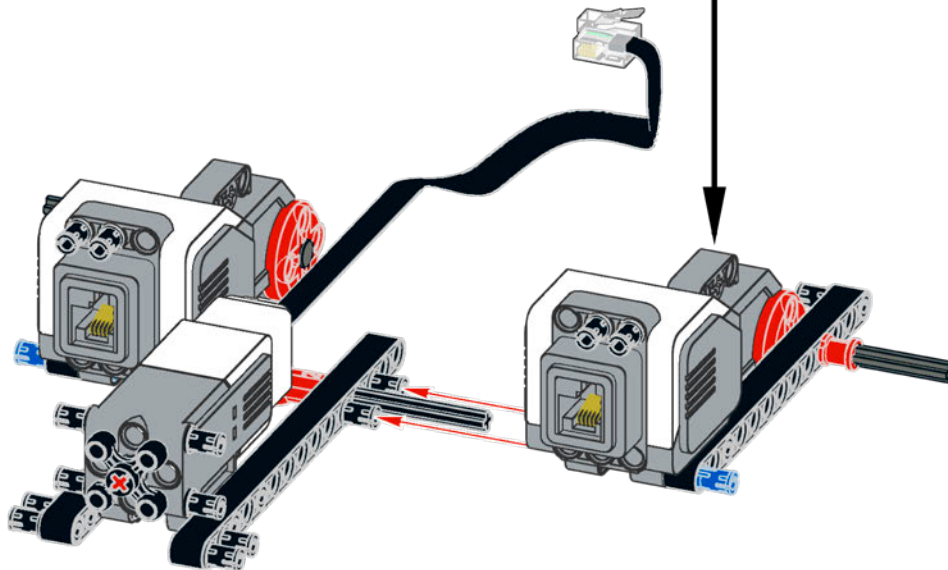
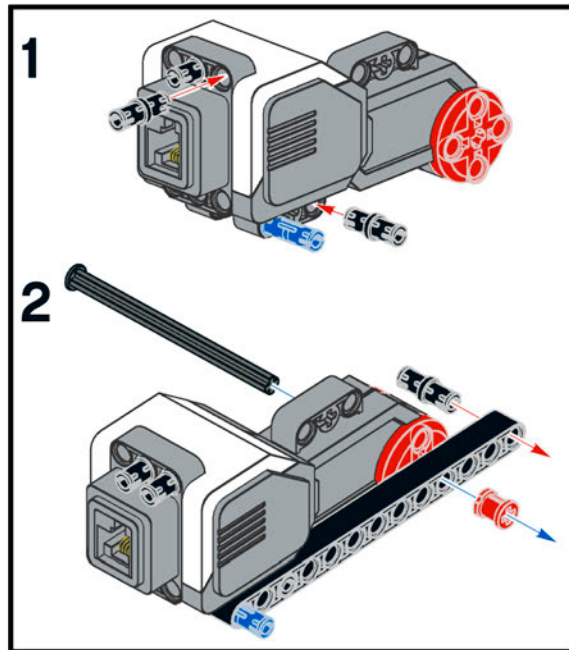
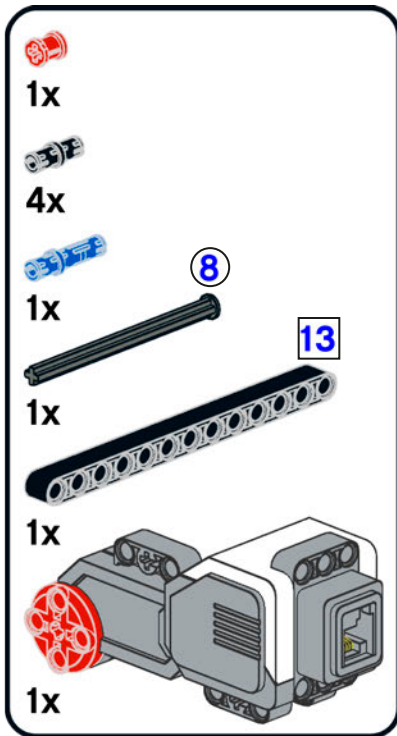


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1:1

7



1:1



13



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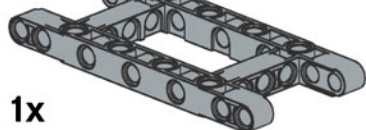
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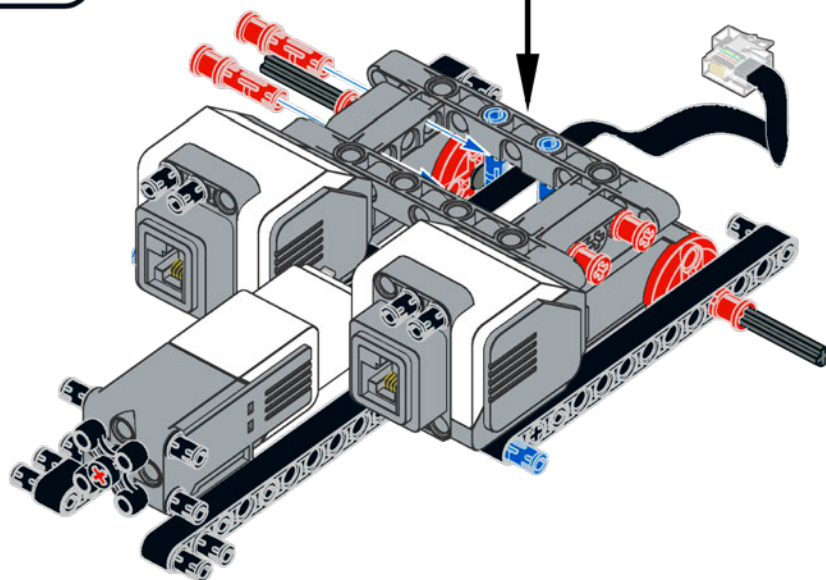
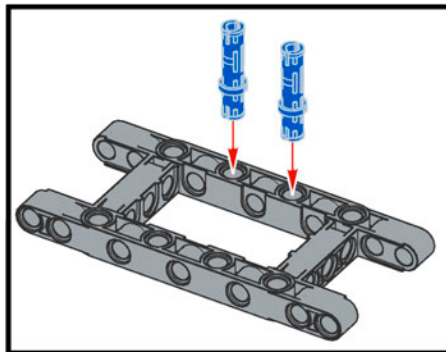
2x



4x



1x

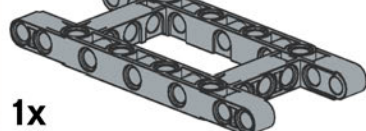


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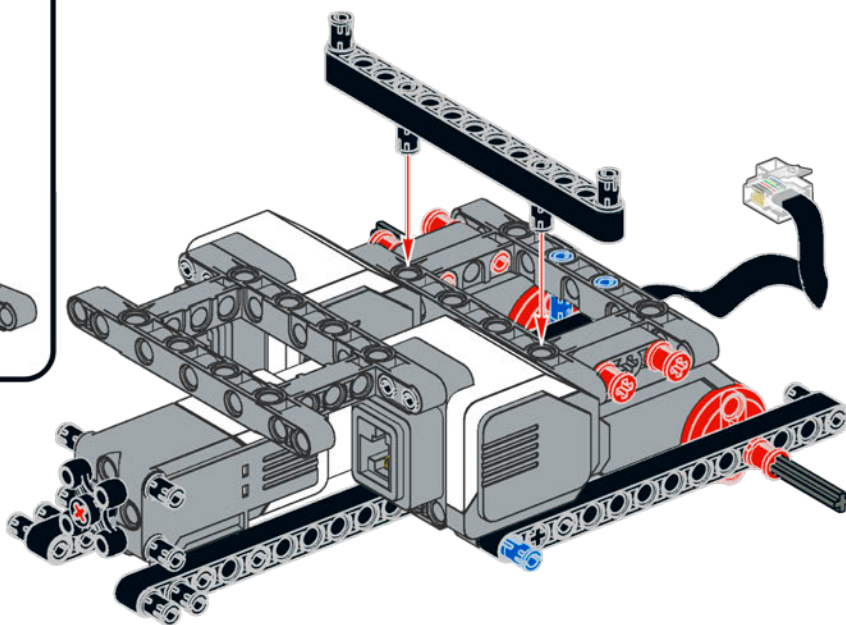
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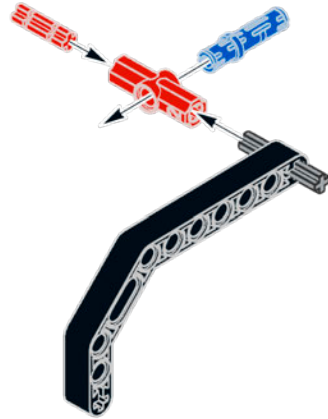
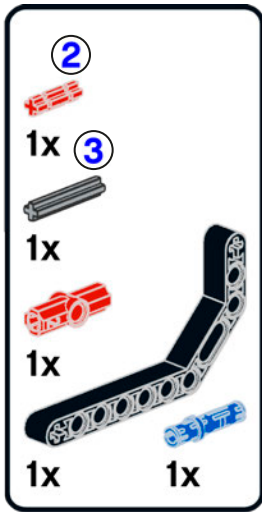
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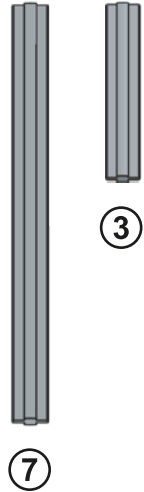


hood assembly

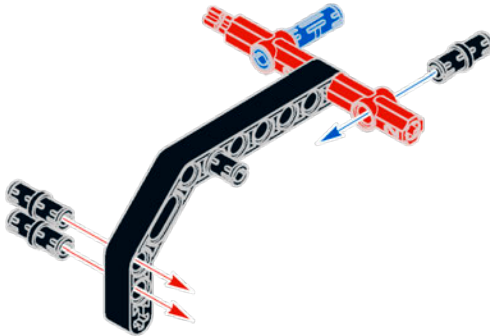
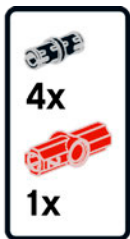
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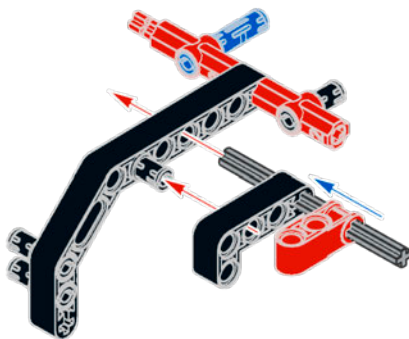
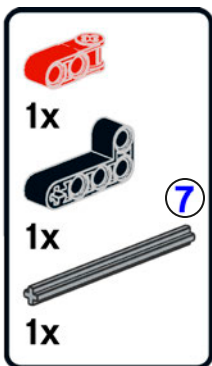
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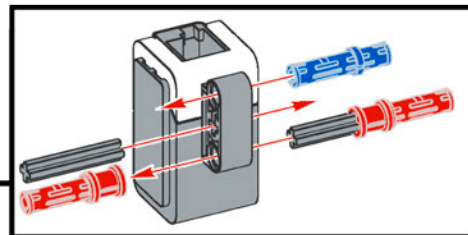
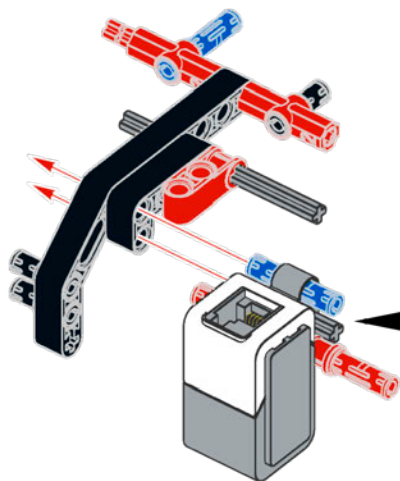
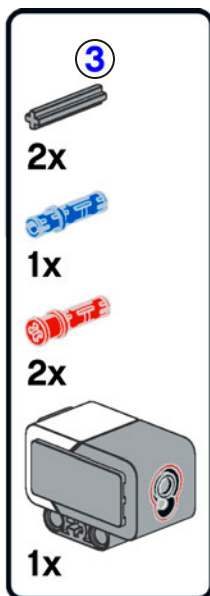
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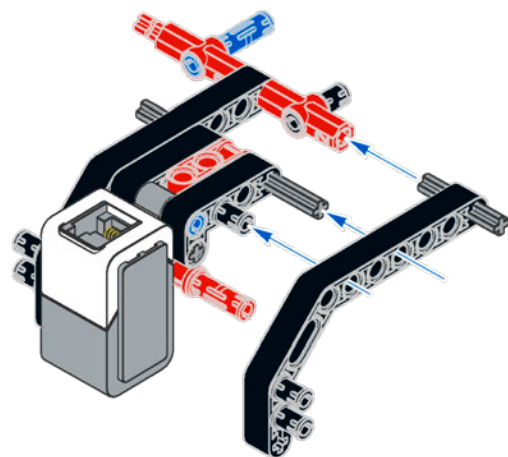
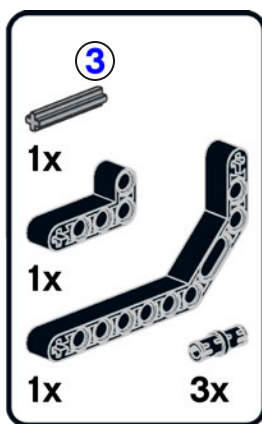


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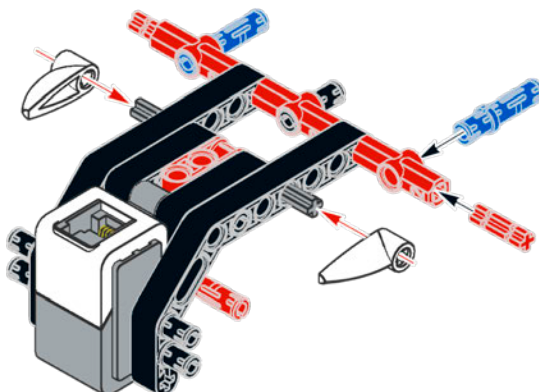
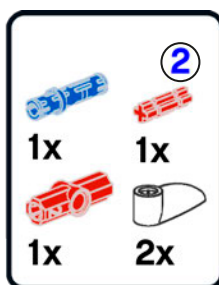


The downward-looking Color Sensor will be used to detect colored spots and follow lines on the ground.

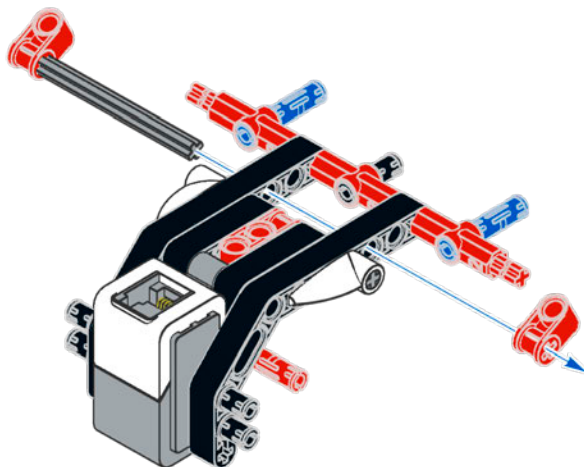
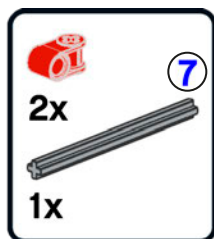
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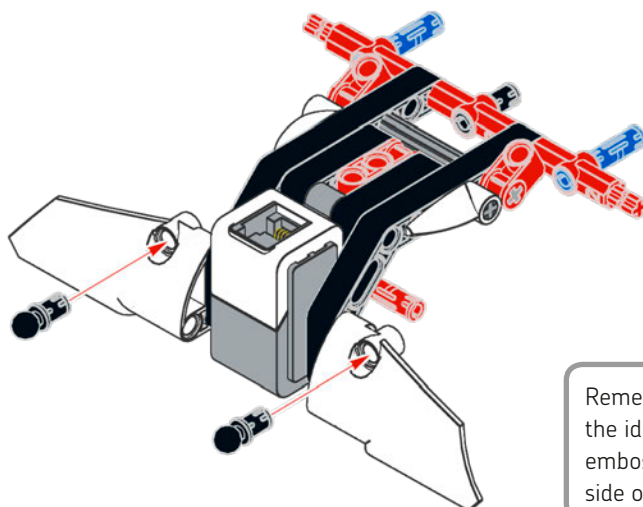
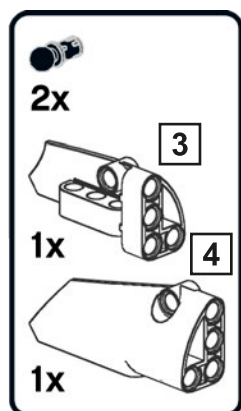
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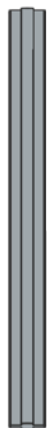


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Remember: You'll find the identifying numbers embossed on the inner side of the panels.

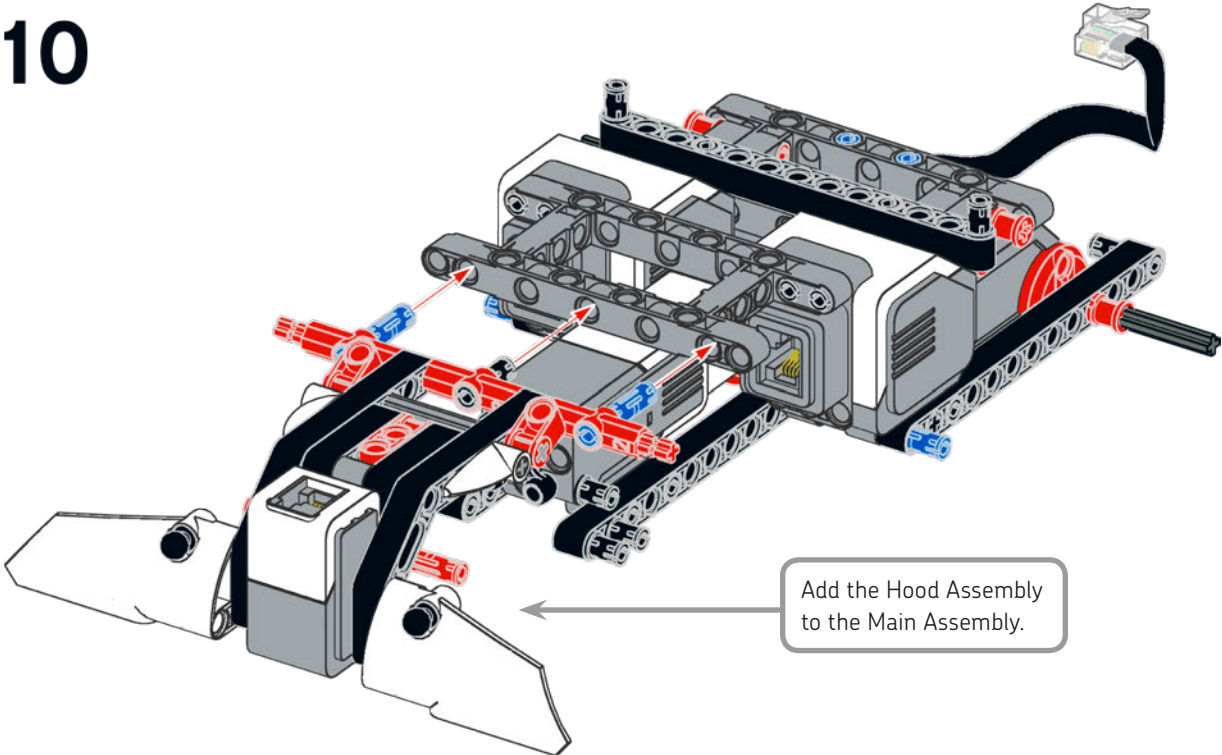
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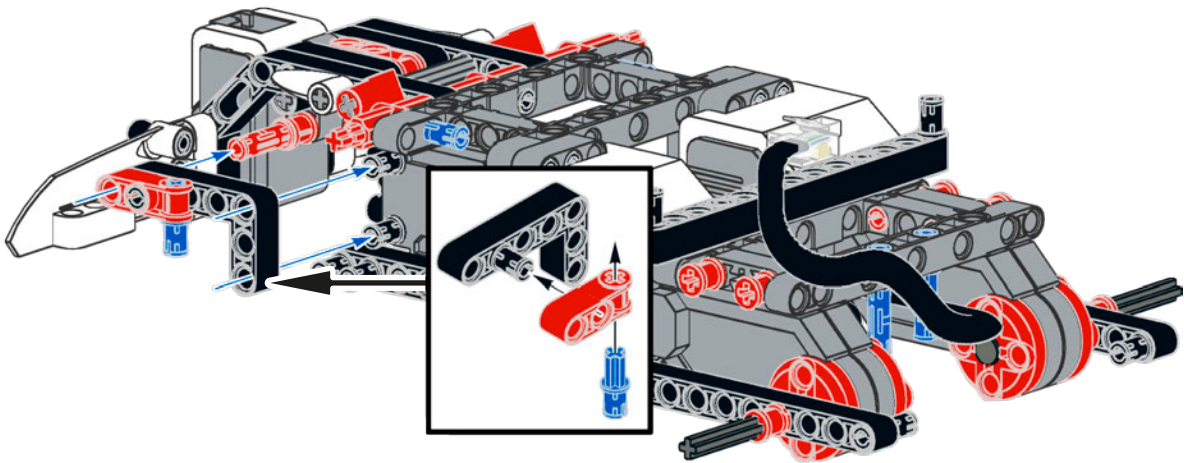
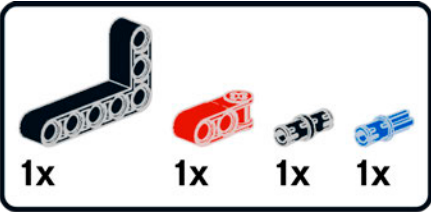
main assembly

10

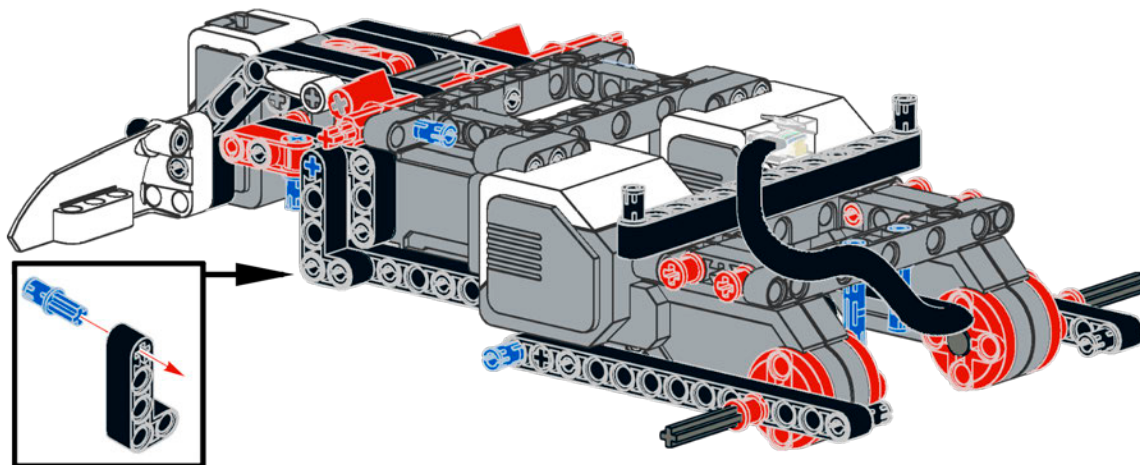
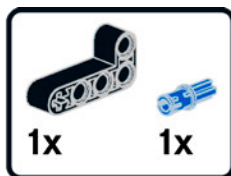


Add the Hood Assembly to the Main Assembly.

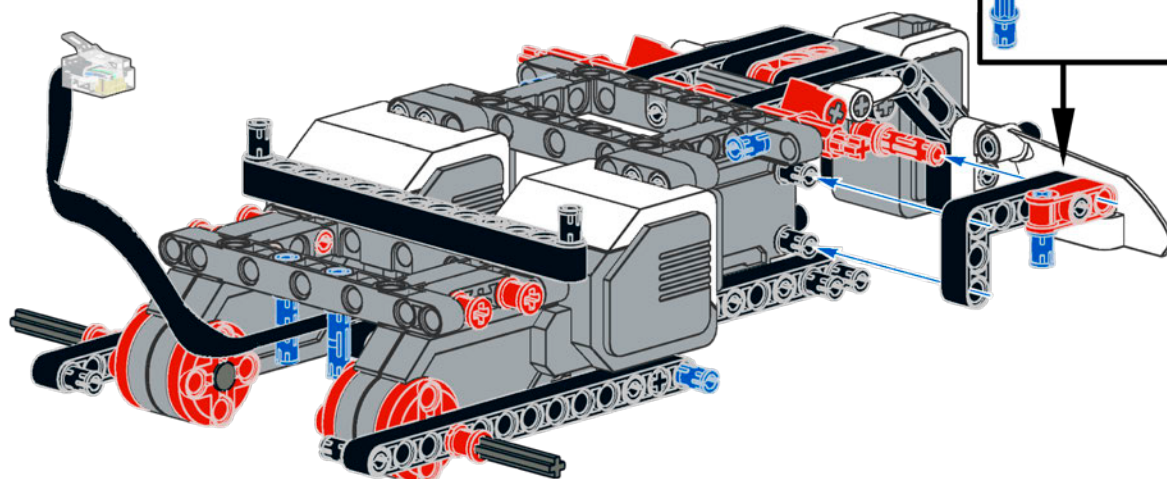
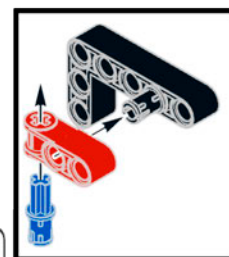
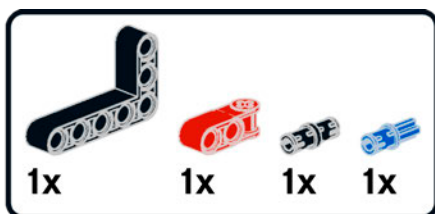
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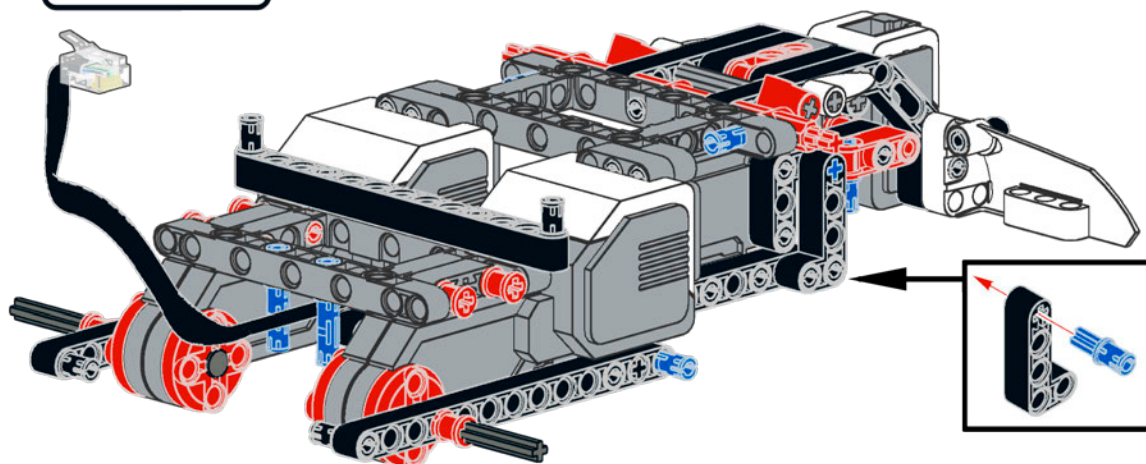
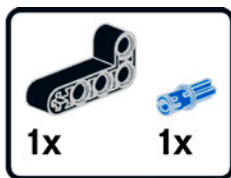
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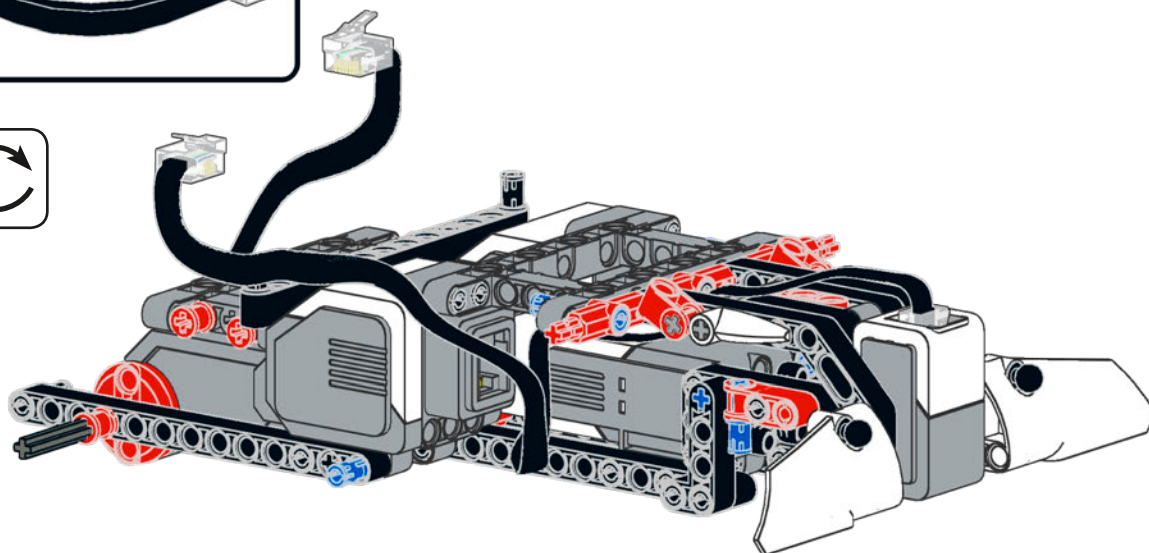
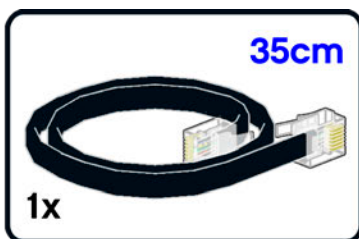
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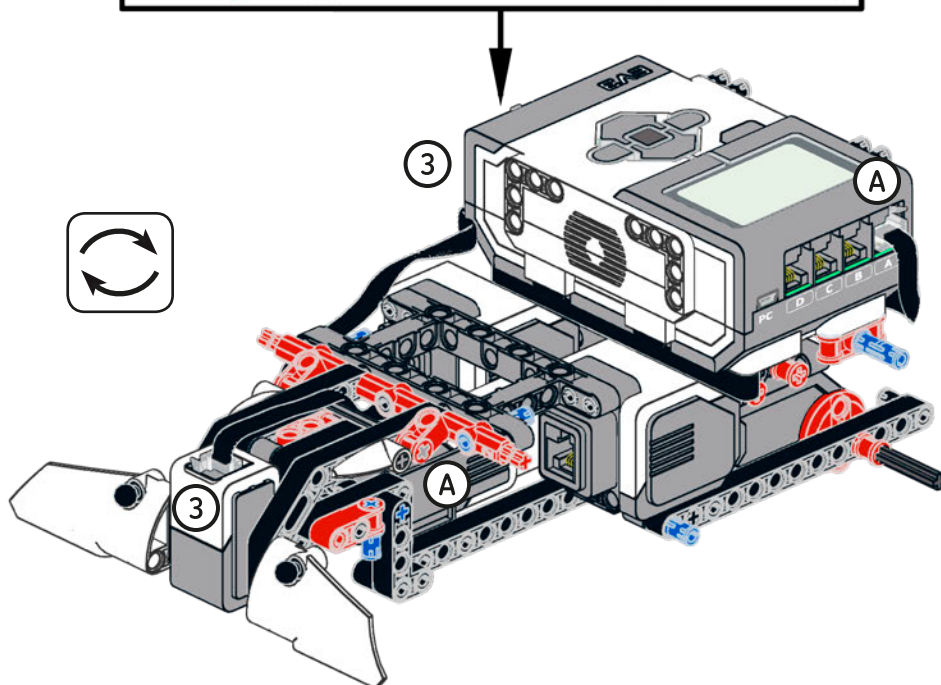
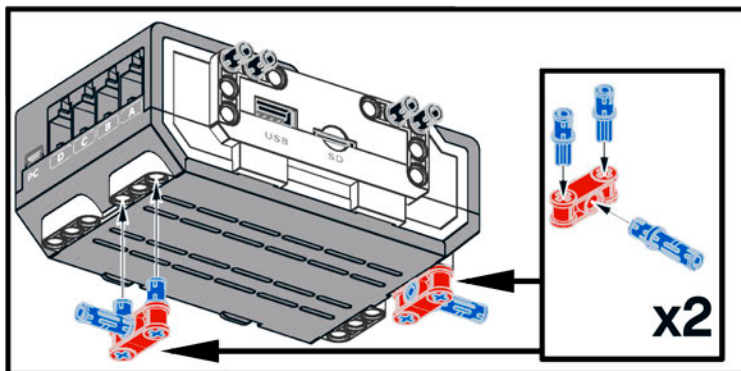
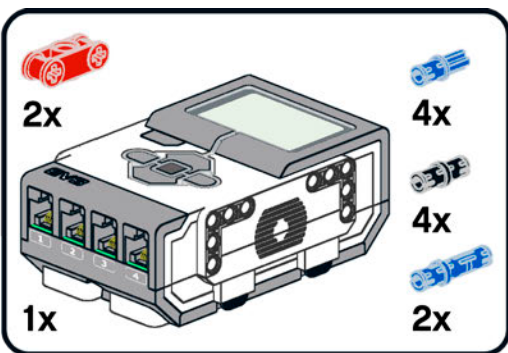
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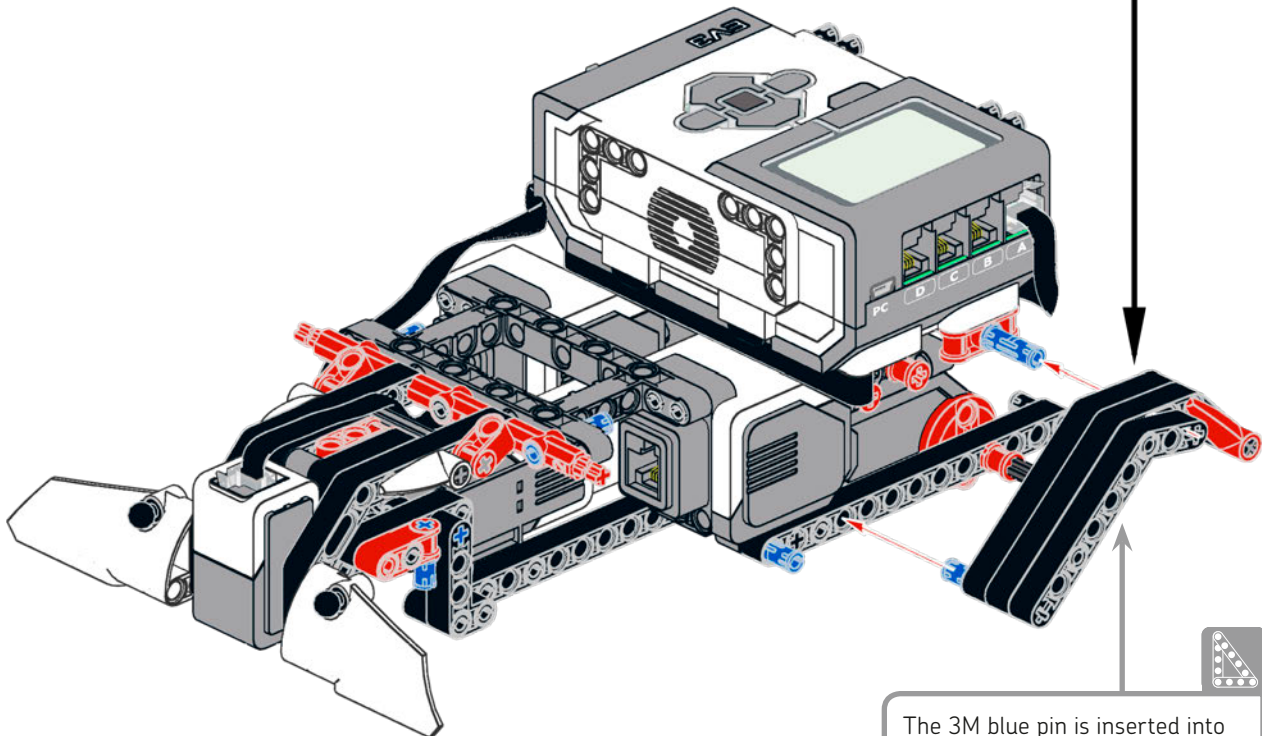
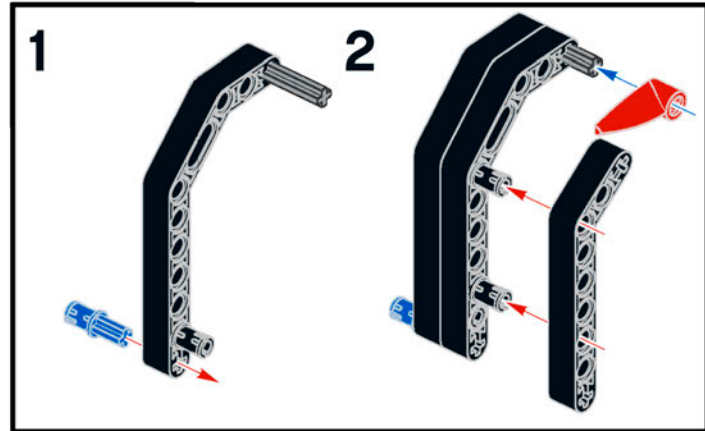
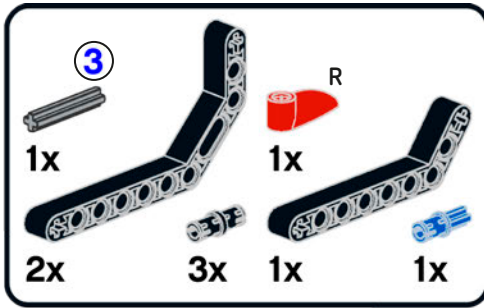
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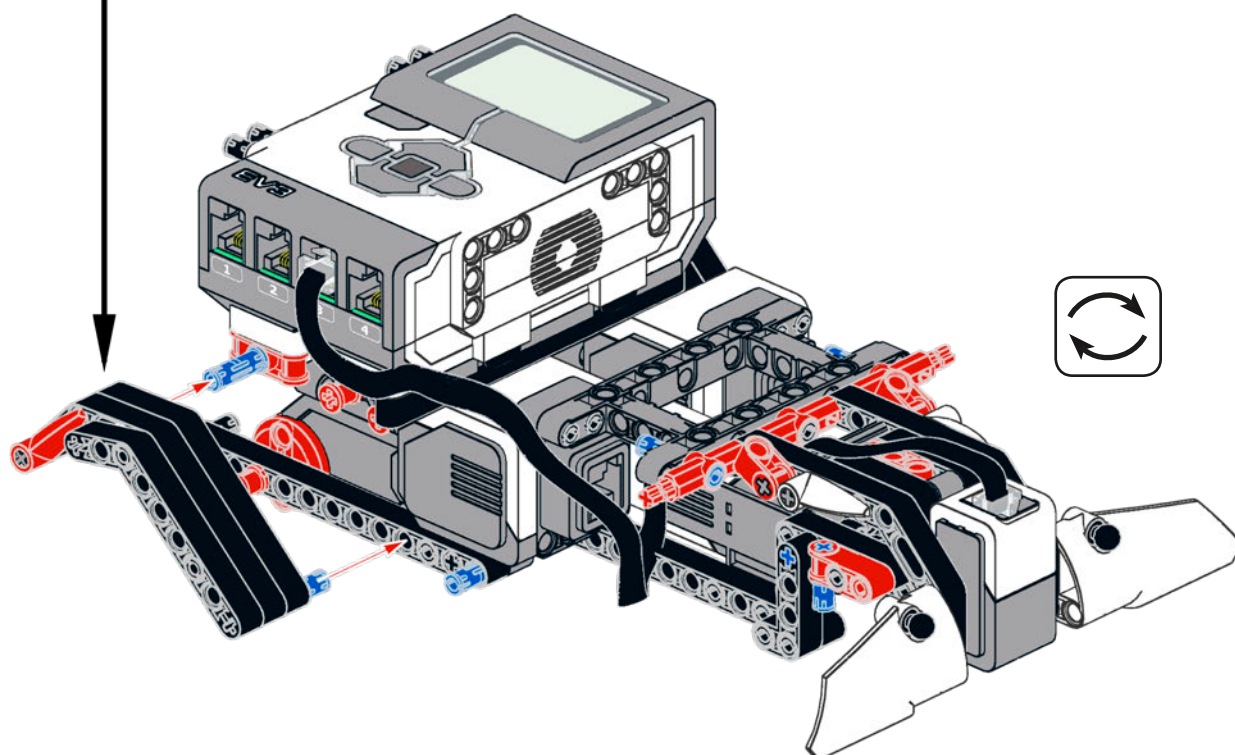
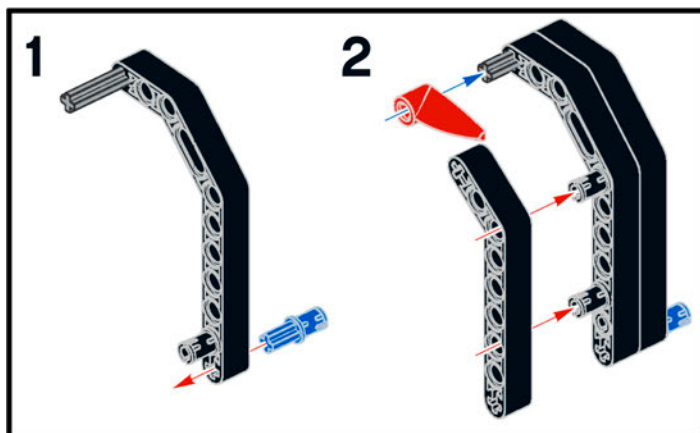
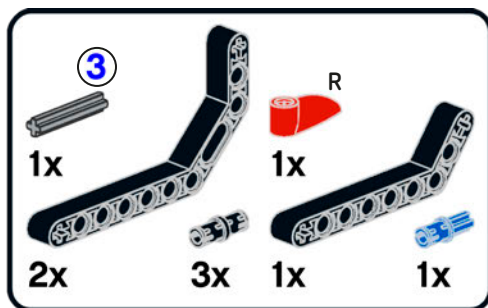
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③ 1:1

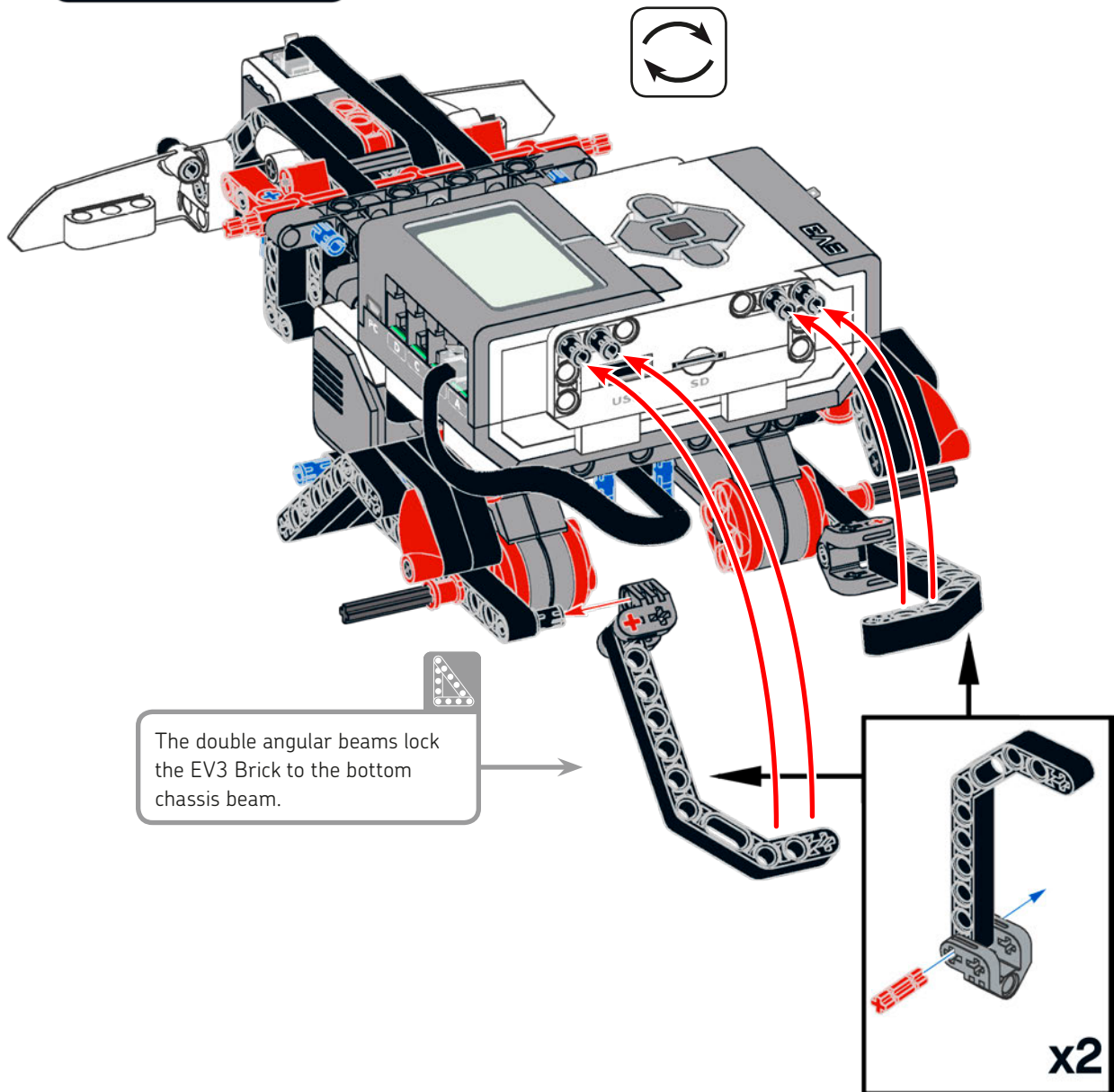
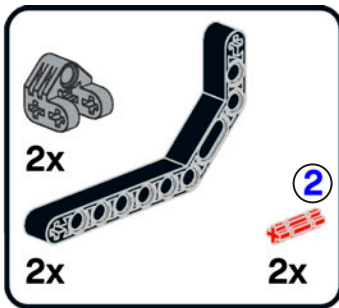
The 3M blue pin is inserted into the large slots of the double angular beams.

18

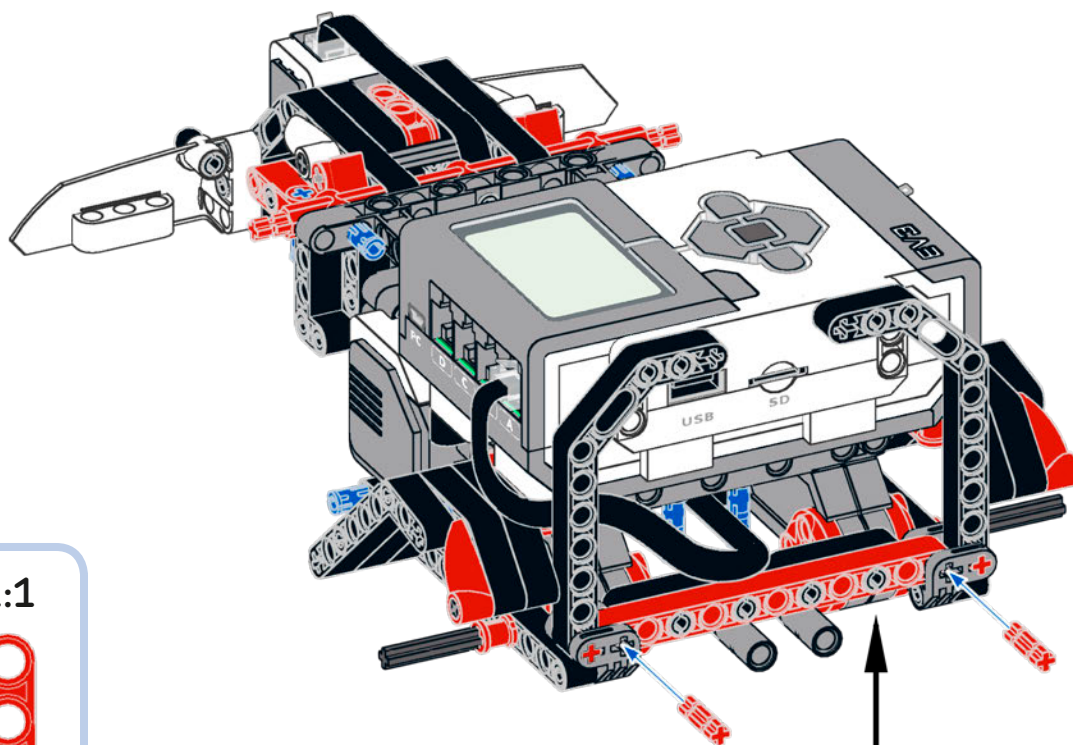
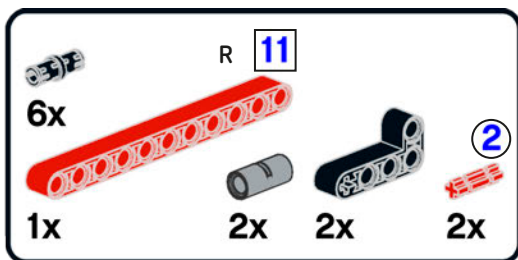


(3) [Grey Technic Pin] 1:1

19



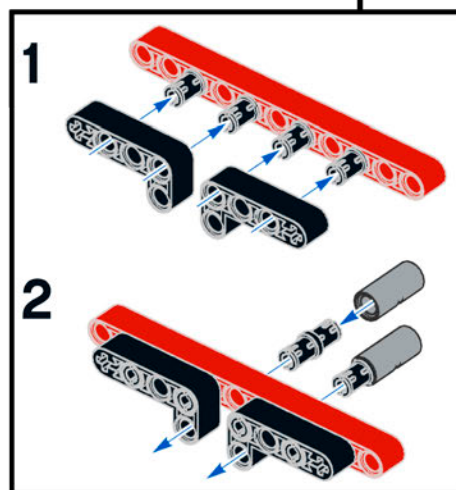
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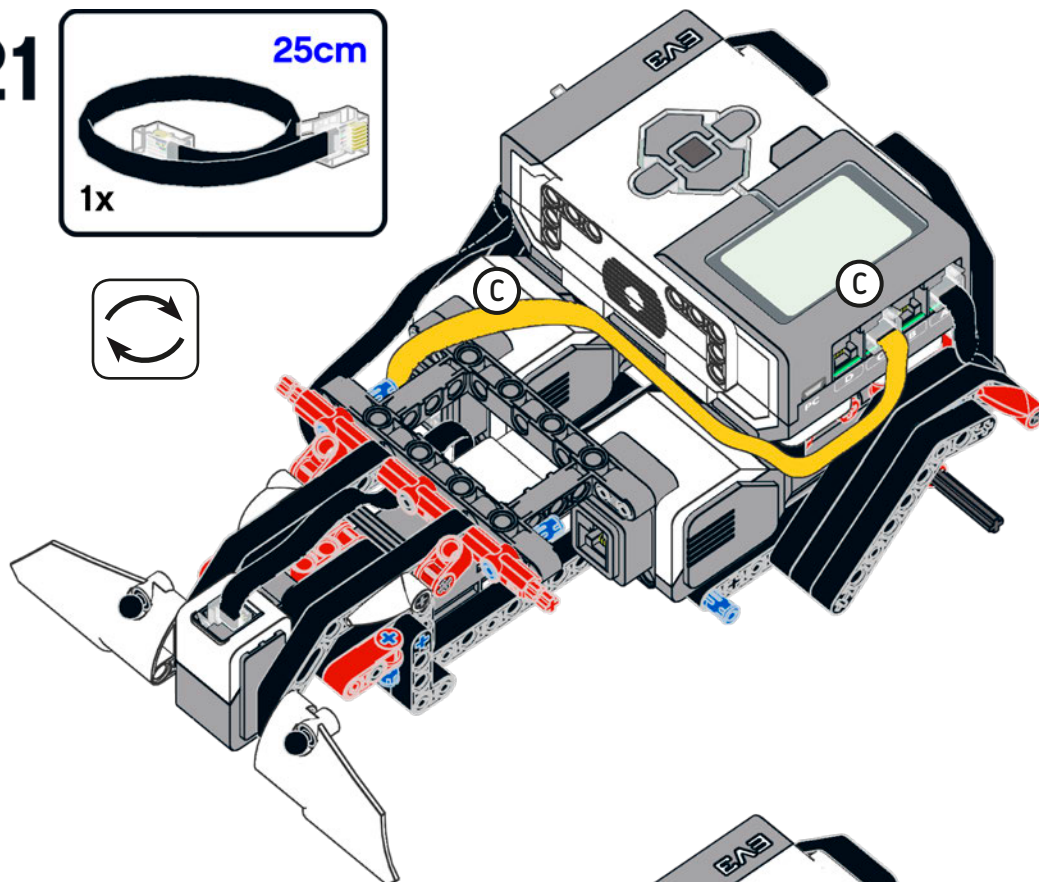
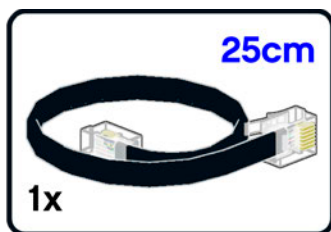
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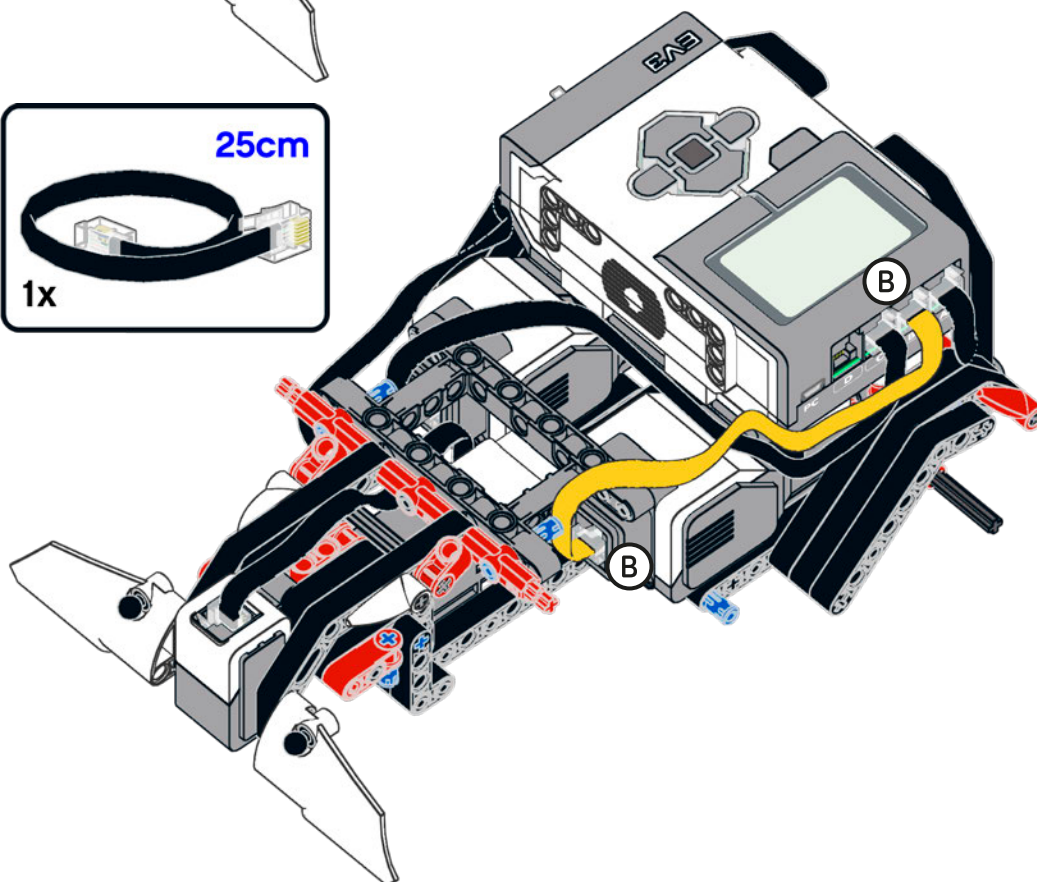
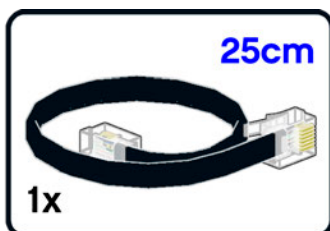
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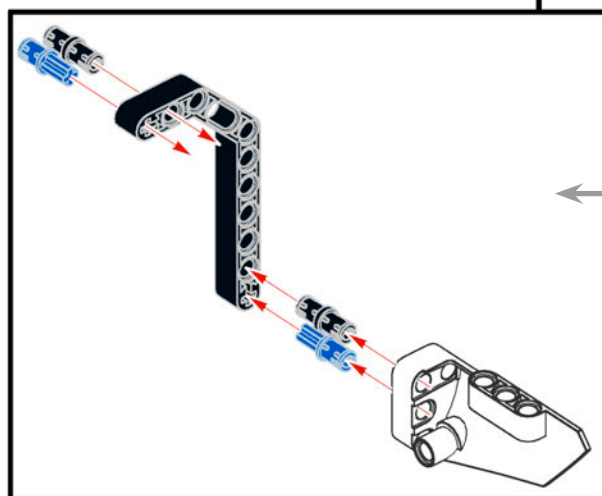
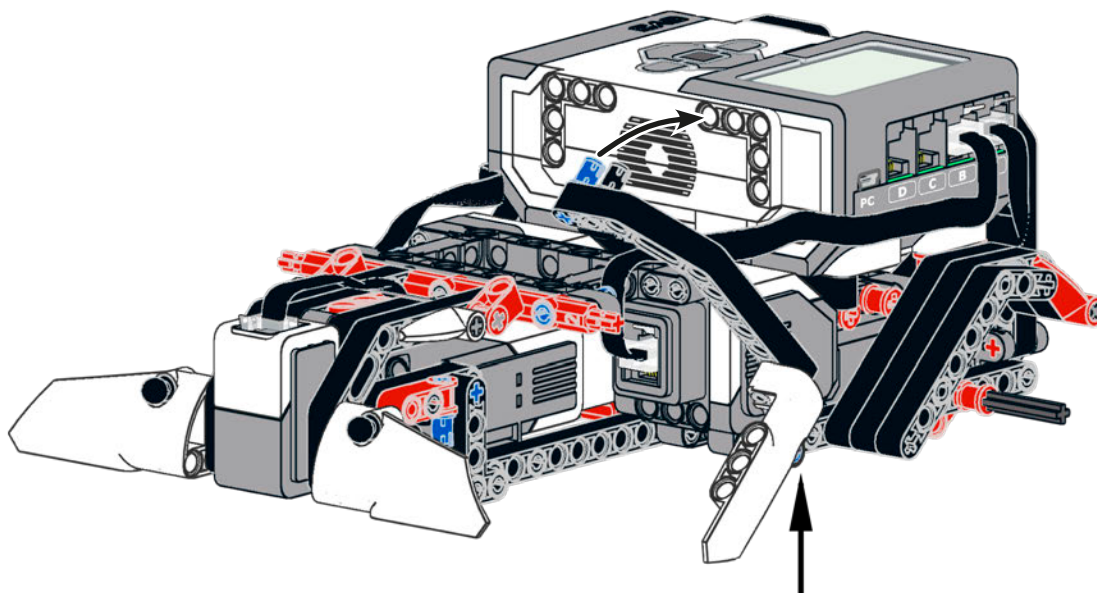
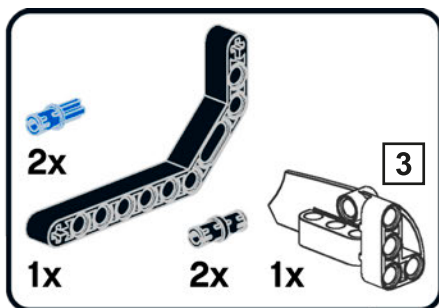
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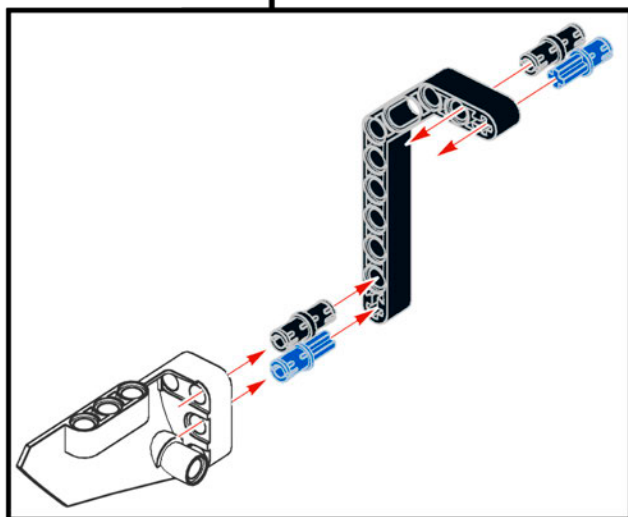
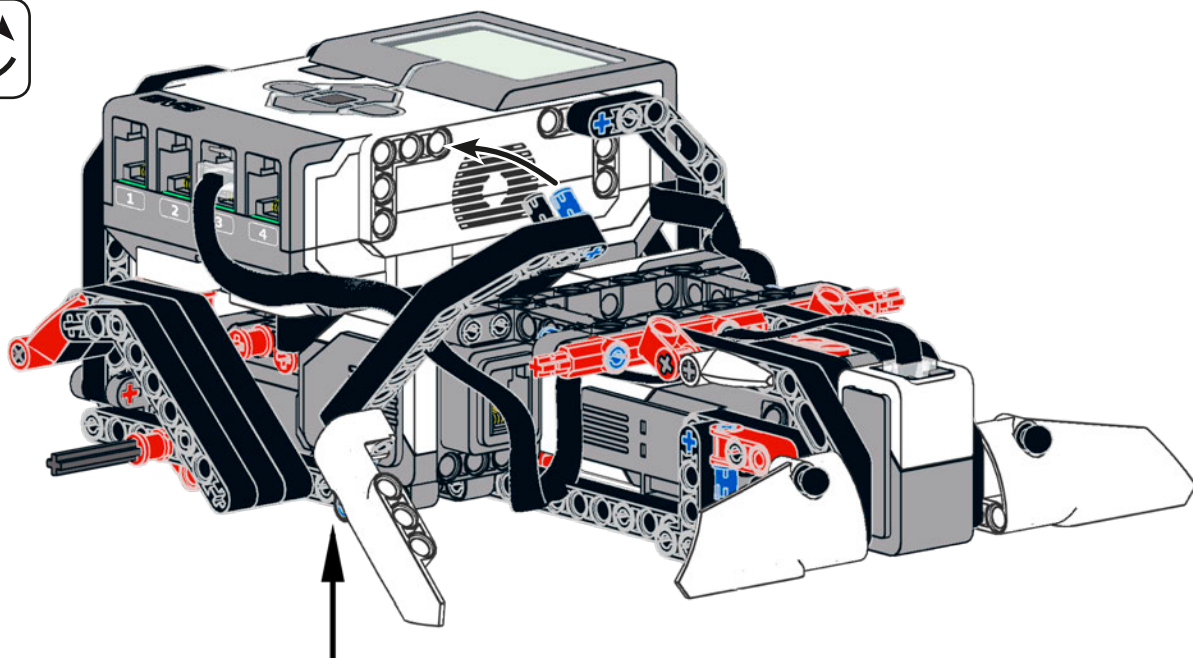
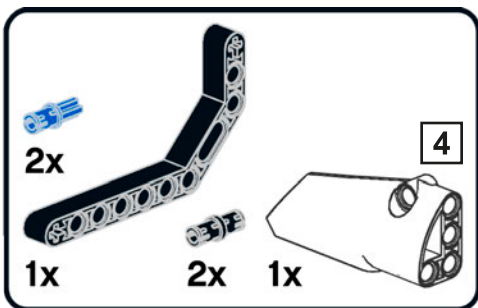


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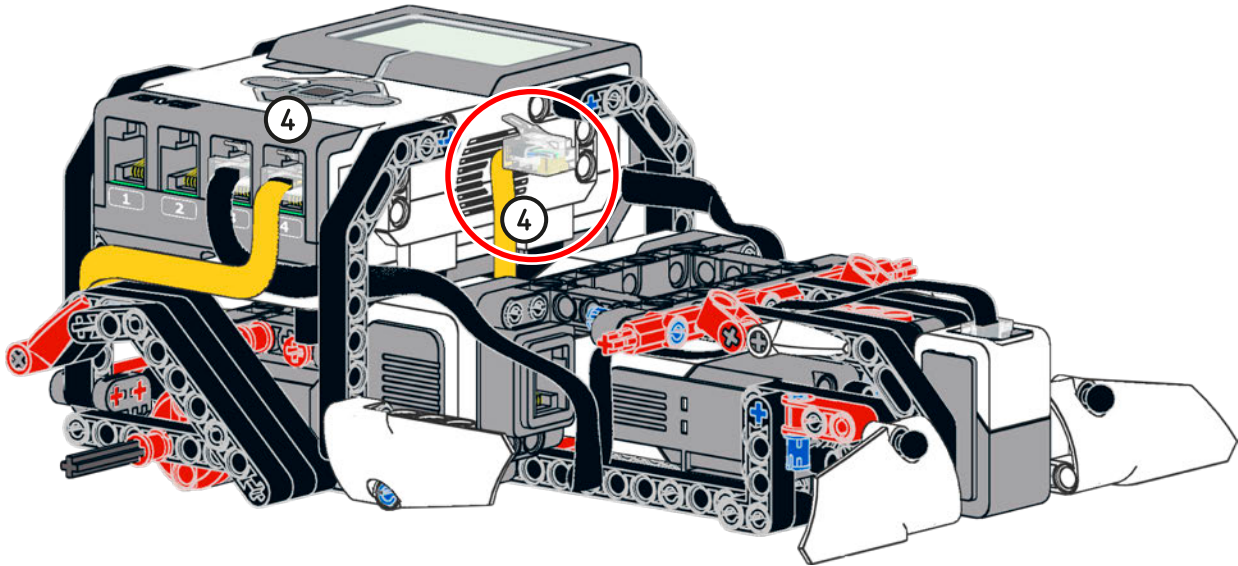
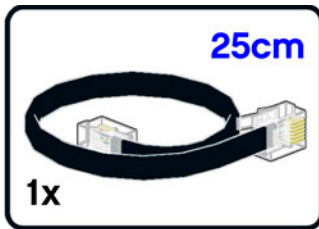


This double angular beam locks the EV3 Brick to the rest of the chassis. The white panel is used as a cross block; it's not just decorative.

24

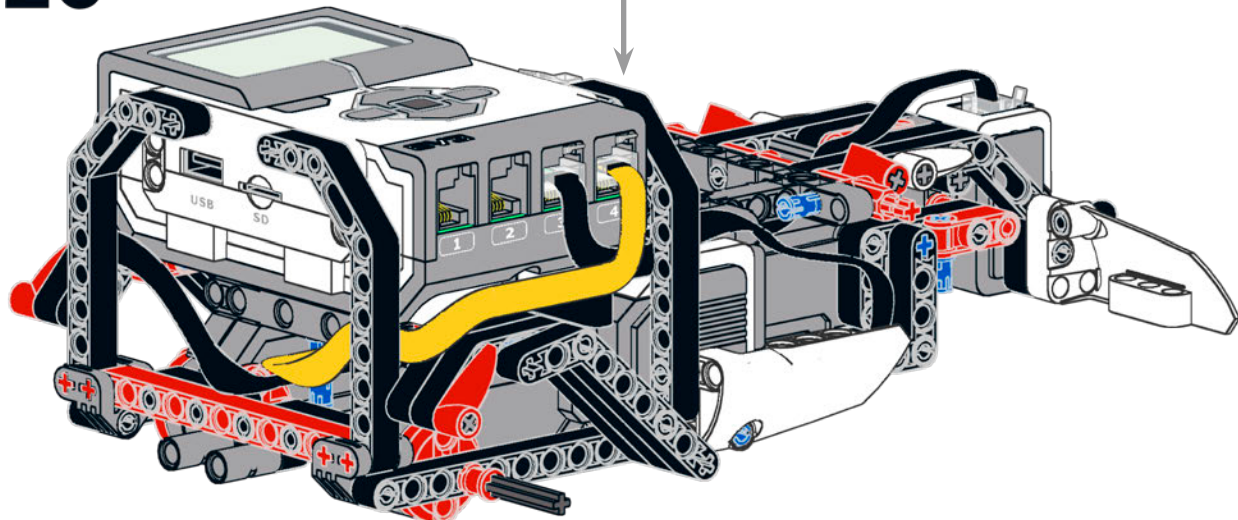


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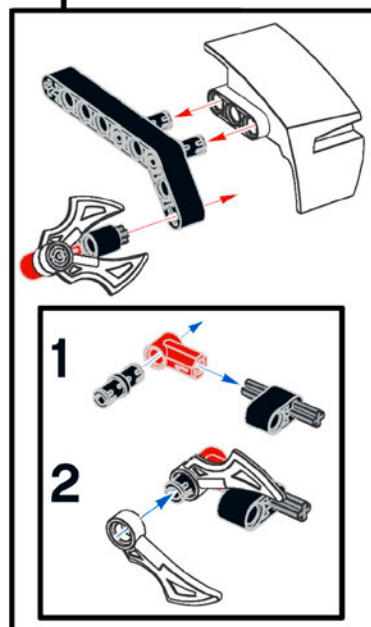
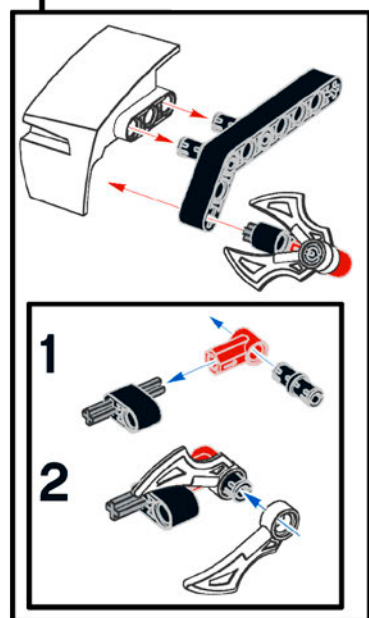
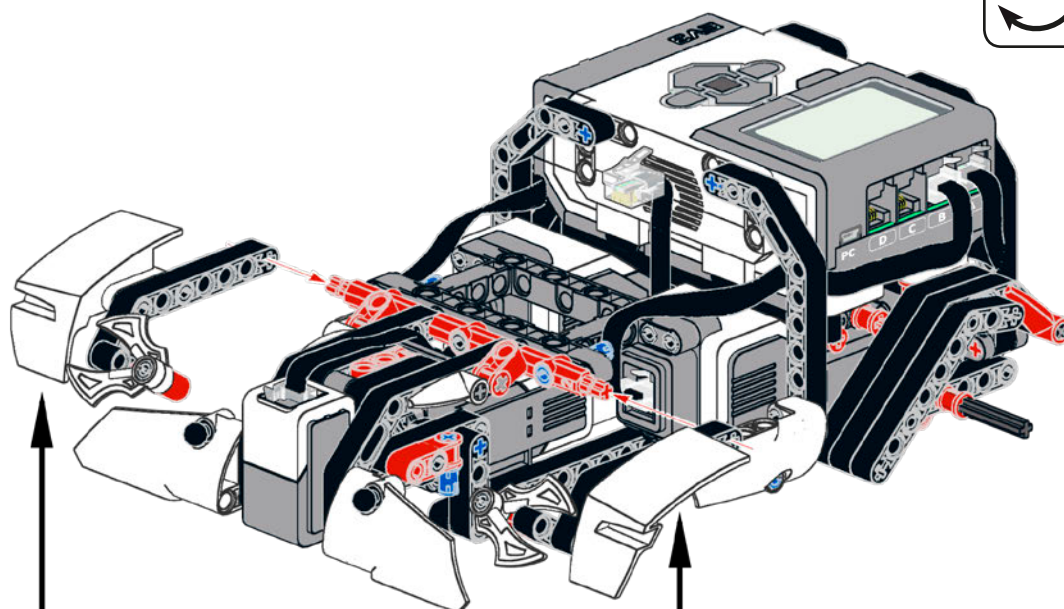
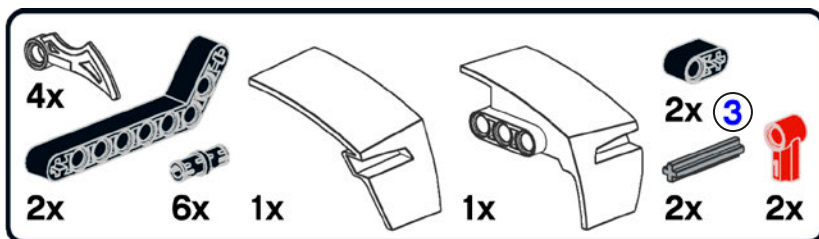


Attach the 25 cm cable to input port 4 and route it as shown.

26

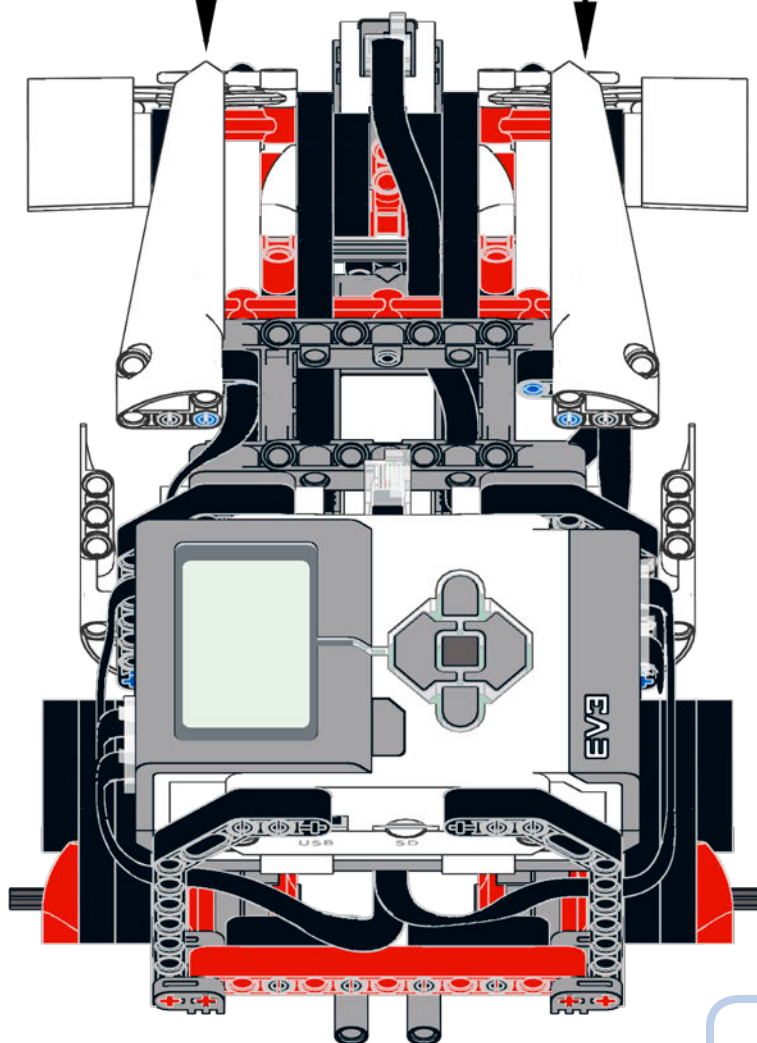
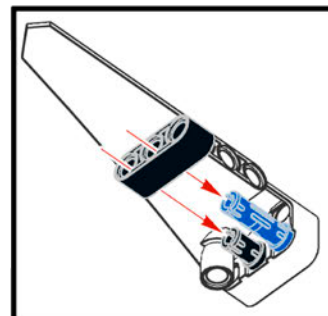
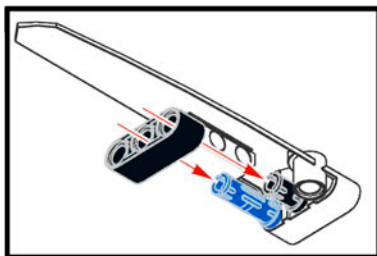
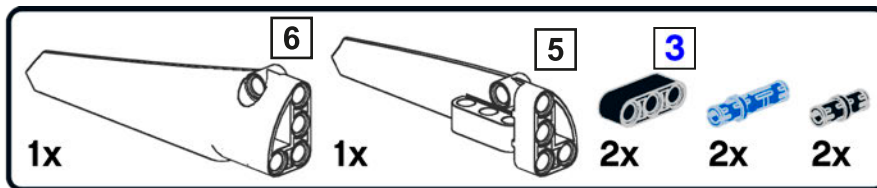


27



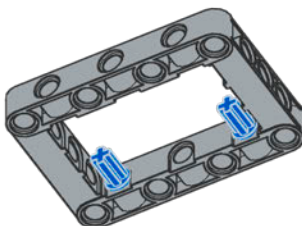
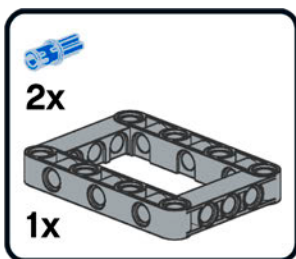
③ 1:1

28

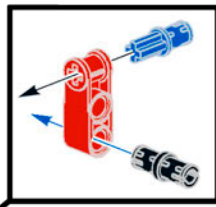
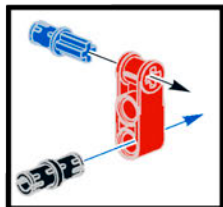
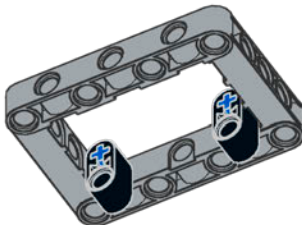


car roof assembly

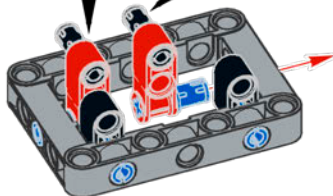
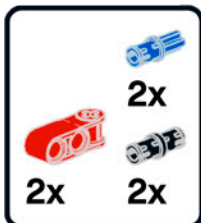
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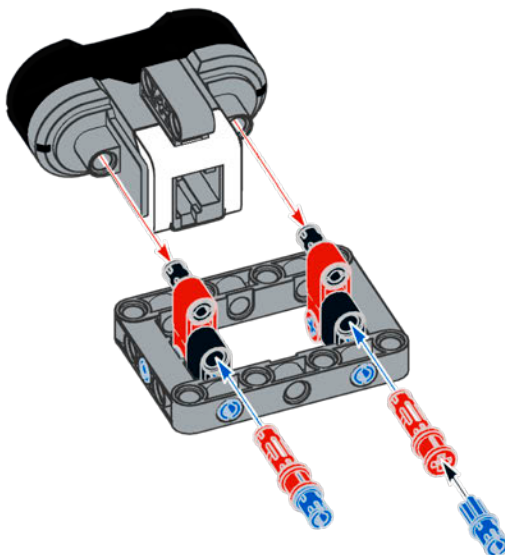
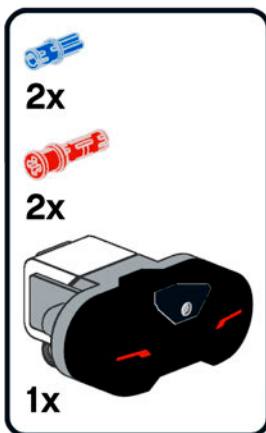
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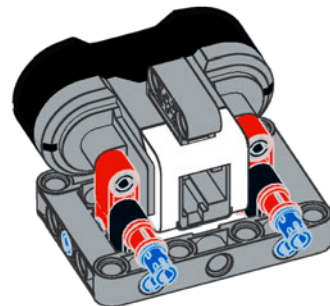
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4

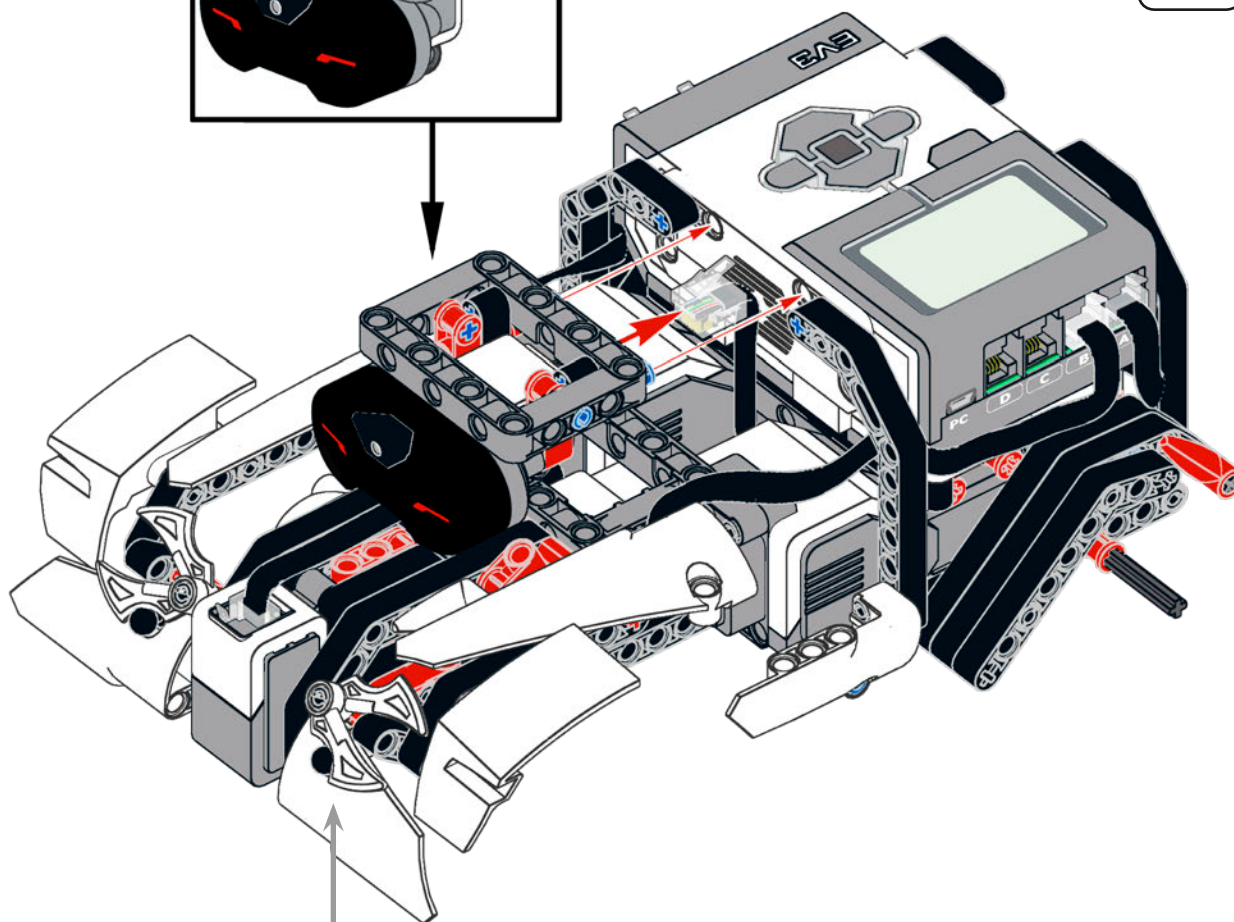
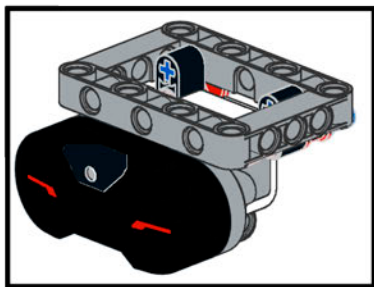


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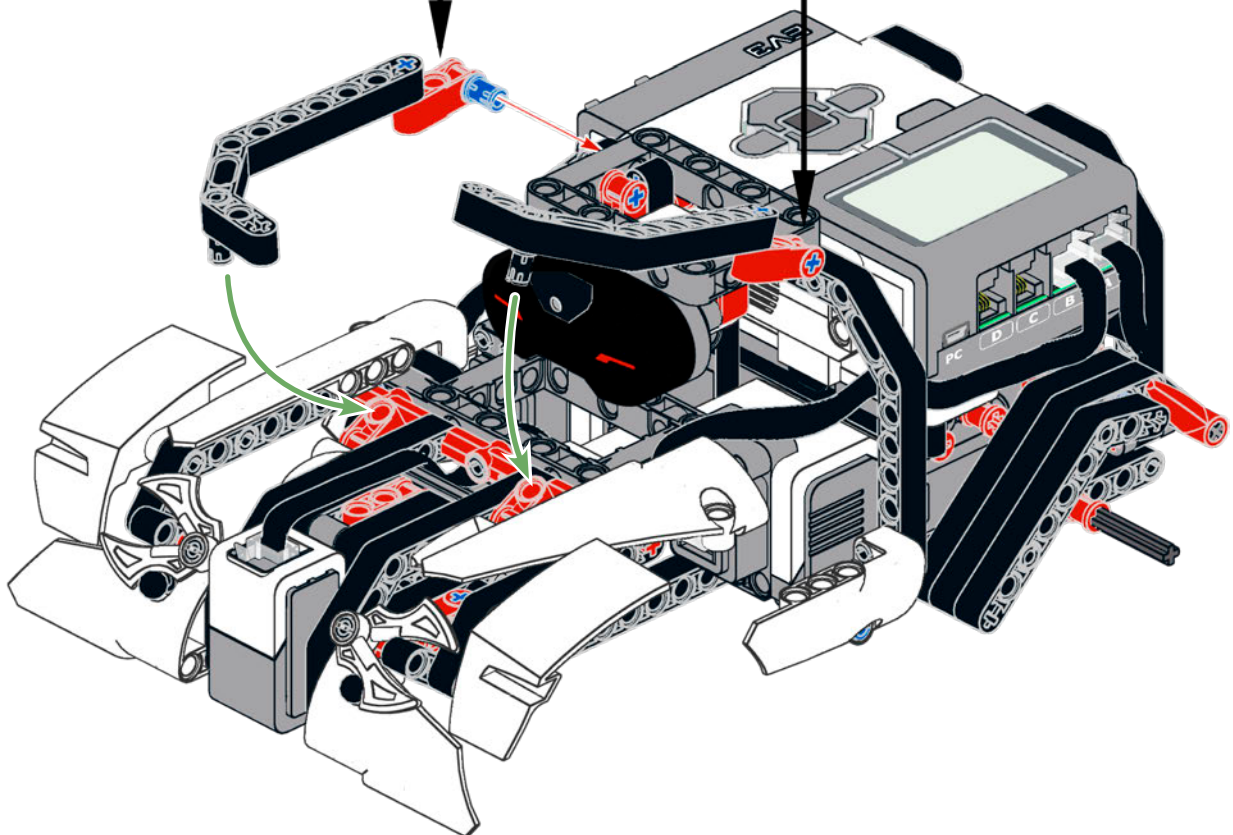
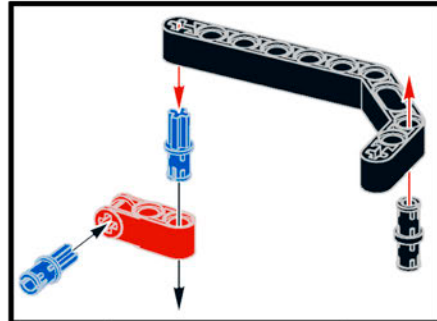
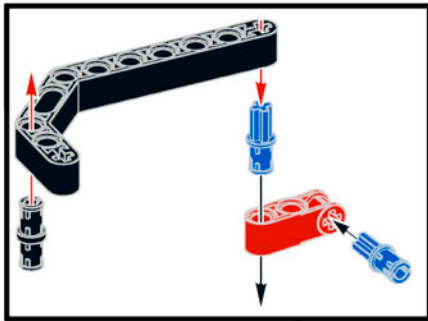
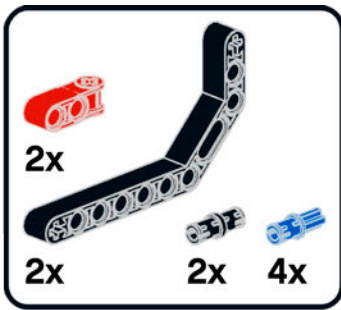
main assembly

29



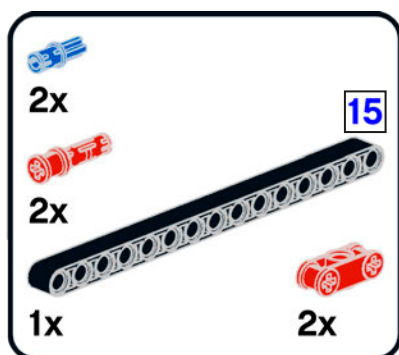
The white blades are ideal for making some evil-looking headlights! The IR Sensor inside the cabin looks like it's the driver of the SUP3RCAR.

30

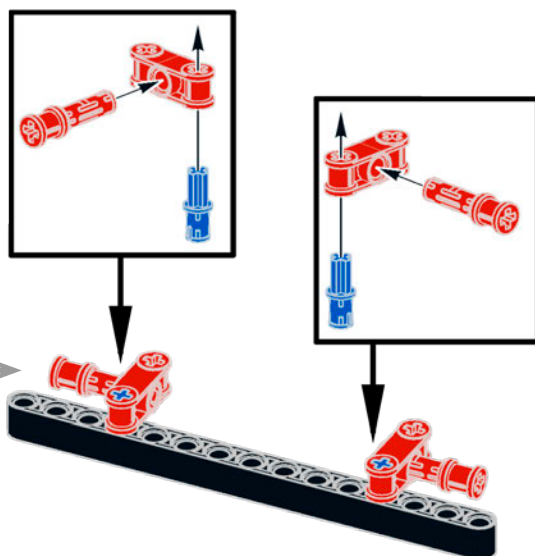


steering assembly

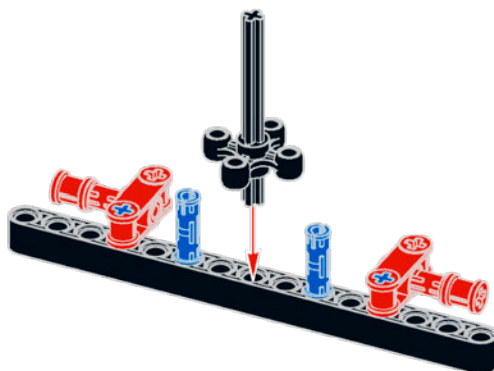
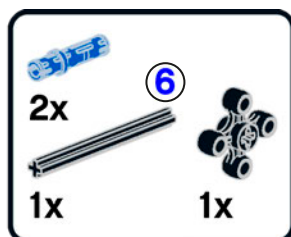
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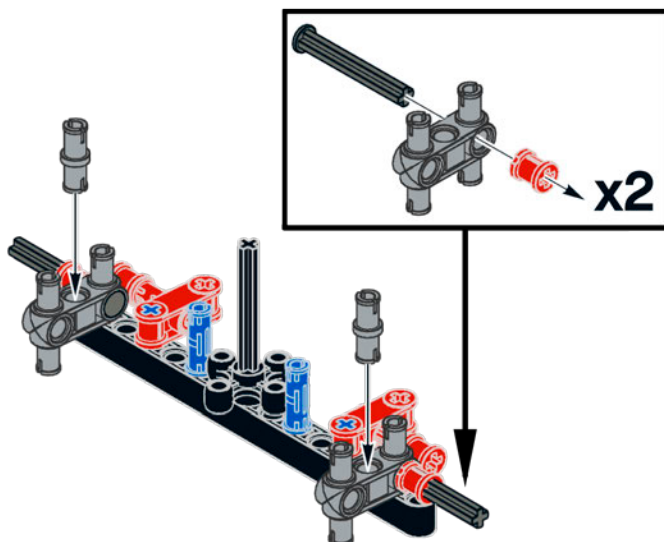
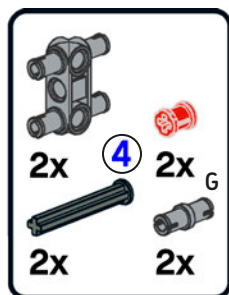
These red pins will lock this assembly to the car frame.



2



3



1:1

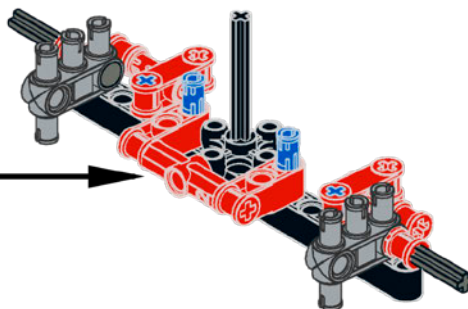
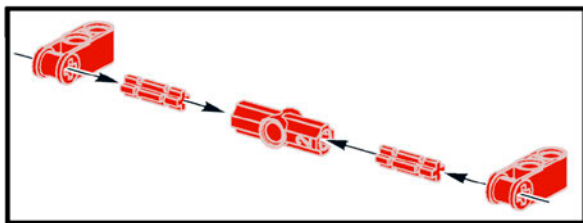
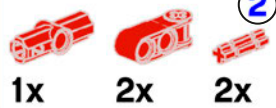


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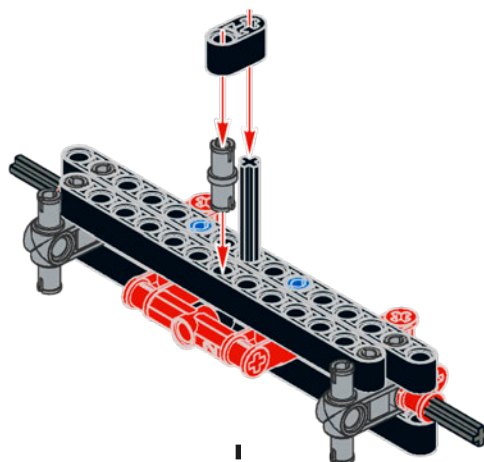
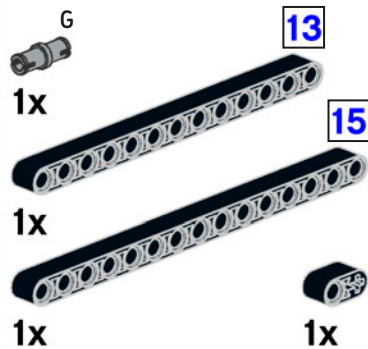


15

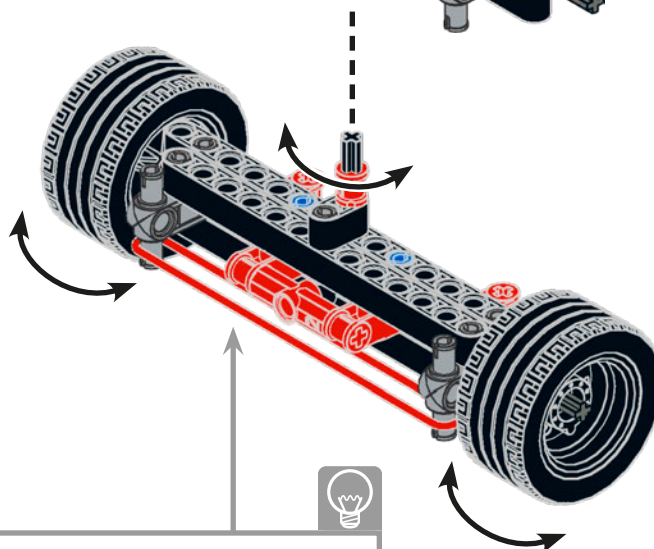
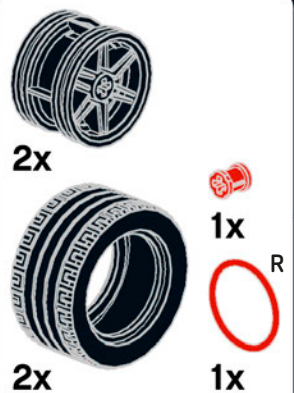
4



5



6



1:1



4

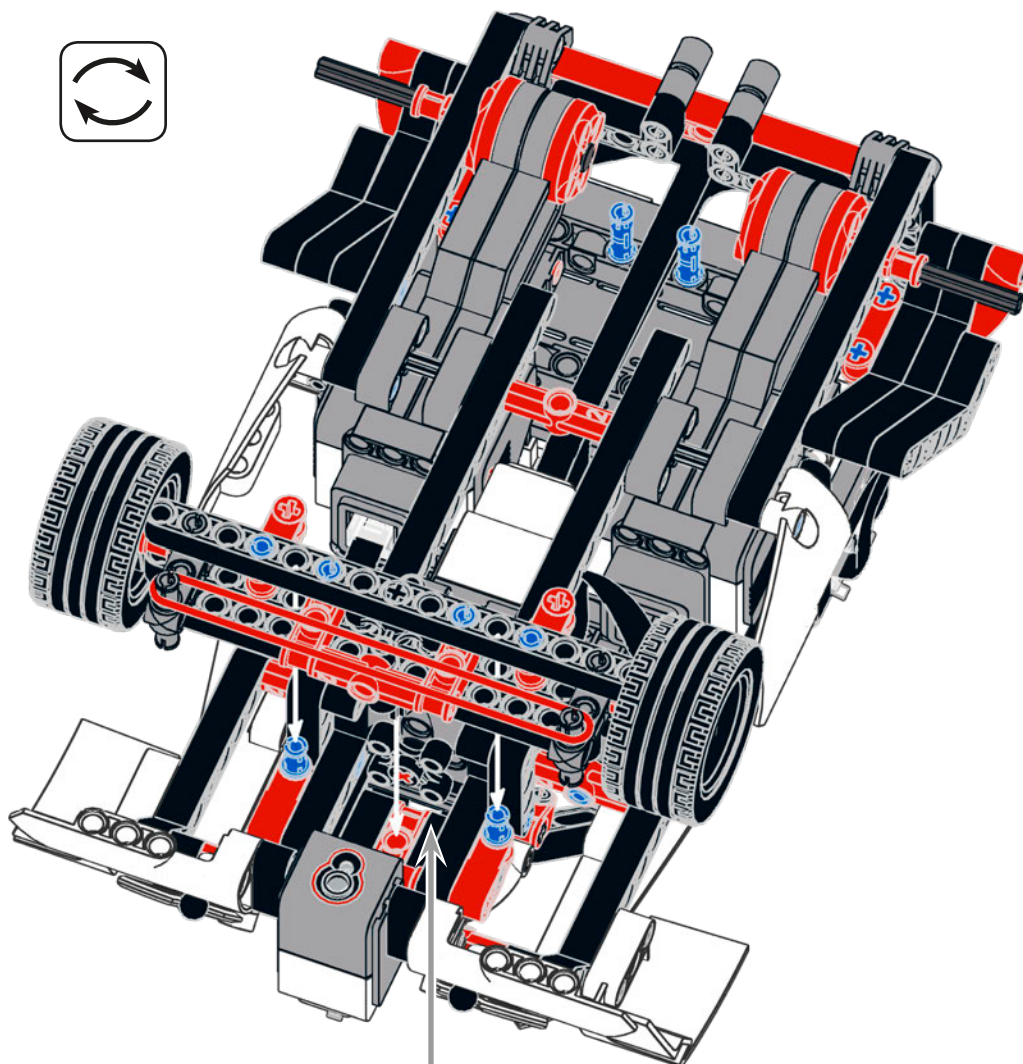


13

This red rubber band keeps the front wheels pointing slightly inward (this is called *positive toe* or *positive tracking*). This helps keep the car going straight. In a real rear-wheel-drive car, increasing positive toe improves straight-line stability while sacrificing turning response a bit. In the case of a LEGO car, positive toe is even more necessary because the steering gearing and linkages are a bit wobbly and would otherwise prevent the SUP3R CAR from driving straight.

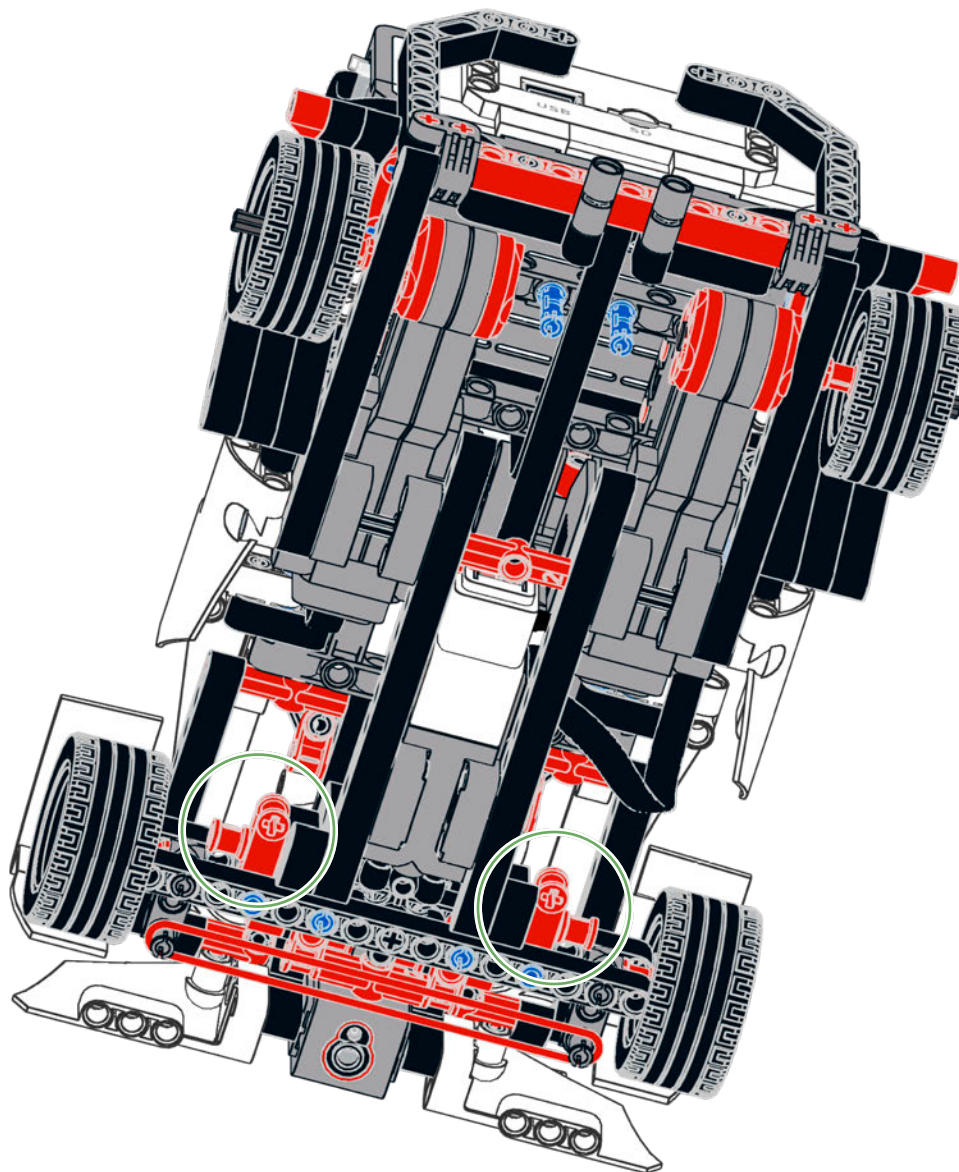
main assembly

31

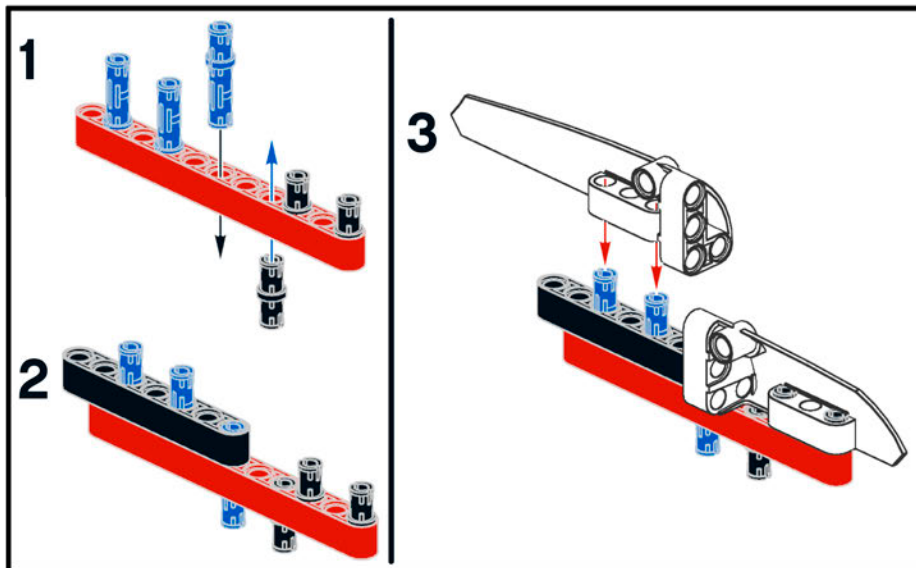
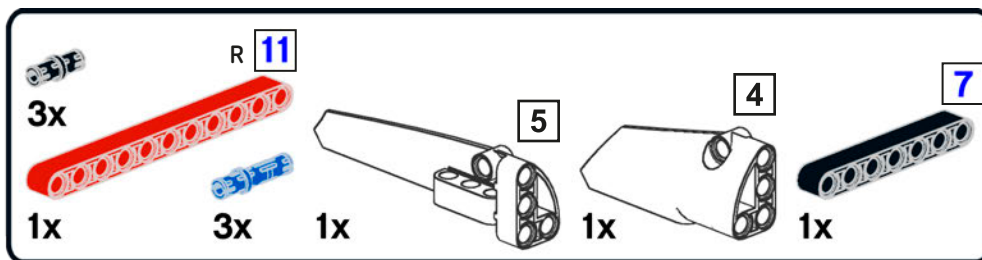


Add the Steering Assembly to the Main Assembly. Notice that the knob wheel attached to the Medium Motor is turned by 45 degrees to correctly engage the other knob wheel of the Steering Assembly. After you've inserted the Steering Assembly, push the two red 3M pins with stop into the car frame to lock the assemblies together.

32



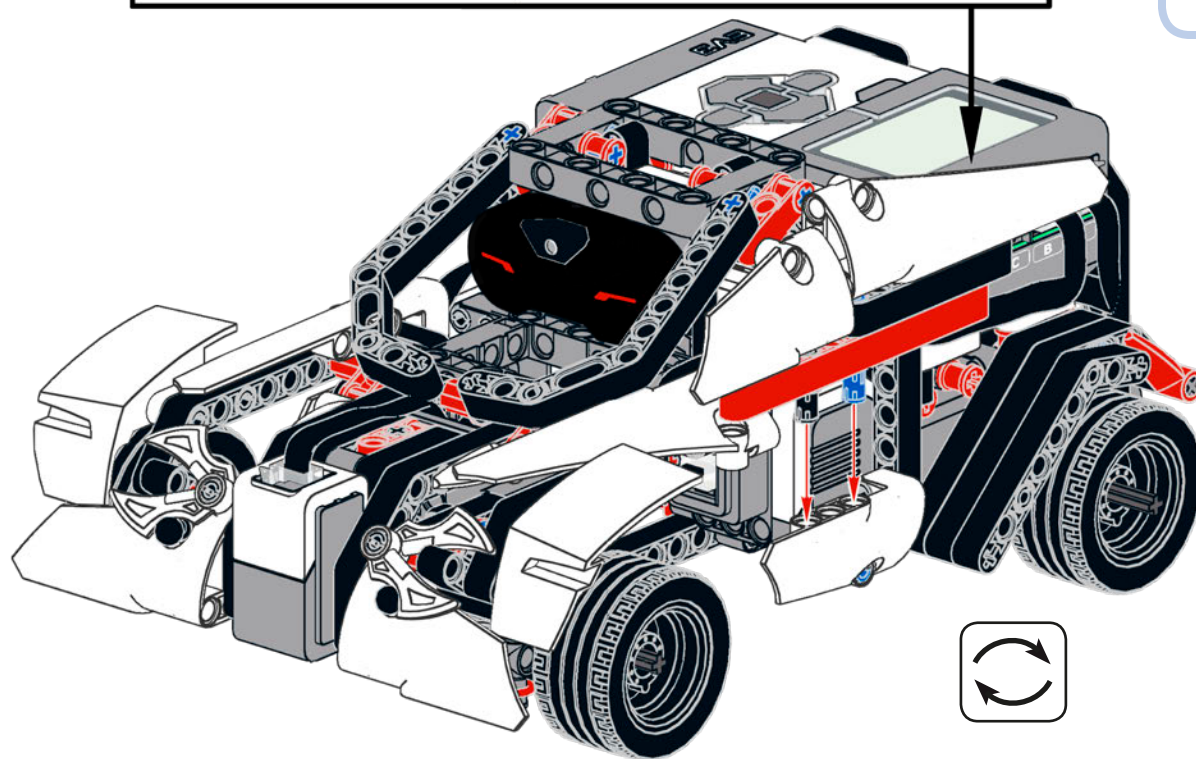
33



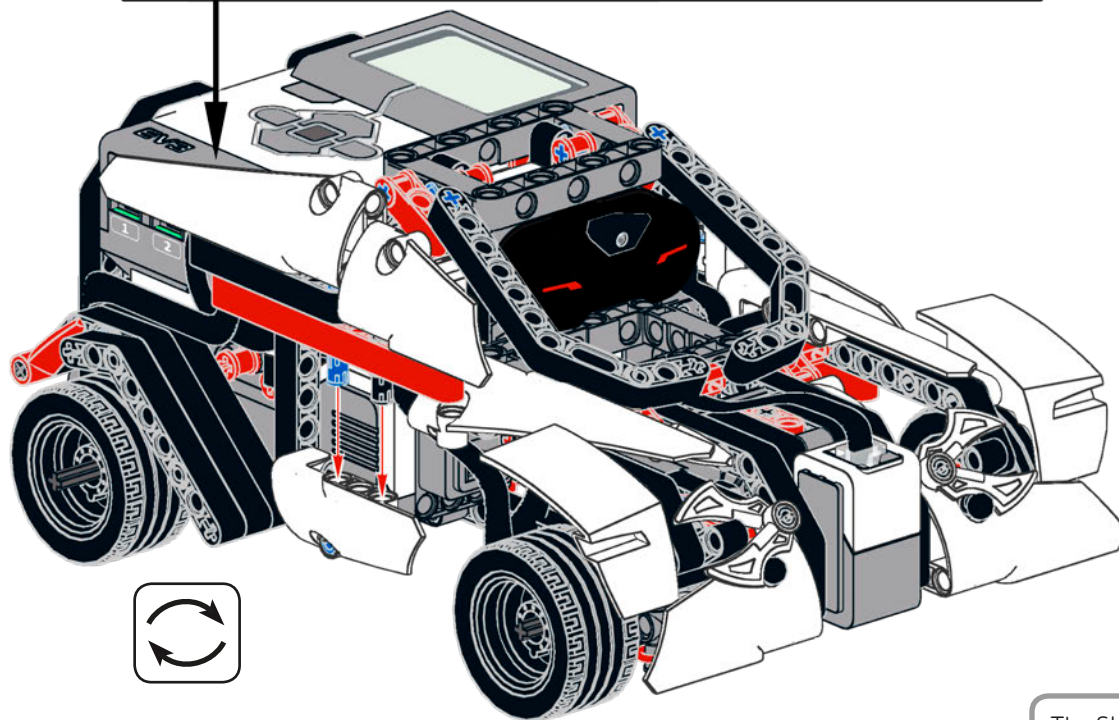
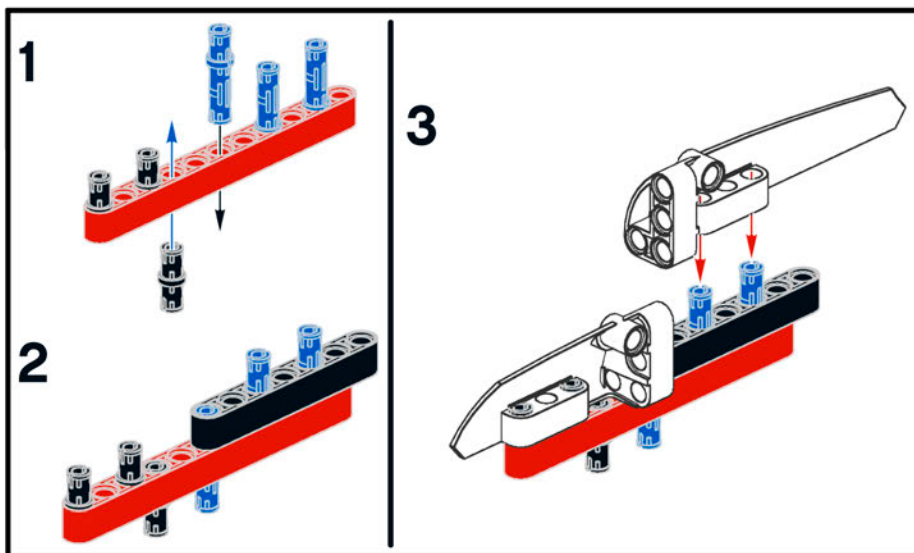
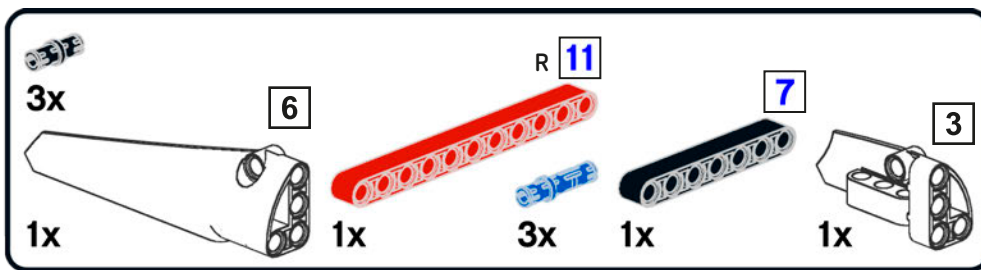
1:1



11



34



1:1

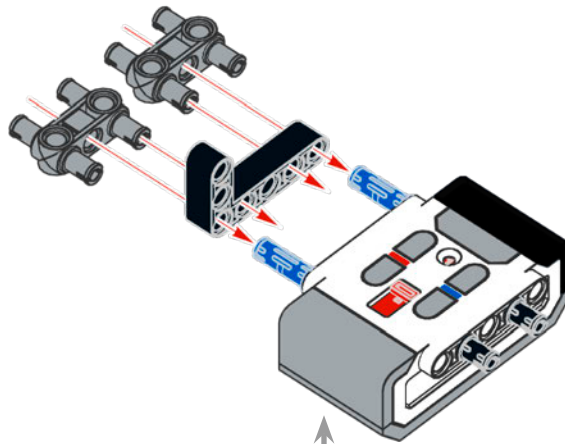
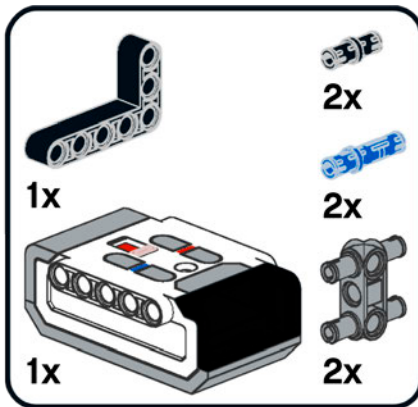


7

The SUP3R CAR is complete.

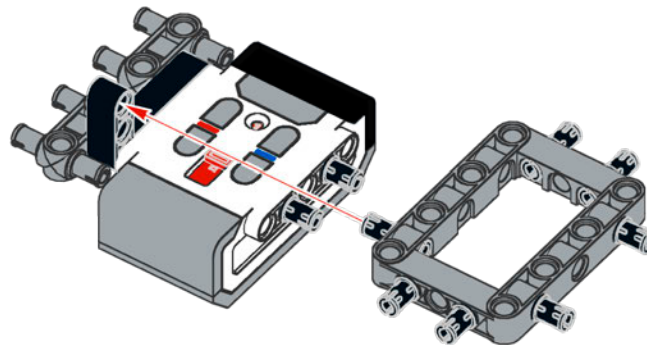
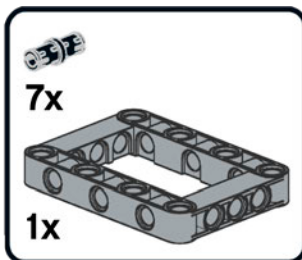
building the R3MOTE

1



The Remote IR Beacon has tiny buttons and would be uncomfortable and counterintuitive to use with a steering car. This ergonomic R3MOTE solves the problem!

2



3

4x



1x



2x

5



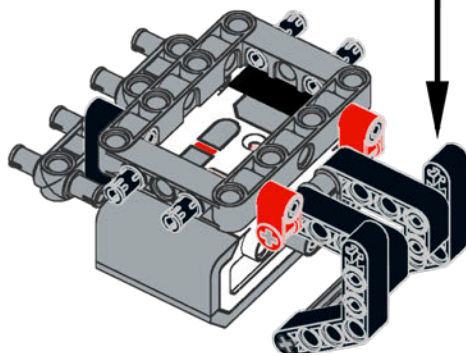
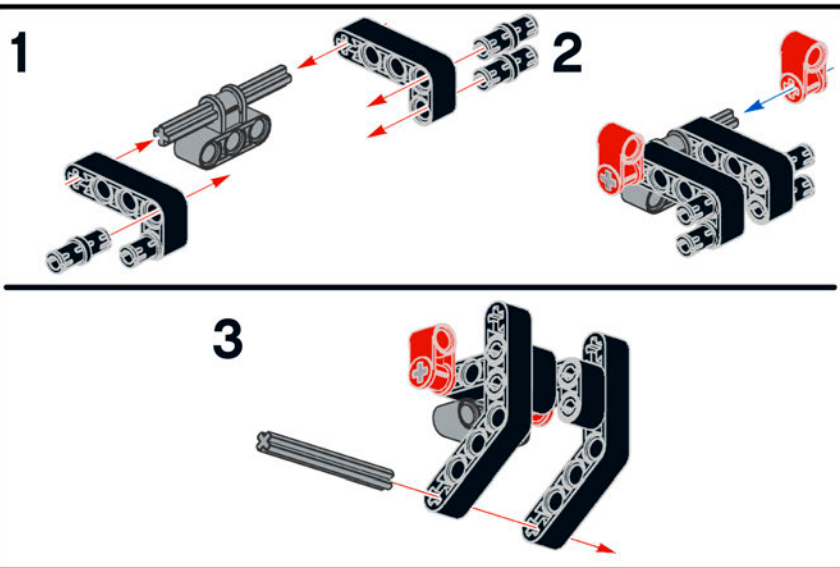
2x



2x



2x

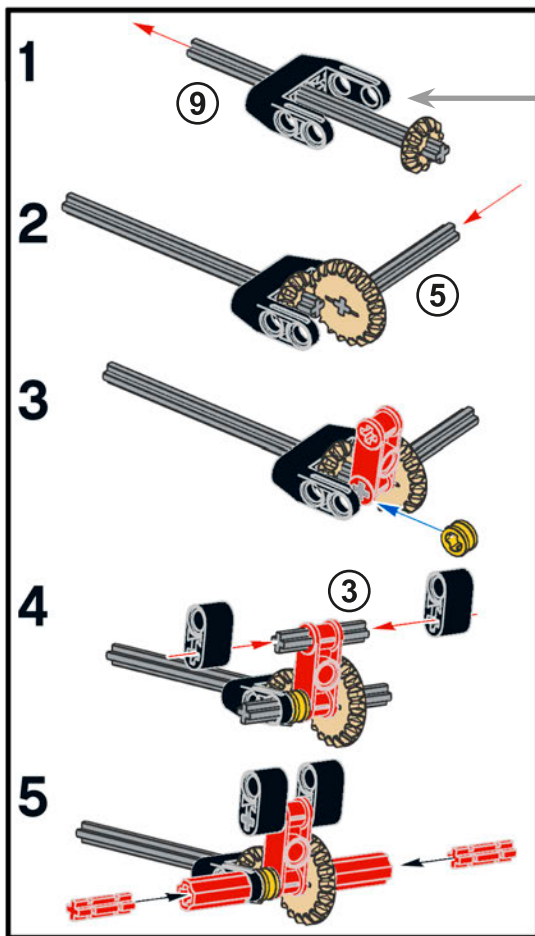
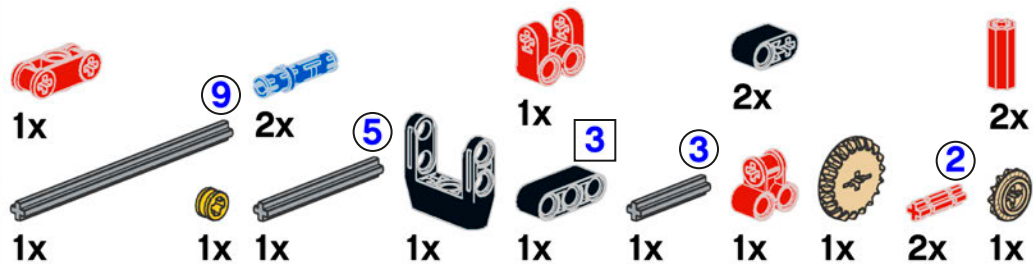


1:1

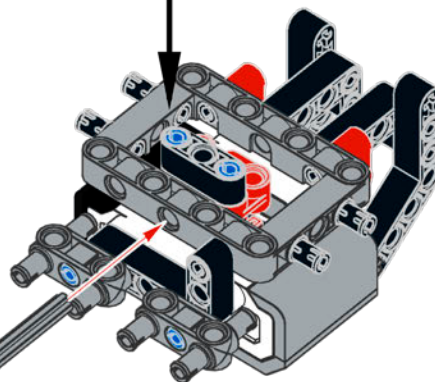
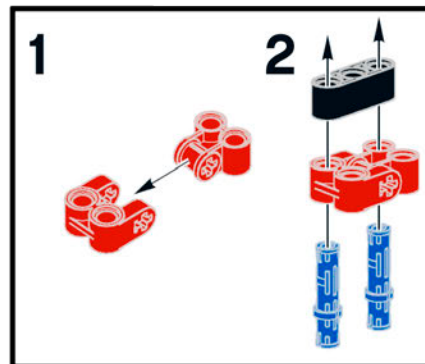


5

4

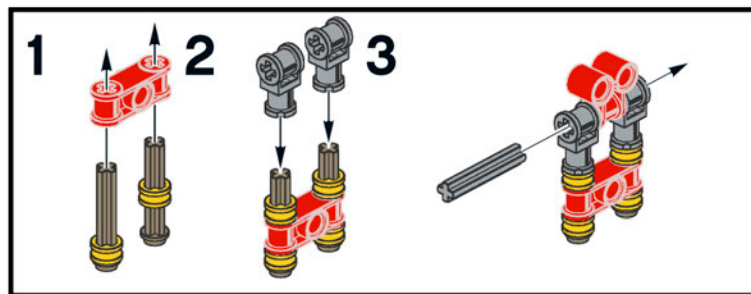
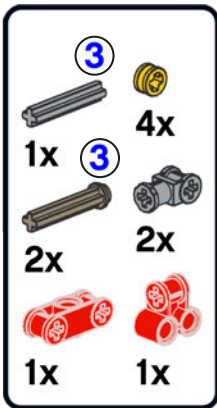


This cross block is designed to hold a 12z gear and a 20z gear coupled at a 90-degree angle.

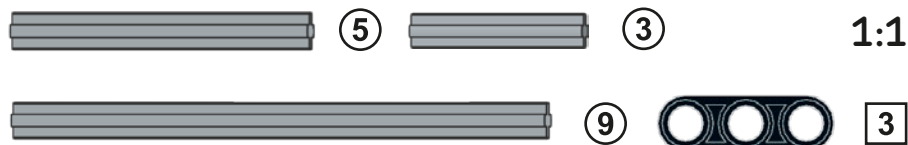
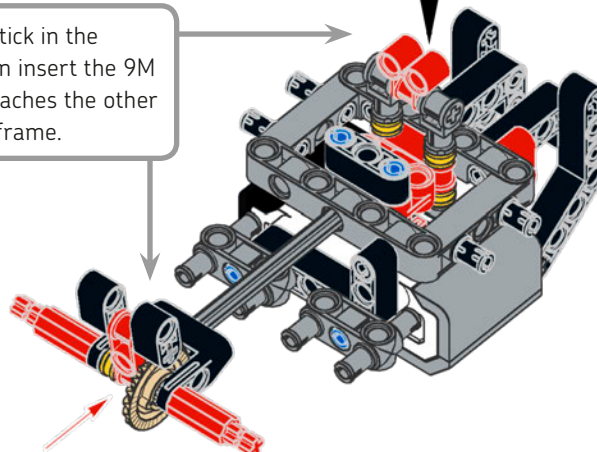


Don't push in the axle completely. You first need to add the other joystick, which you'll do in the next step.

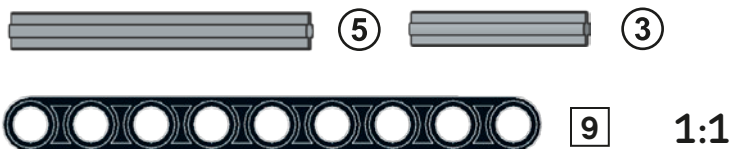
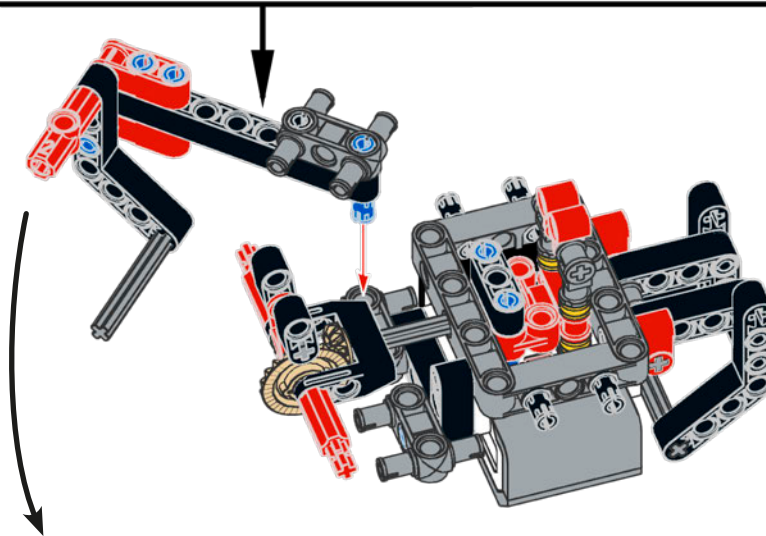
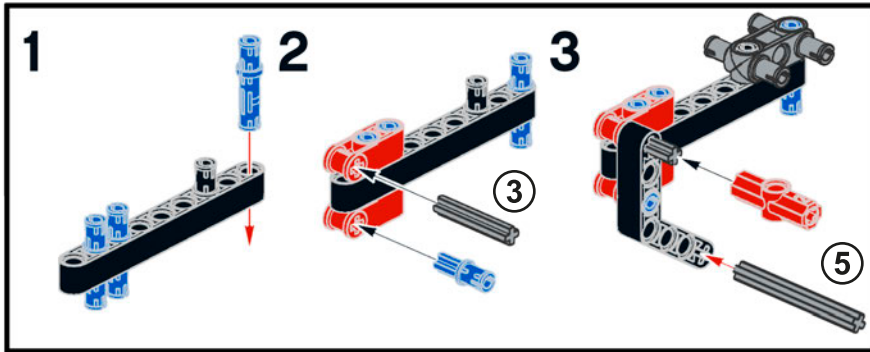
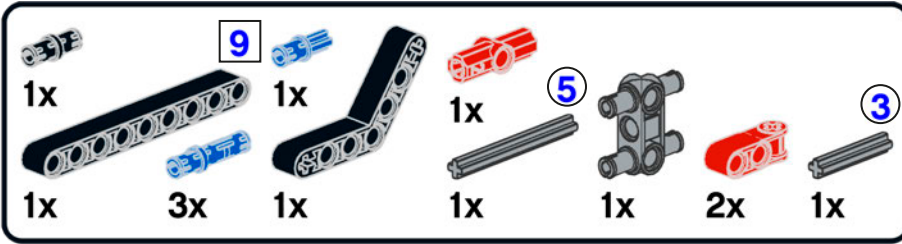
5



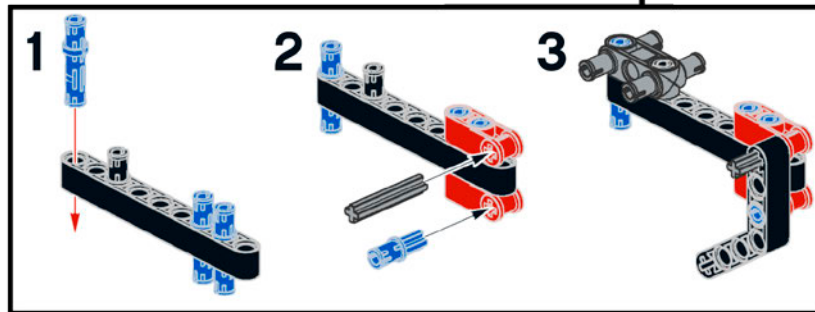
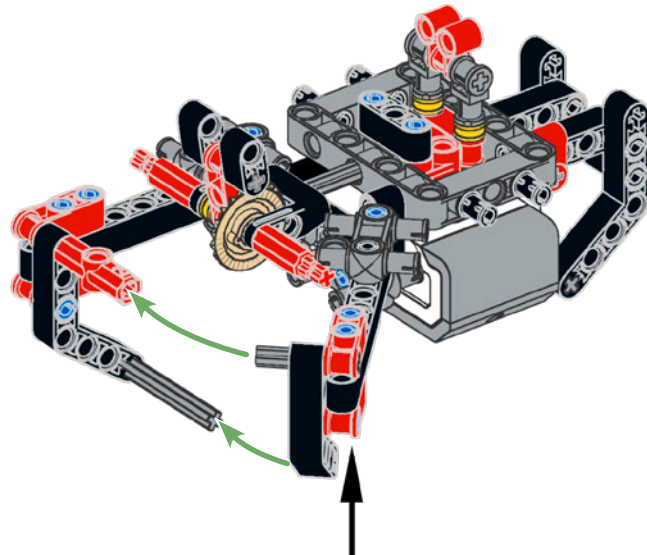
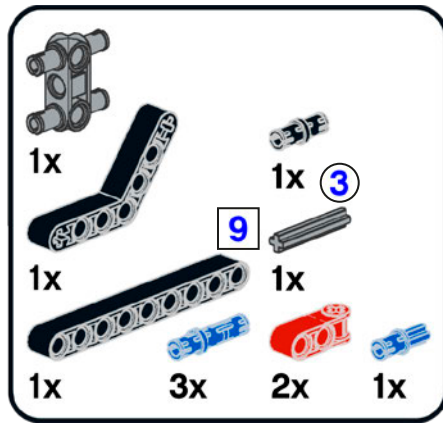
Place the joystick in the O-frame. Then insert the 9M axle until it reaches the other end of the O-frame.



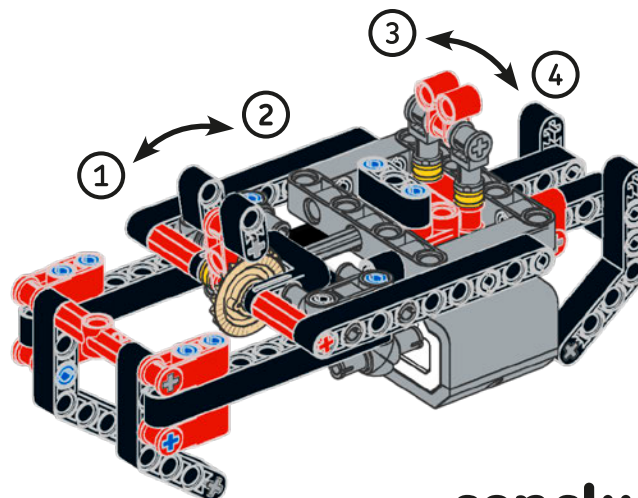
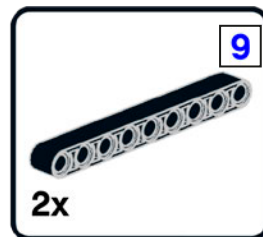
6



7



8



Moving the joysticks, you will press the Remote IR Beacon buttons indicated by the circled numbers.

The R3MOTE is complete.

conclusion

In this chapter, you learned to build the SUP3R CAR and its R3MOTE. The SUP3R CAR is not just a remote-controlled car. It's an autonomous vehicle that can drive itself by following lines on the ground, or it can even follow you if you walk around wearing the Remote IR Beacon! You'll learn how to program it in the next chapter.