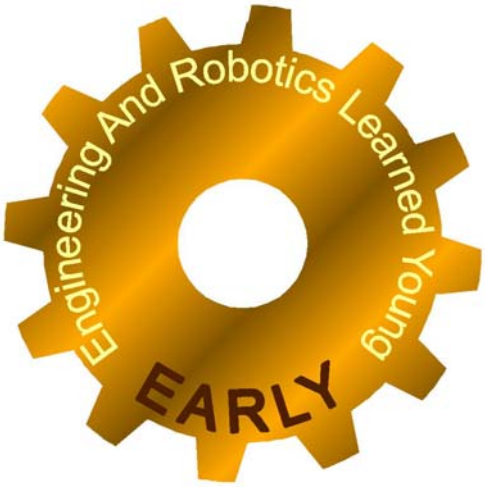
EARLY



A Simple Base for Beginning Teams

The following is a guide to building a simple base for teams to use in EARLY competitions. It was developed for teams that may be struggling with drive and steering concepts, but is available to any EARLY team. This simple and durable design can help all teams get a good start building a robot, and the team will still have to work on design challenges to add any tools to the robot to accomplish the task at hand for each EARLY competition.

Written by Chris Sanborn
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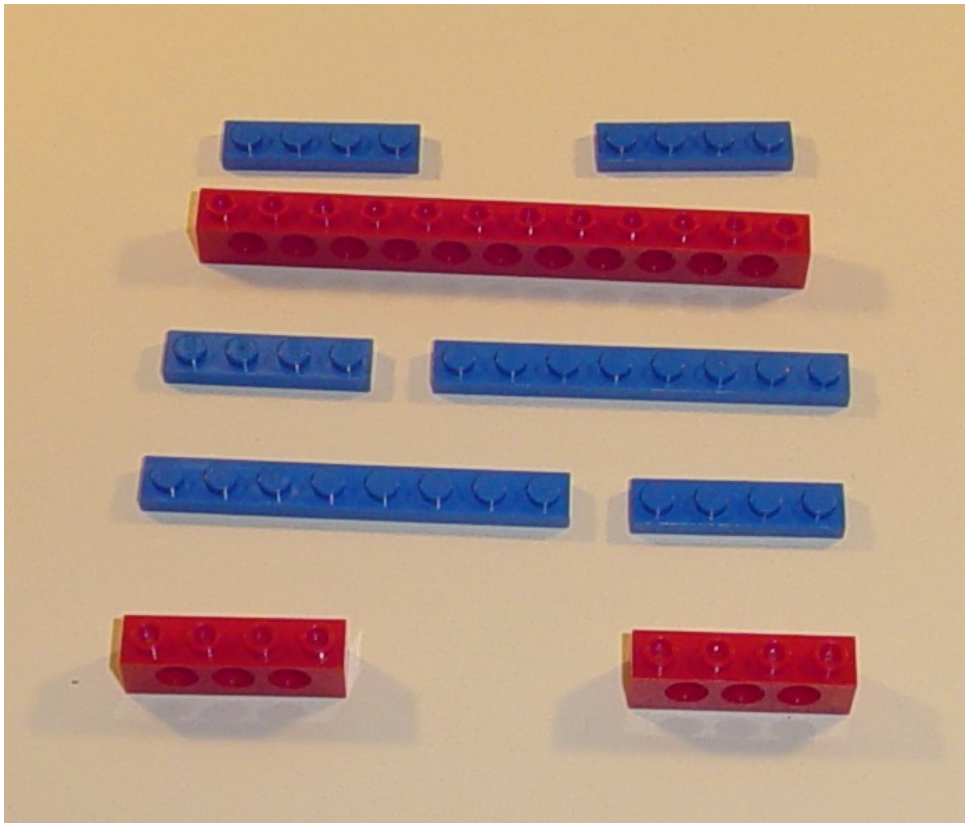
With help from Browning ES

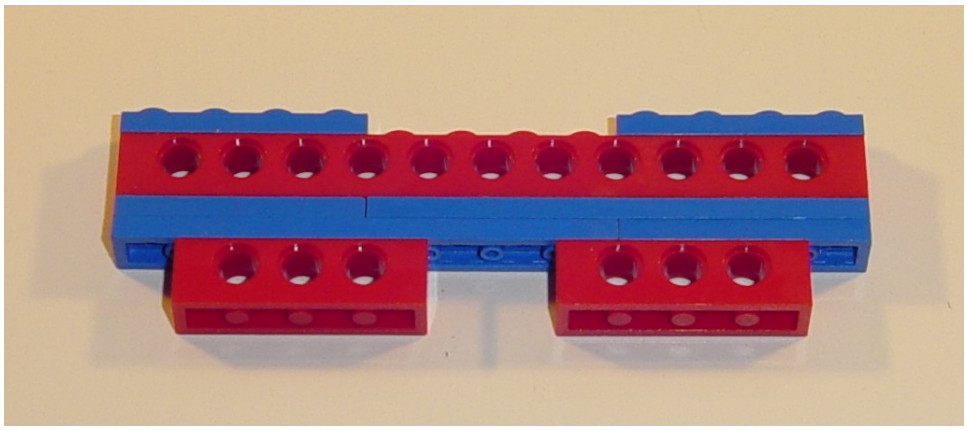
Rev A

Start with these parts:

4 – 1 x 4 blue plates
2 – 1 x 8 blue plates
2 – 1 x 4 red beams with 3 holes
1 – 1 x 12 red beam with 11 holes

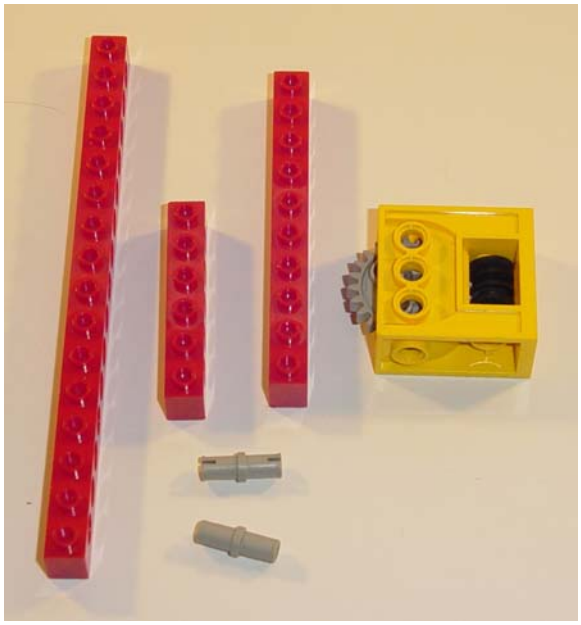


Those parts come together to look like this:

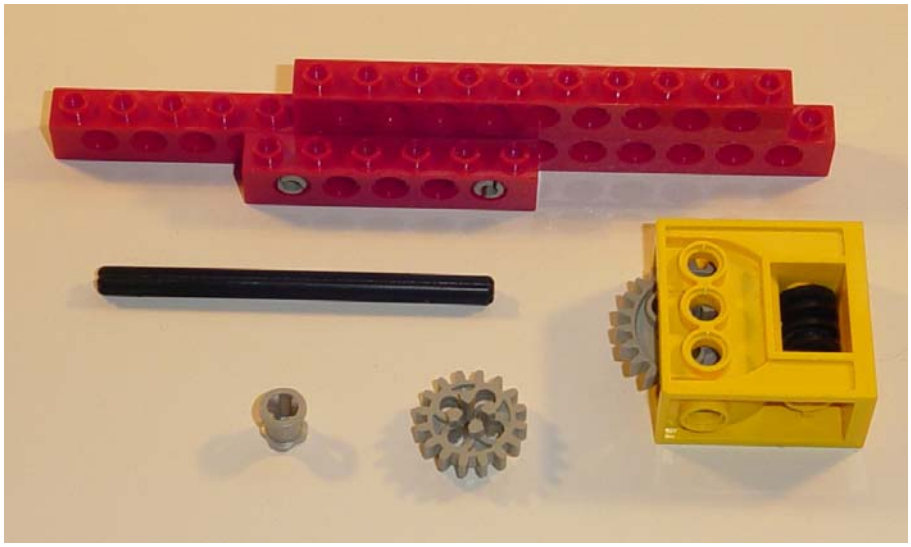


The following steps will be done twice to make 2 sides of the robot base. These parts will be needed for each side:

1 – gear box (without the axles, we are going to add new axles)
1 – 1 x 16 red brick (or beam) with 15 holes
1 – 1 x 10 red brick with 9 holes
1 – 1 x 6 red brick with 5 holes
2 – grey or black pins

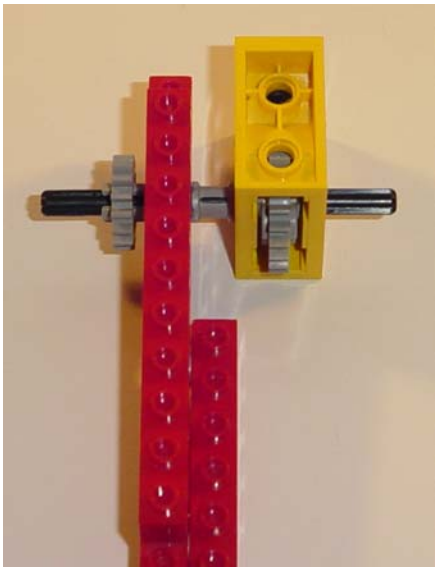


Push the pins into each end of the 1x6 brick, and lock it together with the long 1x16 brick with the first pin going into the 5 hole from the left and place the shorter red brick on top as shown here:



Collect the additional parts shown in the photo above:

1 – 16 tooth gear
1 – axle bushing
1 – 8 units long axle

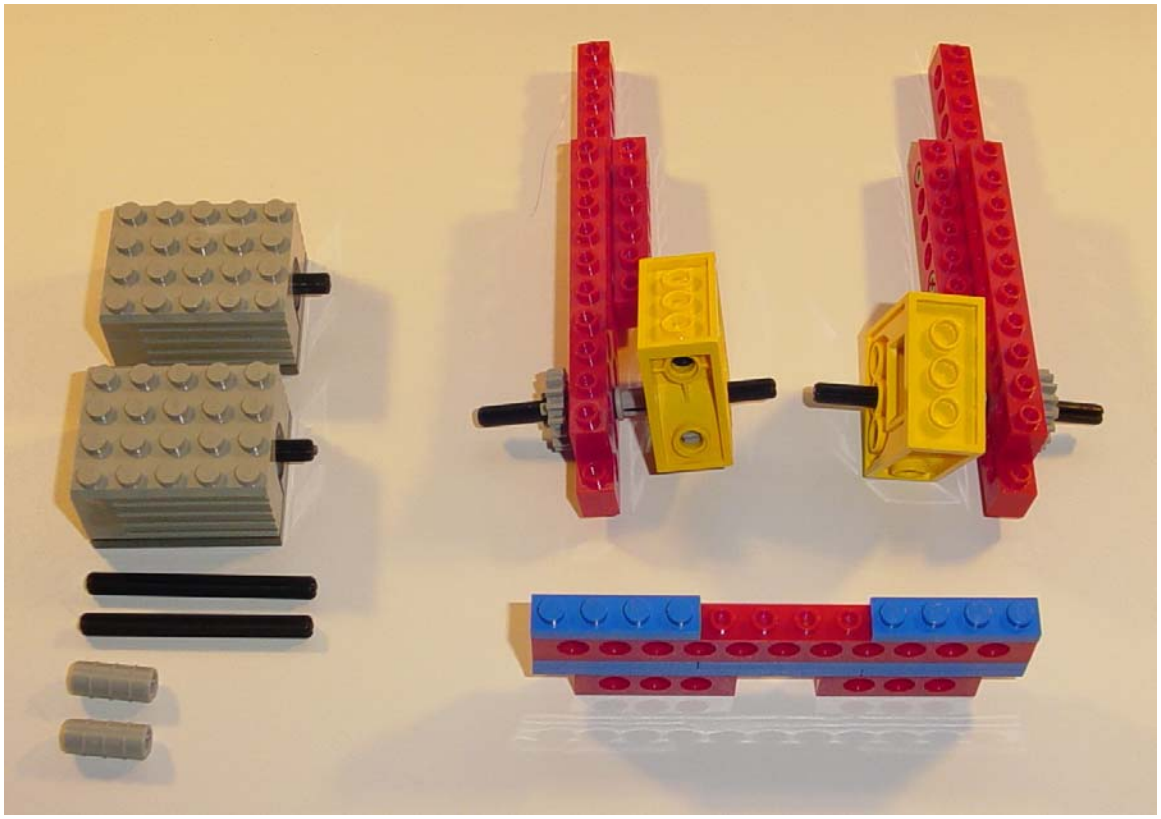


Then assemble those to look like this.
The axle is in the 3rd hole from the end of the 1x16 red beam.

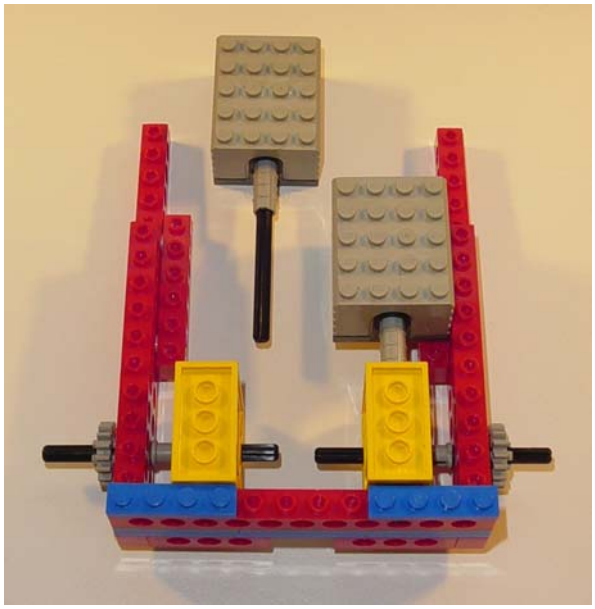
Repeat these last 3 steps to make 2 like parts that are a mirror image of each other. Both parts are shown side by side in the picture below.

Collect the additional parts in the following picture:

2 – motors
2 – axle joiners
2 – 6 units long axles

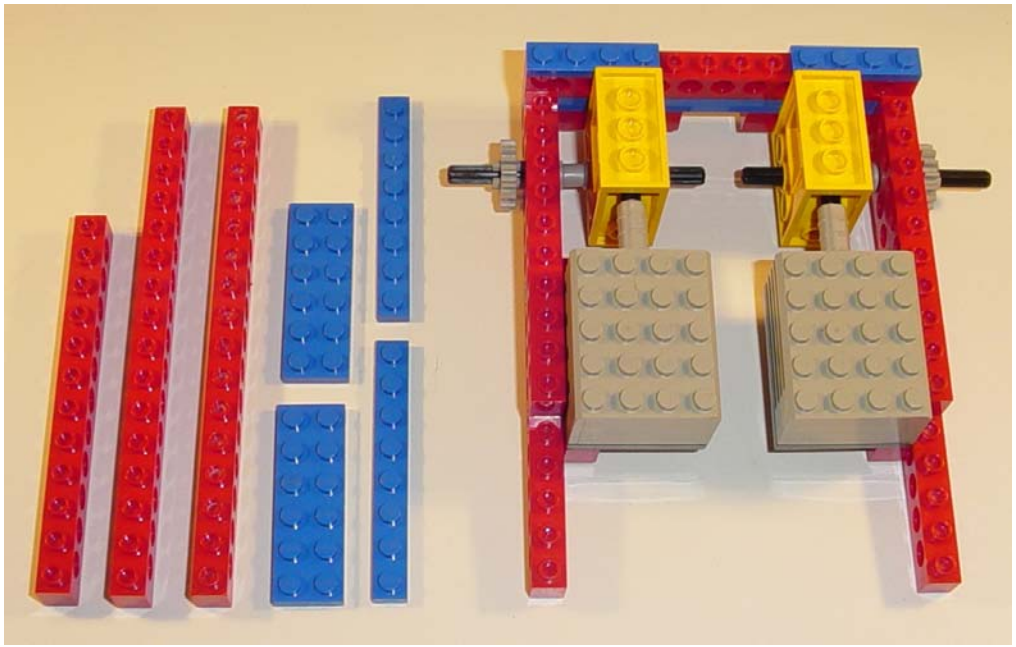


Secure motors to the top of the 1x6 red bricks as shown:
(note that the gear boxes might seem upside down, this is correct)

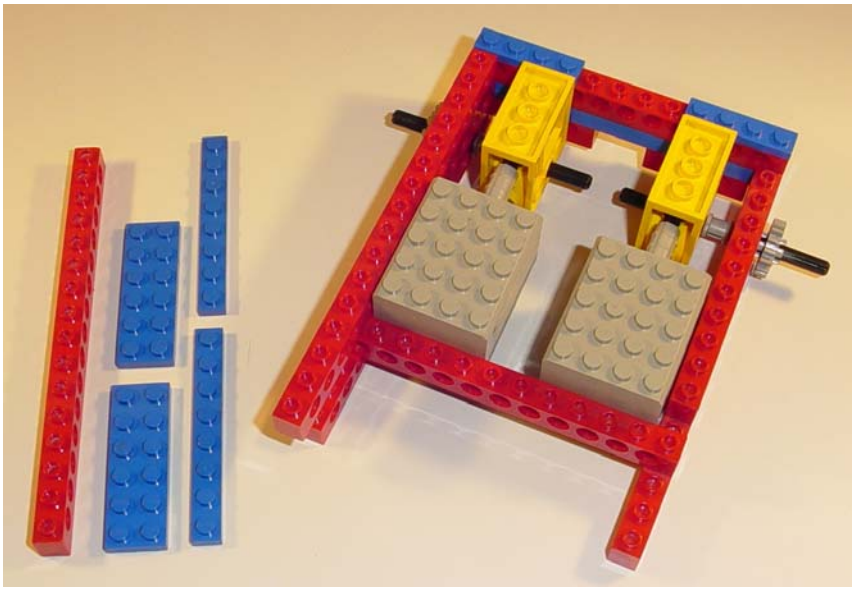


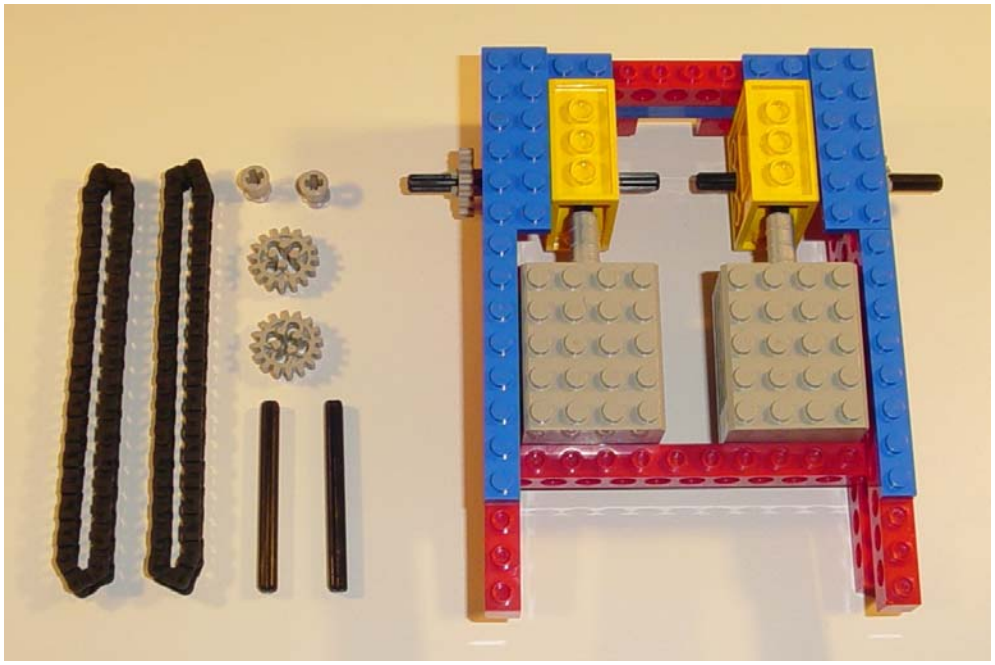
Then collect the following additional parts:

1 – 1 x 12 red brick with 11 holes
2 – 1 x 16 red bricks with 15 holes
2 – 2 x 6 blue plates
2 – 1 x 8 blue plates



The shorter (1x12) red beam goes across just in front of the motors, and the longer beams go along the side. The blue plates then follow along the top to make the structure stronger as shown in the following 2 photos:

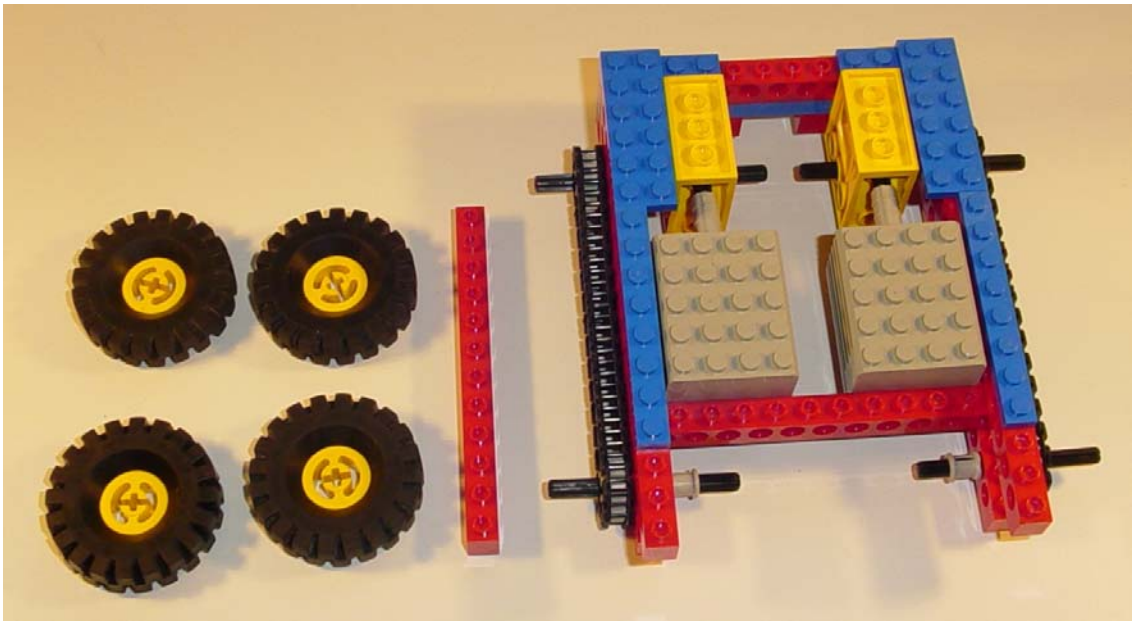




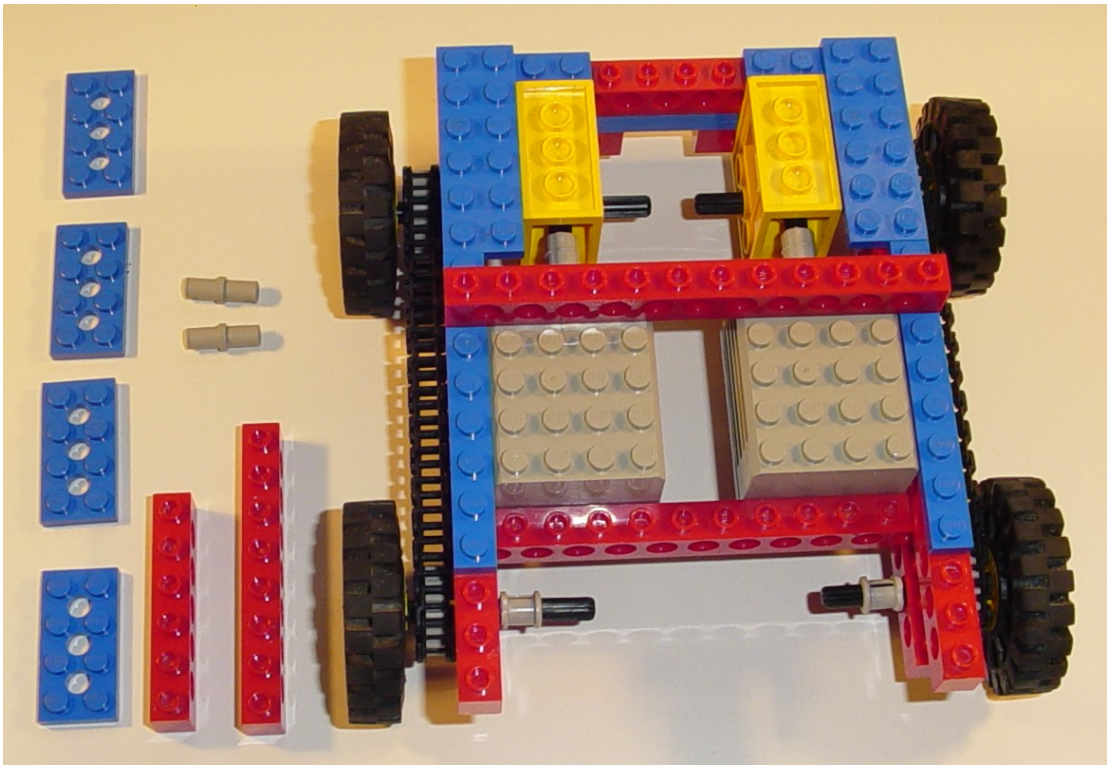
Collect the parts shown above to complete the next step:

- 2 – axle bushings
- 2 – 16 tooth gears
- 2 – 6 units long axles
- 2 – chain lengths with 35 segments each

The front wheel axles are placed one hole back from the end of the lower red beam, and the chain used like this makes the robot 4 wheel drive.



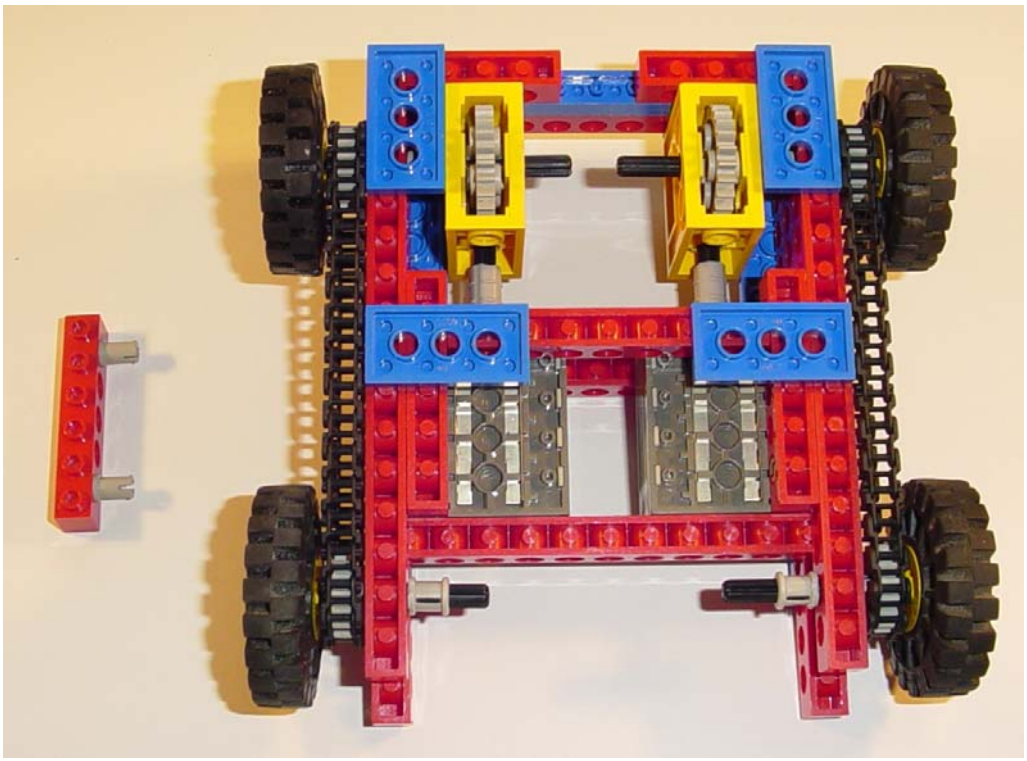
Add 4 large wheels and one 1x12 red beam across the top of the robot as shown here:



Then collect the parts shown in the above picture:

4 – 2 x 4 blue plate
2 – grey or black pins
1 – 1 x 6 red brick
1 – 1 x 8 red brick

As shown below, the 1 x 8 red brick goes across the bottom of the motors, and then the blue plates go over the red bricks as shown. This gives the frame strength.

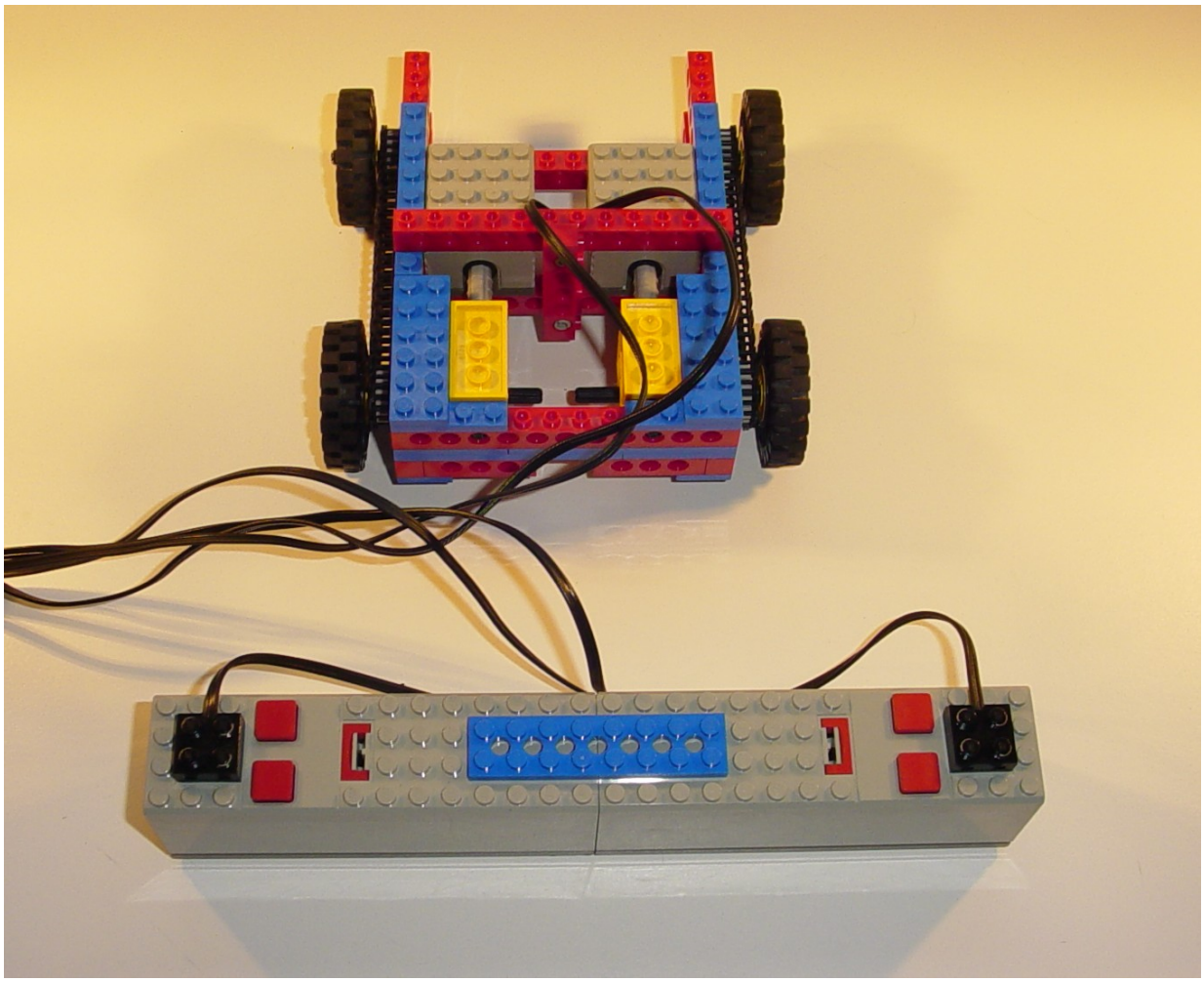


The grey pins go into each end of the shorter red beam, and that beam connects the top and bottom red beams to help hold the motors in place giving the robot additional strength. A photo of the completed robot is on the next page.

The robot has lots of room for the students to add a tool or tools. The tool should be added with as many contact points as possible to make the robot sturdy and the grey and black pins help also to keep Legos together while the robot is working its task.

Now that we have our robot built, let's review some tips on how to best control the robot. Students should be encouraged to check the wires and test the controller each time a new person drives the robot, even during practice.

The following photo illustrates how you might set up the controller, and use each of the buttons to control the right and left side of the base. The right buttons control the right wheels and the left buttons control the left wheels. Pressing both forward buttons makes the robot go forward, and both rear buttons makes it go backwards. Steering the robot has 2 options. You can use one wheel at a time to turn slowly, or use both wheels turning in opposite directions to turn in a quick circle. Also caution that the buttons will stick down when pressed firmly, this will leave the robot in motion unless the student corrects by taping the opposite button.



Once your tool is added get lots of practice and have fun. Good Luck to all teams and hope to see you at the competition.