

## Constructing a Simple Differential Drive Robot

These instructions work for both the **NXT Educational Kit** (in the *plastic tub*) as well as the regular NXT kit (in the *“blue fishing tackle” case*). The finished robot is shown on the right.



### Step 1: Constructing the Third Wheel (unpowered)



The “third wheel is unpowered and acts as a kind of coaster to keep the differential robot stable. We will construct this first. Find the following pieces in your box then put them together as shown. Leave one of the three bigger bushing aside; you will use it to fasten the coaster to its supporting structure, which we need to build next.



Find the following pieces and create a rectangular structure like this:



Now add the wheel with the axle to this supporting structure, secure it with the bushing you still have left, and attach the entire structure to the underside of the brick with the motor ports.



### Step 2: Attaching a Powered Wheel

Next we will add the motors with wheels to provide power to our robot. Here is how you put together the motor’s supporting structure and attach it to the brick on the right side (you will use the motor in the next step, not right now):



Next, find an axle, insert it into the business end of the motor, then stick the motor onto the supporting structure you created on the brick. Make sure it faces the right way and is attached along the “ridge” of the motor. Finally, add a thin bushing as a spacer, then add the wheel to the axle.



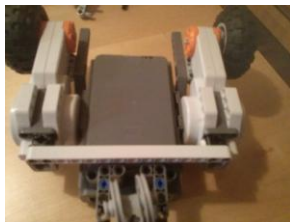
### Step 3: Attaching the second Powered Wheel



To build and attach the left wheel, follow the previous construction plan but treat it as mirror image. In other words, you want to reverse “left” and “right” to make sure the powered wheel will fit properly on the left side of the brick. Once you attach the left wheel, your robot should look like this (it is almost finished).

### Step 4: Adding Stabilizer Bars

The robot is basically finished, but you will find that the motors are not that tight and can move



and twist a little. That is not desirable, so you add one stabilizer bar (use the longest beam in your box together with two double pins) at the back of the motors across the bottom of the brick, and another one with a smaller beam and two corner connectors in front. We will later attach sensors to this stabilizer.



### Step 5: Connect the Cables



Finally, take a pair of medium or small cables and connect one motor to port A, the other to port C. The finished robot should look something like the picture on the left.

Next we need to learn how to program our new robot. Later on, we will attach various sensors to the basic frame, but for now this will do nicely.