



# Activity 1 – Building a Basic Robot

## Vocabulary

- beam
- bracket
- bronze bushing
- connector
- continuous rotation servo
- Quick Rivet
- Quick Rivet Peg
- setscrew
- standard servo
- thumbscrew
- wing nut



## Materials

- TETRIX PRIME Starter Set
- Painter's tape
- Stopwatch
- "Building a Basic Robot Data Sheet"

## Objective

Learn how to build the Wheelie Bot using the *Builder's Guide*.

## Procedure

1. Become familiar with the starter set.
  - A. Examine the metal and plastic parts.
  - B. Identify and inventory each element within the PRIME set using the top card from the set.
  - C. Think critically about why the parts are separated into storage bins and why this is a necessary step.
2. Follow the instructions in the *Builder's Guide* to assemble the Wheelie Bot robot. The Wheelie Bot is a three-wheeled robot with one continuous rotation servo driving a wheel for propulsion and one standard servo providing the steering control.
3. After you have successfully assembled your robot, you need to connect the servos to the receiver. The drive servo should be plugged into channel 3 and the steering servo plugged into channel 1. This will enable you to move the joystick forward to move forward and sideways to turn.
4. If the servomotors do not move the robot in the same direction as the joystick movement, use the NOR/REV switches to change the direction of rotation.
5. Become familiar with the operation of the robot by operating the controls and driving it.

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## Set Up Your Maze

1. Locate your classroom maze or set up the maze (if allowed by the instructor) by using an 8' x 8' area on the floor. Using painter's tape, create an outside border, at least two obstacles, a starting area, and an ending area. If your team's robot goes outside the lines, it is disqualified.
2. Practice driving the robot through the maze. After you have become familiar with the control system, record how much time it takes to complete the maze. Complete the maze three times and determine the mean time.
3. Change the controller setup by changing the steering servo to channel 4. This change will enable you to drive the robot using the right joystick to control forward and backward movement and the left joystick to control turning.
4. Practice driving the robot through the maze using the new driving configuration. After you have become familiar with the control system, record how much time it takes to complete the maze. Complete the maze three times and determine the mean time.
5. Using the mean time, write a paragraph comparing your impressions of each driving method and supporting the one you preferred.
6. If instructed to do so, disassemble the robot and return the TETRIX PRIME parts to the storage container. You will use the same robot for the next activity. If you are not disassembling the robot, store the robot carefully in the location provided by your instructor.

## Troubleshooting

If the robot does not function correctly, you should:

- Make sure the batteries in the controller are fresh. A solid green light should be displayed on the controller.
- Make sure there is a solid red light on the receiver.
- Make sure the controller and receiver have been connected to each other. Turn off the controller, press the connect button on the receiver until the red light flashes quickly, turn on the controller, and press and hold the connect button until the red light on the receiver stops flashing.
- Make sure all wheels turn freely. Loosen the setscrews and adjust clearance so the wheels turn freely.
- Make sure the battery and servos are correctly connected. The black wire on each connector should be located at the outer end of the receiver.