

Build a Tower that can support a golf ball

- Using only what is in the MINDSTORMS set (NOT using the EV3 brick, cabling, and tires), build a tower that will support a golf ball at the top. Make the tower as tall as you can.

Programming Robot to move

- Program your robot to travel along the rectangle on the floor.

Using a gripper attachment on Robot

1. Build the gripper attachment in the instructions that start on page 13.
2. Attach the gripper and program the robot to travel to a location, pick up an empty water bottle, and move the water bottle to the zone to complete the task. Robot must release the bottle and move out of the zone.

Build Cargo Delivery Attachment

1. Build the cargo delivery attachment in the instructions that start on page 16.
2. Attach the cargo delivery attachment and program the robot to move the cargo to the zone and drop it.

Using Ultrasonic Sensor and Sounds

1. Program your EV3 robot to use the ultrasonic sensor to stop moving a specific distance (15 cm) before a wall and trigger a sound
2. Details:
 1. When robot reaches 30 cm before the wall, have a warning sound trigger, and make the robot slow way down
 2. When robot reaches 15 cm before the wall, stop the robot and program it to say “Good Job!” and make a face display on the brick’s screen.

Using Color Sensor for Maze

- Program your EV3 robot to use the color sensor to navigate the maze

Using Touch Sensor and Sounds

1. Program your EV3 robot to use the touch sensor to stop and turn around when it hits a surface that triggers the touch sensor
2. Make your robot drive between two walls. When the robot reaches the wall, use the touch sensor trigger to have it turn around and drive the other way. Add a sound when the touch sensor is pressed if you like.
3. The program should stop after the touch sensor has been triggered 6 times

Snap Circuit Bingo

- Complete a minimum of four circuits to complete a “BINGO” on your card (BINGO is all complete either across, down, or diagonal)

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FIRST LEGO LEAGUE CHALLENGES

- SPACE TRAVEL MISSION

The robot needs to send payload rockets (carts) rolling down the space travel ramp. The first cart (vehicle payload) is pre-set and ready to go, but the robot needs to load the other two from base.

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FIRST LEGO LEAGUE CHALLENGES

- EXTRACTION MISSION

The robot needs to get all the core samples out of the core site model.
The add-on mission is to carry/push one or more samples back to base.

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FIRST LEGO LEAGUE CHALLENGES

- 3D PRINTING MISSION

The robot needs to get a regolith core sample and place it in the 3D printer, which causes the 2 x 4 brick to pop out.

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FIRST LEGO LEAGUE CHALLENGES

- AEROBIC EXERCISE MISSION

The robot needs to repeatedly move one or both of the exercise machine's handle assemblies to make the pointer advance.

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FIRST LEGO LEAGUE CHALLENGES

- STRENGTH EXERCISE MISSION

The robot needs to lift the strength bar so that the tooth strip's 4th hole comes at least partly into view.

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FIRST LEGO LEAGUE CHALLENGES

- FOOD PRODUCTION MISSION

The robot needs to move the push bar (the right distance, at the right speed) so that the gray weight is dropped after green, but before tan.