

Things That Go Bump - RCX

Suggested Time

60 minutes

Age

8 - 13

Challenge

In this activity, design and construct an RCX car and program it to travel in a straight line until it hits a wall. Once it hits the wall, program the car to reverse direction and continue until it hits another wall at which point it stops.

***Topics***

Touch Sensors

Subjects

Engineering & Technology

Programming Themes

Motor Forward, Motor Backward, Wait for Touch

Related Math & Science Concepts

- Gears
- Wheels and Axles
- Acceleration
- Velocity

Materials

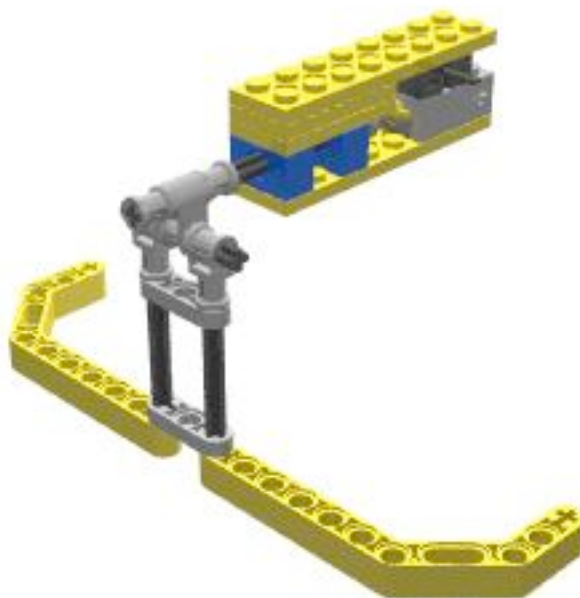
- RCX Car
- Assortment of LEGO pieces
- Tape Measure
- 2 Parallel Walls (can be built with LEGO bricks)

***Building
Instructions***

1. Take an RCX and attach a 4-wheel base and a motor.



2. Build two bumpers to control the touch sensors.



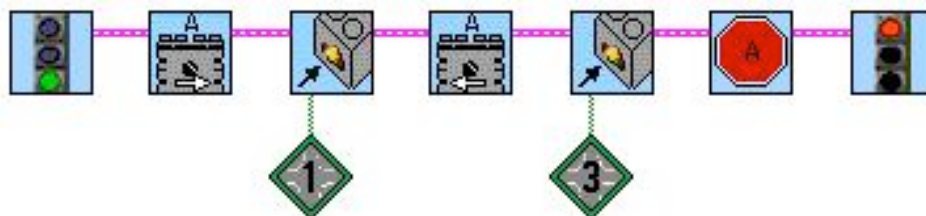
3. Attach the bumpers to the car and wire the motor to an output on the RCX.



Hint: Since the surface area of the touch sensor is small, build bumpers to increase its sensitivity (larger surface area).

Programming Instructions

1. Using ROBOTLAB Inventor 1, program the car to drive between two walls, reversing its direction when it hits a wall.



In Action

Run the car between two walls, in a hallway or between two constructed walls. The car should hit one wall, reverse into the other, and stop moving.

Related Activities

- Sturdy Car: The Drop Test
- Bulldozer
- Platform 9 $\frac{3}{4}$
- Fan-tastic

***Building and
Programming
References***

- Building With Bricks
- Building With Plates
- Building With Beams
- Axle Uses
- Connector Pegs and Bushings
- Hubs and Tires
- The RCX
- RCX Motors and Wires
- RCX Touch Sensors

Knowledge Base

- My car drives, but not straight.
- My car is driving backward.
- My car spins in place. Why won't it move?
- My car falls or tips backward when I drive.
- My motors/wheels fall off when I drive my car.
- Can you write a program to make a car drive forward until the touch sensor has been pressed 4 times?
- Is it possible to load a program on 2 different RCXs from the same .vi?

***Classroom
Management*****Procedure:**

1. Students can either start with a pre-built car and add bumpers or design a bumper car from scratch.
2. Have students test their bumpers and redesign as necessary. Each car should drive in a straight line until it hits a wall. Then the car should reverse direction and continue to drive until it hits another wall. The car should stop after it hits the second wall.
3. Include time in the lesson for students to discuss building and programming strategies.
4. Students can fill out the Engineering Journal.

Activity Extensions:

- Modify your bumper-car program (Things That Go Bump) using Jumps and Lands so that the bumper car will keep bumping and reversing indefinitely, until you push the Run button to stop the program.
- Instead of reversing after it hits a wall, program your car to turn 90° and then continue forward until it hits another wall.

(Hint: you'll need two motors for this one.)