

Line Follower - NXT

Suggested Time

60 minutes

Age

8 - 13

Challenge

In this activity, design and construct an NXT car and program it to be able to closely follow a line. Don't let your car stray from the road by using light sensors only.

***Topics***

Light Sensors, Turning, Gearing & Friction

Subjects

Science, Engineering & Technology

Programming Themes

Motor Forward / Backward, Wait for Light / Dark, Loops, Jumps / Lands

Related Math & Science Concepts

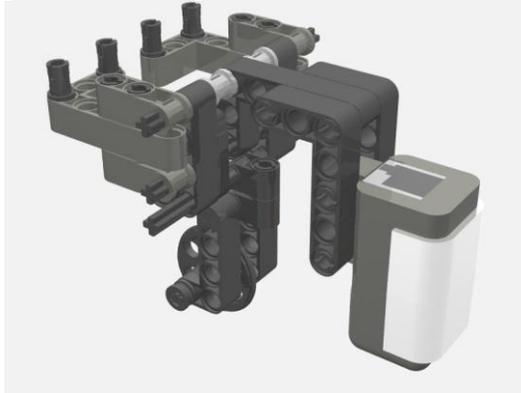
- Gears
- Wheels and Axles
- Acceleration
- Velocity
- Vector Quantities

Materials

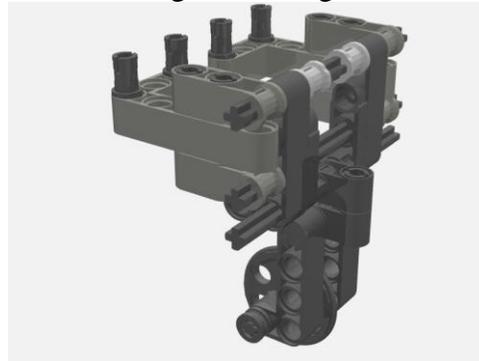
- NXT Car (that can turn)
- Light Sensor
- Solid Colored Floor
- Tape (opposite color of the floor)

Building Instructions

1. Build a front wheel assembly containing both a light sensor and a wheel capable of turning.



2. Make sure the wheel has a good turning radius.



3. Attach the light sensor and wheel to the front of the NXT car. Wire the light sensor to an input and the motors to the outputs.

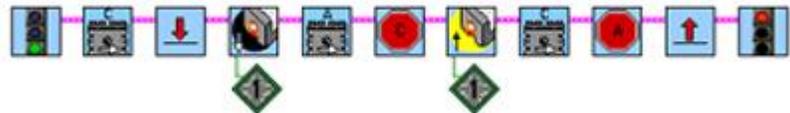


Programming Instructions

Building Hints:

- *Using a skid plate instead of two front wheels helps reduce friction.*
- *Friction reduction allows for ease in turning.*
- *Gearing down will slow down your car and make tighter turns.*
- *The light sensor should be facing down and as close to the floor as possible.*

1. Choose whether to use ROBOLAB or the LEGO NXT Software to program (follow step 2 for ROBOLAB; follow step 3 for LEGO NXT Software.)
2. Using ROBOLAB INVENTOR 2, program your car to follow a line using a light sensor.



3. Using the LEGO NXT Software, program your car to follow a line using a light sensor. First set to wait for dark.



4. Second, set to wait for light.



In Action

***Classroom
Management***

The car should be able to follow a line (either light or dark) and be able to turn both left and right.

1. Students will use an NXT car and a light sensor to make a line follower. The car should be able to turn.
2. Discuss design criteria before the students start building. Since all the cars will need to turn, the design will be different than a car that just drives forward.
3. Completed Line Followers can start by using the easy course (a slightly wavy line) and move on to a harder course (line with a right angle).
4. Students should test their Line Followers.