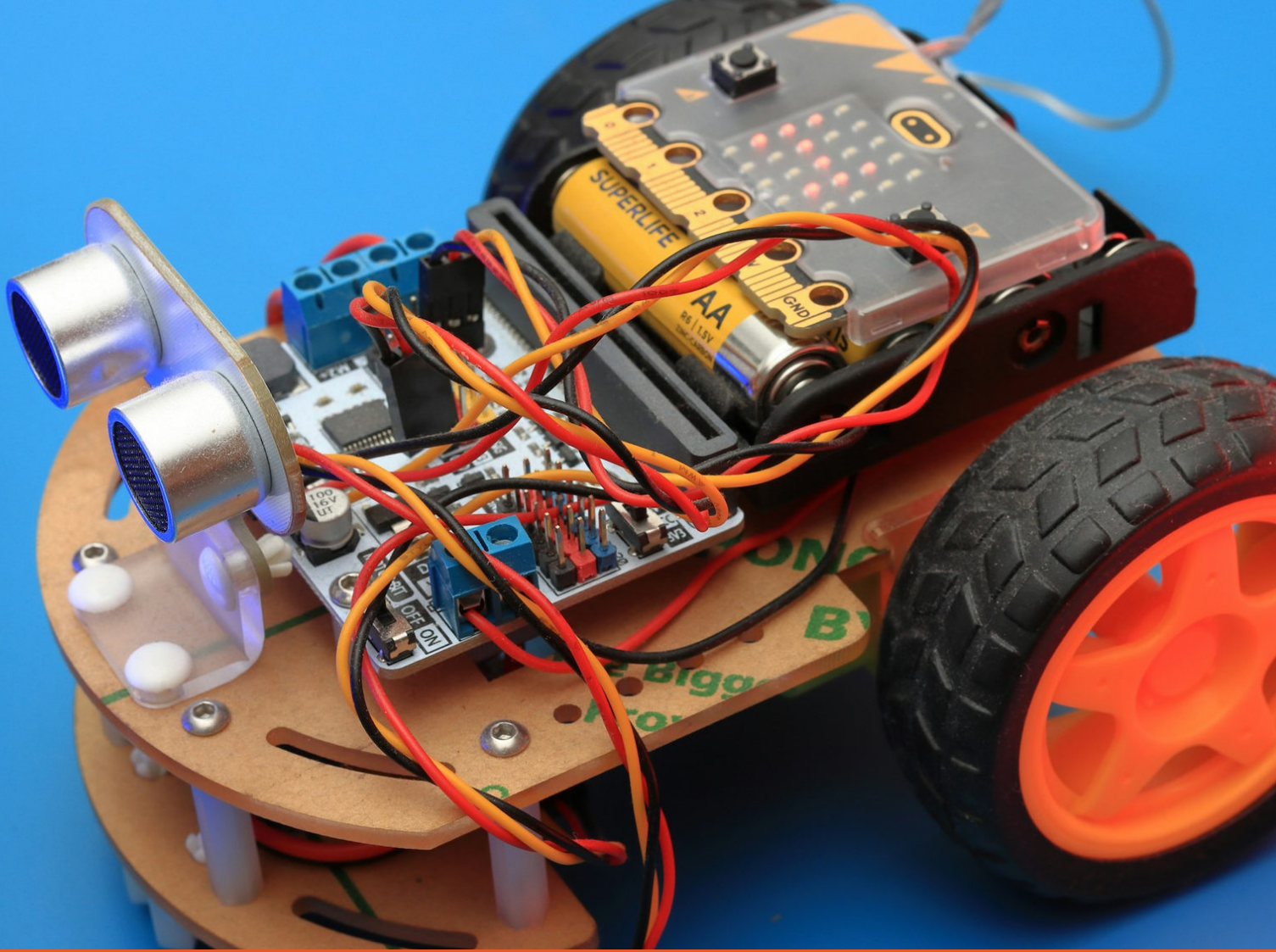




EduTrend Contents

EDUTECH · HANDS-ON ROBOTICS PROJECTS · PRIMARY

Line-Following Buggy

Build and program a buggy that follows a black line with a light sensor

Ages 8–10

Level: Developing

2 × 50 minutes

Groups of 3 · up to 30

Activity 02

Inside: activity at a glance · step-by-step session plan · facilitator notes · 3 pupil worksheets · assessment checklist

ACTIVITY 02 · AT A GLANCE

Line-Following Buggy

Groups assemble a simple buggy from a kit or a micro:bit buggy, then test the light sensor over black tape and white card. They program a simple rule: if the sensor sees black, turn one way; if white, turn the other. They test on a track, adjust speed and threshold, and improve until the buggy completes a curved lap.

Learning outcomes

By the end of the session pupils can:

- assemble a buggy;
- read a light sensor;
- program an if-else rule;
- improve through testing.

KEY WORDS

buggy · light sensor · line · threshold · if-else · speed

CURRICULUM LINKS

Science: light and reflection.
Maths: angles on curves. D&T: assembling products.

1**SENSE**

What can it detect?

2**THINK**

What should it decide?

3**ACT**

What should it do?

4**TEST**

Run it

5**DEBUG**

Find and fix

6**IMPROVE**

Make it better

Materials (per group)

- Robot buggy kit or micro:bit buggy with line sensor
- Black tape track
- Device
- Worksheets 1, 2 and 3

Before the session

- Lay a tape track with gentle curves.
- Check buggies.
- Prepare a sensor display program.
- Print worksheets.

SAFETY

Keep the track clear. Keep fingers away from wheels.

ACTIVITY 02 · SESSION PLAN

Step by step

Slower speeds make line following much easier; start slow and speed up.

Time	What happens	Say or ask
Lesson 1: 0–25 min Build	Assemble buggy.	<i>“Is everything secure?”</i>
25–50 min Sense	Read black and white values.	<i>“What is the difference?”</i>
Lesson 2: 0–25 min Program	If–else rule.	<i>“What should it do on black?”</i>
25–40 min Test	Run the track.	<i>“Where does it lose the line?”</i>
40–50 min Improve	Adjust speed and threshold.	<i>“What helped most?”</i>

CHALLENGE CARD (print or copy onto the board)

Build and program a buggy that follows a curved black line for a full lap using a light sensor.

ACTIVITY 02 · FACILITATOR NOTES

The project know-how in brief

A light sensor measures reflected light: black tape reflects less than white card. By following the edge of the line, the buggy can turn towards white when it sees black and towards black when it sees white.

The threshold sits between the black and white readings. Speed matters: a fast buggy can overshoot a curve before the sensor reacts.

Common ideas to listen for

- “The sensor sees the line like an eye.” It measures brightness.
- “Faster is better.” It may leave the line.
- “One test is enough.” Test several laps.

Adapting the activity

Support

Use a straight track first.

Stretch

Add a second sensor.

WORKSHEET 1

Sensor values

Name: _____

Class: _____ Date: _____

Record readings.

Sensor values

Surface	Reading
Black	
White	
Edge	
Threshold	

WORKSHEET 2

Test laps

Record tests.

Test laps

Test	Speed	Completed?	Problem
1			
2			
3			
4			

WORKSHEET 3

Improvements

What made it work?

Our improvements and why

FOR THE TEACHER

Assessment checklist

Use during the session. One sheet covers up to eight pupils; copy as needed.

Pupil	Builds buggy	Uses sensor rule	Improves by testing

Suggested codes: W = working towards · E = expected · G = greater depth

ABOUT THIS ACTIVITY

Line-Following Buggy is a sample activity from the EduTrend Contents Edutech Hands-On Robotics Projects programme (primary, level: developing). Every activity in the programme follows the same format: a practical challenge, a clear session plan, facilitator notes and ready-to-print worksheets, so that teachers, club leaders and parents can run it without extra preparation.

Full 15-, 20- and 32-week programmes are available from EduStore at edutrend.org.

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