



EduTrend Contents

EDUTECH · ROBOTICS RESOURCES FOR TEACHERS · MIDDLE SCHOOL

Square, Then Stop at a Line

A classic two-part robot challenge in one lesson

Ages 12–14

Level: Intermediate

60 minutes

Pairs · up to 30

Activity 04

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

ACTIVITY 04 · AT A GLANCE

Square, Then Stop at a Line

Pairs get one robot, one laptop and a challenge card. Part one: drive a square and return to the start. Part two: drive forward and stop exactly at a black line using a light sensor. Pairs record how close they get, debug, and finish by discussing what made each part hard and how they solved it.

Learning outcomes

By the end of the session students can:

- program loops for a square;
- calibrate turns;
- use a light sensor to stop;
- reflect on debugging.

KEY WORDS

loop · turn · calibration · light sensor · stop · accuracy

CURRICULUM LINKS

Maths: angles and measurement.
Science: light. Computing: loops and conditions.

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 pair)

- Robot with a light sensor
- Laptop
- Challenge card
- Black tape line
- Tape measure
- Worksheets 1, 2 and 3

Before the session

- Mark start squares and lines.
- Check robots.
- Print challenge cards.
- Print worksheets.

SAFETY

Keep test areas clear. Keep hands away from moving wheels.

ACTIVITY 04 · SESSION PLAN

Step by step

Teachers who have debugged a robot themselves plan more realistic lessons; try this first.

Time	What happens	Say or ask
0–10 min Setup	Connect and test the robot.	<i>"Is everything working?"</i>
10–30 min Square	Loop and calibrate turns.	<i>"Does it return to start?"</i>
30–48 min Line stop	Use the light sensor.	<i>"How close can you stop?"</i>
48–55 min Measure	Record accuracy.	<i>"What was the error?"</i>
55–60 min Reflect	Discuss debugging.	<i>"What was hardest?"</i>

CHALLENGE CARD (print or copy onto the board)

Program a robot to drive a square back to its start and then stop exactly at a black line, measuring and improving accuracy.

ACTIVITY 04 · FACILITATOR NOTES

The teaching know-how in brief

A square uses a loop of four forward moves and four 90° turns. Small turn errors add up, so calibration matters.

A light sensor detects the change from floor to black tape. The robot drives until the reading passes a threshold and then stops; speed affects how far past the line it goes.

Common ideas to listen for

- “Four turns of 90 always make a square.” Calibration matters.
- “The robot stops instantly.” It slides a little.
- “Sensors read the same everywhere.” Lighting varies.

Adapting the activity

Support

Provide the loop structure.

Stretch

Drive a square that stops at a line on each side.

WORKSHEET 1

Square

Name: _____

Class: _____ Date: _____

Record attempts.

Square

Attempt	Turn setting	Distance from start (cm)
1		
2		
3		

WORKSHEET 2

Line stop

Record attempts.

Line stop

Attempt	Speed	Distance past line (cm)
1		
2		
3		

WORKSHEET 3

Debugging

Reflect.

What was hard and how we solved it

FOR THE TEACHER

Assessment checklist

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

Student	Uses loops	Calibrates turns	Uses sensor to stop

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

ABOUT THIS ACTIVITY

Square, Then Stop at a Line is a sample activity from the EduTrend Contents Edutech Robotics Resources for Teachers programme (middle school, level: intermediate). 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.

© 2026 EduTrend Contents. This activity may be printed and copied for use with students in your own school, club or home. It may not be resold or published elsewhere. Photos: Judy Beth Morris / Unsplash.