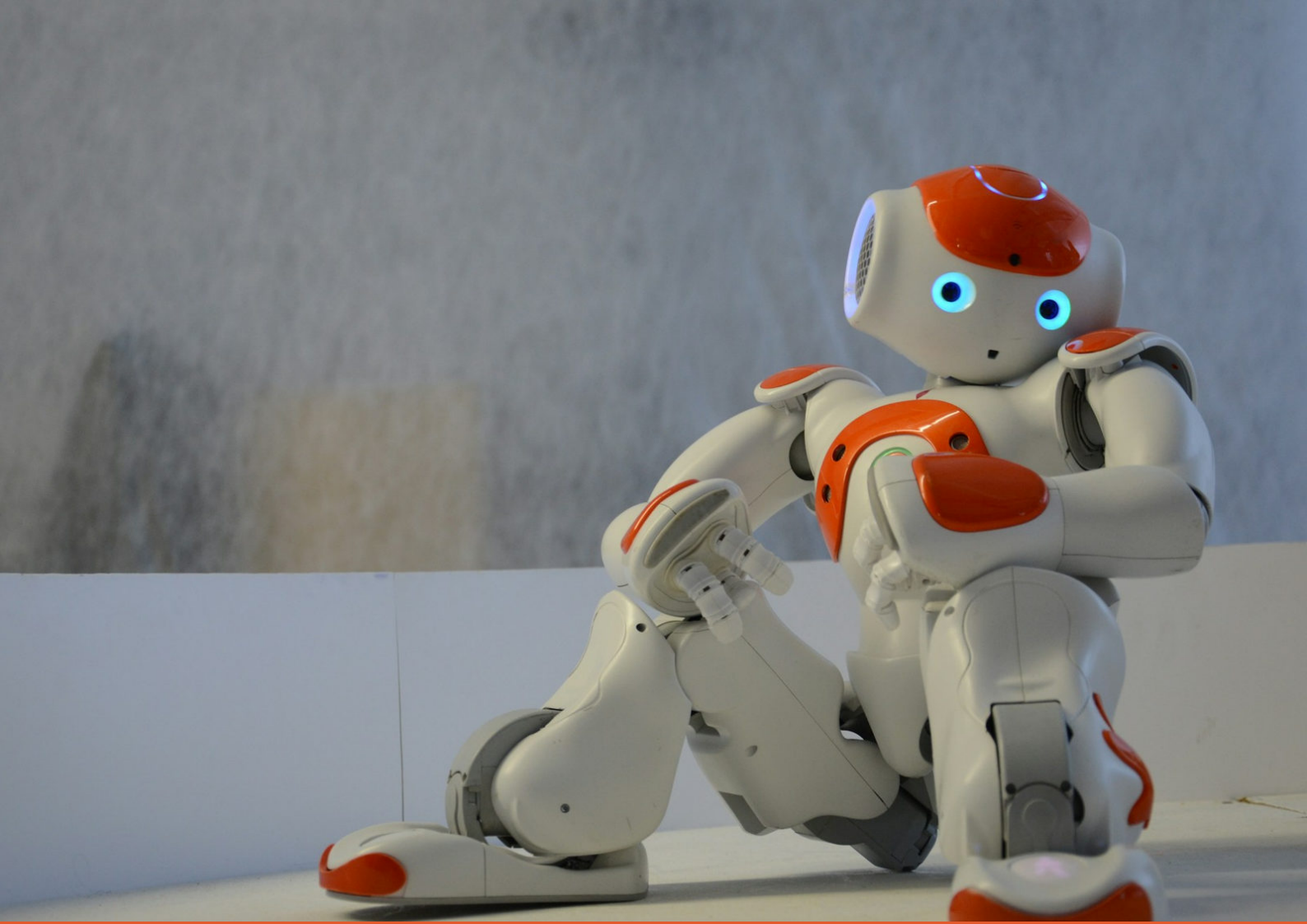




EduTrend Contents

EDUTECH · INTRODUCTION TO ROBOTICS · MIDDLE SCHOOL

Which Sensor for the Job?

Test robot sensors and match them to real tasks

Ages 11–14

Level: Intermediate

60 minutes

Groups of 3 · up to 30

Activity 03

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

ACTIVITY 03 · AT A GLANCE

Which Sensor for the Job?

Groups rotate through sensor stations: a light sensor over black and white surfaces, a distance sensor aimed at objects at different ranges, and a touch or button sensor. They record readings, find the range and limits of each, then match sensors to robot tasks and justify their choices.

Learning outcomes

By the end of the session students can:

- take sensor readings;
- describe sensor range and limits;
- choose sensors for tasks;
- justify choices with evidence.

KEY WORDS

sensor · reading · range · threshold
· ultrasonic · reflectance

CURRICULUM LINKS

Science: light and sound. Maths: tables and ranges. Engineering: design choices.

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 kit or micro:bit with sensors
- Black and white card
- Ruler
- Worksheets 1, 2 and 3

Before the session

- Set up three sensor stations.
- Prepare display code to show readings.
- Print task cards.
- Print worksheets.

SAFETY

Handle electronics carefully. Keep drinks away from kits.

ACTIVITY 03 · SESSION PLAN

Step by step

Ultrasonic distance sensors struggle with soft or angled surfaces; let students discover it.

Time	What happens	Say or ask
0–8 min Hook	How does a robot vacuum avoid walls?	<i>“What does it sense?”</i>
8–35 min Stations	Rotate and record readings.	<i>“What is the range?”</i>
35–45 min Limits	Find failures.	<i>“When does it go wrong?”</i>
45–55 min Match	Choose sensors for tasks.	<i>“Why that sensor?”</i>
55–60 min Share	Justify choices.	<i>“What evidence?”</i>

CHALLENGE CARD (print or copy onto the board)

Test three sensors, record their readings and limits, and choose the best sensor for four robot tasks with evidence.

ACTIVITY 03 · FACILITATOR NOTES

The robotics know-how in brief

A light (reflectance) sensor measures how much light bounces back: white surfaces reflect more than black, which lets robots follow lines. An ultrasonic sensor measures distance by timing an echo.

Every sensor has a range and limits. Soft, angled or very close objects can confuse distance sensors. Choosing a threshold turns a reading into a decision.

Common ideas to listen for

- “Sensors are always accurate.” They have limits.
- “One sensor can do everything.” Tasks need different sensors.
- “Robots see like eyes.” They measure single quantities.

Adapting the activity

Support

Provide a readings table with examples.

Stretch

Choose thresholds and test them in code.

WORKSHEET 1

Sensor readings

Name: _____

Class: _____ Date: _____

Record at each station.

Sensor readings

Sensor	Condition	Reading
Light		
Light		
Distance		
Distance		
Touch		

WORKSHEET 2

Match sensors

Choose and justify.

Match sensors

Task	Sensor	Reason
Avoid walls		
Follow a line		
Detect a bump		
Find a torch		

WORKSHEET 3

Limits

When do sensors fail?

Sensor limits we found

FOR THE TEACHER

Assessment checklist

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

Student	Records readings	Identifies limits	Justifies choices

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

ABOUT THIS ACTIVITY

Which Sensor for the Job? is a sample activity from the EduTrend Contents Edutech Introduction to Robotics 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.

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