

## technology

# Driving the floor robot

## Lesson at a glance

Open with a floor robot stuck on its start square and a flag a few squares away — ask how we give it instructions. Model algorithm and bug with the turn rule (a turn stays put; only forward steps), then drive one short route on the IWB interactive while the class predicts. Groups lay arrow cards, enter moves on a Bee-Bot or floor robot, predict the stop square, and fix one wrong step if it misses. They copy the working card line into the Investigation Journal and share one bug and fix in a talk.

## Learning objectives

- Enter a short sequence of moves so a floor robot travels toward a target
- Predict where the robot will stop, then find and fix a wrong move

## Before the bell — prep

Tape one 4×4 grid per group the day before — each square must match one robot step (about 15 cm for a Bee-Bot) or predict-run-debug fails. Place one floor robot, paper flag and arrow-card set per group; clear bags and chairs from floor lanes. Journal pages ready at desks, not on the mats.

**Materials**

| Item                                                                                                  | Qty | Per   | Source             | Low-cost substitute                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------|-----|-------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bee-Bot or similar floor robot                                                                        | 1   | group | school kit         | a child acts as the robot and follows arrow cards across a taped floor grid                                                                                      |
| taped floor mat with squares matching one robot step (15 cm sides for Bee-Bot, or manufacturer's mat) | 1   | group | classroom          | masking-tape grid on the hall floor with the same step-sized squares, or large squared paper sheets joined on the floor cut or marked to the robot's step length |
| paper flag or target card                                                                             | 1   | group | classroom          | a sticky note or small toy as the target                                                                                                                         |
| arrow or move cards (forward, turn left, turn right)                                                  | 1   | group | provided printable | arrows drawn on scrap card or sticky notes                                                                                                                       |
| Investigation Journal pages                                                                           | 1   | pupil | classroom          | a blank A4 sheet with space to draw arrows and mark yes/no                                                                                                       |
| masking tape                                                                                          | 1   | class | classroom          | painter's tape or chalk lines on a hard playground surface outdoors with adult supervision                                                                       |
| ruler or metre stick (to mark 15 cm squares if taping your own mat)                                   | 1   | class | classroom          | use the manufacturer's Bee-Bot mat so measuring is not needed                                                                                                    |

**Safety watch-point**

Clear bags and chairs from floor lanes before robots run. Keep walkways free so pupils do not trip on mats, robots or trailing card lines.

## Teaching moves

- **Steps the robot can follow:** Board only algorithm and bug with a concrete move list. Finger-demo the turn rule on the grid: turn stays on the same square; only forward advances. Run one full predict-enter-go-observe cycle (a deliberate wrong turn is fine), then revoice that the robot only does the buttons we press.
- **Plan the route on the board:** Drive the IWB interactive: 4×4 grid, robot bottom-left facing right, flag two right and one up. Pupils call forward / turn left / turn right; you drag. Hands-up prediction before run. Known-good path is forward, forward, turn left, forward — or swap one turn so the class spots and fixes the bug.
- **Program the floor robot:** Groups of 3–4: enterer, path-watcher, card-keeper. Arrow cards must be laid in order before anyone presses go; after a miss, change the card first, then the matching button. Circulate for turn-rule slips and random re-lists. If robots are short, run a robot station plus child-robot mats and rotate so every child presses buttons once.
- **Record our moves:** Hand Journal pages as groups leave the mats. Pupils copy the arrow line left beside the mat — not from memory. Release prompts in order: arrows, yes/no on target, circle the fixed step. Point to each board prompt only after the class finishes the one before.
- **What was the bug?:** Invite two or three groups to name one wrong step and the fix. Revoice: a bug is a wrong step, not a naughty robot; order is what decides where it stops. Keep pack-away for the summary so the share stays a talk.

## What it should show

A correct short sequence lands the robot on the flag; groups should say the path, predict the stop square, and change one wrong step rather than invent a new random list. Common misses: treating a turn as also advancing one square, or entering left instead of right. If the robot overshoots every run, check the taped squares match one robot step.

## Misconceptions & interventions

- **The robot knows the way to the flag and can guess if we get a step wrong.** — Point at the buttons and revoice: it only follows the steps we enter, in that order. Clear the program, enter one deliberate wrong turn, and watch it go the wrong way together.
- **A turn also moves the robot onto the next square.** — Finger-demo on the grid: after turn right, stay on the same square and only spin to face the new way; then forward steps onto the next square. Have the group re-lay that card and re-run.

**Differentiation**

| Emerging                                                                                                                                                                                                                                                           | Developing                                                                                                                                                                                                                     | Proficient                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Offer a short menu of three- or four-move routes and stand with the group for the first clear-and-enter.</li><li>• Let them copy move words from the arrow cards onto the Journal if drawing arrows stalls them.</li></ul> | <ul style="list-style-type: none"><li>• After one success, add a second target on a slightly longer path still with one clear goal.</li><li>• Prompt: which single step would you change to land one square earlier?</li></ul> | <ul style="list-style-type: none"><li>• Challenge a route that needs two turns, still one flag.</li><li>• Early finishers sketch a second shorter route they would try next, or quietly tell a partner where the bug was and why.</li></ul> |

**Cross-curricular hook**

Link to Maths position and direction — left, right, forward and predicting stop squares on a grid.