

technology

micro:bit responds to an input

Lesson at a glance

Open by asking what could set a micro:bit off without a button—shake, tilt or sound—then map a button example into Input–Process–Output boxes and swap the input for a sensor. Model on shake → show happy face live in MakeCode (or the IWB simulator), deliberately break the input once and name the bug. Pairs build the shake program, test and debug, then record input, output, bug and one improvement on the Investigation Journal page before a short display-only share.

Learning objectives

- Program a micro:bit to react to a sensor input such as shake, tilt or sound
- Test, find and fix a bug in the response program
- Propose one improvement to how the device responds

Before the bell – prep

Charge or battery-fit one micro:bit per pair where possible, plus USB leads and laptops/tablets with makecode.microbit.org. Check board version: V1 or mixed kits mean shake/tilt only—no sound. Open a clean MakeCode project on the IWB; scrap paper ready for short-kit IPO sketches.

Materials

Item	Qty	Per	Source	Low-cost substitute
micro:bit (with USB lead)	1	pair	school devices	run the lesson on the IWB using the MakeCode simulator

Safety watch-point

Cables behind the desk edge; no swinging micro:bits by the lead. Unplug by the plastic body and coil leads loosely at pack-away.

**Teaching moves**

- **From button to sensor:** Sketch three boxes labelled Input, Process, Output. Fill a button-A example together, rub out the input, and ask what could replace it today. Say only sensor input and input → process → output here; hold debug for the live break. If kits are mixed or V1, state that pairs will use shake or tilt, not sound.
- **Watch the model:** Drive the exact path on the IWB: on shake → show icon happy face. Name the icon before pupils predict. After the first successful shake, deliberately change on shake to on button A, show that shaking does nothing, name the bug as the input, restore shake and model 'I fixed it by...'. Fold the class in: was that input or output?
- **Program, test and debug:** Leave the pupil block steps on the IWB. Pairs share one board and device; short-kit groups rotate ~8 minutes at a live station while others sketch IPO on scrap paper. Minutes 16–22 are deliberate debug—if it worked first time they break one block, swap boards and find the bug. Freeze at 25 so every pair can say input, output and one bug aloud.
- **Record in your journal:** Investigation Journal (InvestigationLog) only—no typing. Leave starters visible: Input was... Output was... Bug was... We fixed it by... / We broke... on purpose... Next we would... Push for a real bug note even when the first run worked; simulator-only pairs record the same four ideas.
- **Input, output and one improvement:** Display-only think-pair-share: 1 min silent look at the journal, 2 min pairs, 2 min harvest three pairs max. Draw out IPO language, bugs named as input/process/output, and one small testable improvement—not a whole new game.

What it should show

On shake, the chosen icon appears on the LEDs each time; IPO talk names shake (or tilt) as input and the icon as output. A board that never reacts usually has the wrong input event, was not downloaded, or has a forever show blocking later inputs. Simulator-only runs should match the same pattern when the shake control is clicked.

Misconceptions & interventions

- **The micro:bit 'knows' I want a face when I shake it, so shaking hard should be enough.** — Hold up the broken demo with on button A still in place and trace the path: it only does the steps in the program. Put on shake back and let them watch the icon appear.
- **If it fails I'll change lots of blocks at once until something works.** — Prompt: which box is broken—input, process or output? Insist they change one thing, test, then decide. Use the deliberate-break swap so they practise finding a single known bug.
- **An improvement means adding loads of new features in one go.** — In the share, accept only one small testable change—clearer icon, longer show time, or a second allowed input—and reject whole-new-game ideas for now.

Differentiation

Emerging	Developing	Proficient
- Printed three-box IPO sketch and the first on-shake block already placed on the IWB; pair stays on the default happy-face output. - Teacher table or simulator station with the block steps read aloud one at a time.	If secure and time allows, try on tilt (logo up/logo down) with the same show-icon output—still one change at a time when debugging.	- Ready one clear improvement idea for the share (clearer icon, short pause) without racing into extra features that break the build. - Name the bug as input, process or output and explain why the fix worked when harvesting.

Cross-curricular hook

Link to English oral language: pairs must say a clear IPO sentence and one bug story using the journal starters.