

Technology

micro:bit: logging data over time

Lesson at a glance

Open by contrasting a single live temperature glance with readings that vanish the moment pupils look away. Pupils build a Temperature Logger in MakeCode: add the datalogger extension, name the temperature column, log Input temperature every 30000 ms inside forever, and clear the log on start. Download to the micro:bit on its battery pack, leave devices in a warm windowsill or cool corner for about nine minutes, then open MY_DATA and copy the set onto the Investigation Journal. Close by naming highest, lowest and trend, and saying what one start-of-lesson reading would have missed.

Learning objectives

- Program a micro:bit to log repeated readings over a period of time
- Read a logged dataset for a trend: what rose, fell or changed and when
- Explain why logging over time shows more than a single reading

Before the bell: prep

Charge or fit battery packs to every micro:bit. USB alone drops the log the moment it unplugs. Spot one warm place (sunny windowsill) and one cool shaded corner before the bell. One front laptop ready to open a MICROBIT drive if devices are locked down.

Safety watch-point

Use battery packs only while logging; keep USB leads tidy when reading back. Low-voltage micro:bit only. No mains packs or damaged leads.



Teaching moves

- **What we're building:** Keep it short. Ask: if I read the temperature once now, what does that tell me about the next half hour? Land on 'nothing': that is why logging exists. Agree the warm and cool spots now so groups know where devices will go.
- **Create a new project:** Direct the class to makecode.microbit.org → New Project → name it Temperature Logger. Dismiss any sign-in prompt; no account is needed. Confirm every screen shows empty on start and forever blocks.
- **Add the data logger:** Do Extensions together on the board before anyone races ahead. Search datalogger with no space. If a pupil cannot find Extensions, they have scrolled the workspace instead of the block list: redirect them.
- **Say what you are recording:** Have them drag set columns into on start and type temperature. Predict first: nothing will show on the micro:bit, and that is correct. Stress spelling: the box text becomes the results heading.
- **Take a reading every half minute:** Watch two slips: pause must sit inside forever under log data, or the device floods thousands of readings a second; 30000 is easy to type as 3000 (three seconds). Say out loud that forever keeps going after they stop watching: that is the point.
- **Start with an empty log:** Check every screen for order: delete the log first, then set columns. The other way round wipes the headings they just typed.
- **Leave it running while nobody watches:** Download, switch to battery pack, confirm each micro:bit is on, then place in the agreed warm or cool spot. Pupils note place and start time on the Investigation Journal. Protect a full nine minutes: no picking up, breathing on, or checking devices. Use the wait for a Maths link or quick review.
- **Read your readings back:** Plug in via USB, open the MICROBIT drive and MY_DATA. If a pupil has only headings and no numbers, power was lost: pair them with a group that has data rather than restarting. Show one log on the front board if locked-down laptops block the drive.
- **What does the pattern show?:** Pupils finish highest, lowest and mostly up/down/steady on the Journal, then compare with the other spot. Let several voices answer what a single start reading would have missed. Do not supply the line. Affirm a flat cool-corner set as a real, useful result.

What it should show

Expect roughly eighteen readings over nine minutes. The warm windowsill set usually runs higher and may drift as sun or room air shifts; the cool corner often stays flatter. A group with empty MY_DATA almost always lost battery power or never left forever running. Wild spikes usually mean someone handled or breathed on the board: treat as interference, not climate.



Misconceptions & interventions

- Pupils expect the graph to stay on screen like a chart they could read later, and think it is broken because it keeps changing. Name it as a live graph. It shows what the sensor reads right now, over and over. Nothing is stored, which is exactly why they have to watch it and describe what it did.
- Pupils treat the up-to value as decoration and leave it at whatever was there, so the bar is always full or never moves. Ask what the biggest reading from that sensor could be. Then change the up-to value on the board and let them watch the same reading redraw at a different scale.
- Pupils read the bar as a measurement in a unit, and ask what the number means in degrees. Say that this is the device's own scale, not a unit they have met. What matters is whether it is going up or down, which is the whole point of watching over time.
- When a sensor does not respond, pupils rebuild the program instead of testing the sensor. Have them change one thing, the sensor block or the up-to number, and run again. In the simulator, remind them the sliders drive the sensor and nothing will move without them.

Differentiation

Emerging	Developing	Proficient
• Aim for the light graph alone, working and responding to a hand. That is the whole idea of the lesson in one script. • The simulator is a good option here, its sliders make the graph move without needing a bright window.	• Graph a second sensor and choose the up-to value deliberately rather than by trial and error. Ask them to say why they picked it. • Watch one reading for a few minutes and describe what it did in a sentence.	• Make the reading change on purpose, a torch, a hand, a shout, and describe what the graph did each time. • Ask what they would need in order to keep the readings after the micro:bit is unplugged, and why a live graph does not do that.

Cross-curricular hook

Tie to Maths Data: the Journal table is the raw set pupils will later organise into a chart, mode and range.