

LESSON 21

Designing a Microbits Weather Station

60 minutes

Microbit Masterclass

WHAT THIS LESSON DOES

Follow this guide to build your own weather station using Microbit. Start by creating a new project on MakeCode, initialise variables, configure buttons and sound detection, create a forever loop, test your program, and reflect on your learning.

WHAT STUDENTS SHOULD BE ABLE TO DO

- Understand how to create a new project on MakeCode for Microbit.
- Learn to declare and initialise variables in a Microbit project.
- Gain skills in configuring Microbit buttons and sound detection.
- Develop the ability to create a 'forever' loop and display sensor data.
- Reflect on the learning process and consider potential applications of Microbit sensors.

BEFORE THE LESSON

- Open MakeCode for Microbit and check the site loads on your school network, as some filters block coding platforms.
- Have a device per pupil or per pair logged in and ready at the MakeCode editor.
- Decide now whether pupils use physical Microbits or the on-screen simulator, and if physical, that they are connected and can download code.
- Build the finished project yourself first so you can model each block and spot where pupils will get stuck.

Designing a Microbits Weather Station

HOW THE LESSON RUNS

Create a New Project
Initialize Variables
Configure Button A
Configure Button B
Configure Buttons A and B
Configure Loud Sound Detection
Create a Forever Loop
Test Your Program
Reflect on Your Learning

TEACHING MOVES

- 1. Create a New Project. Show pupils exactly where 'New Project' is and insist they name it 'Weather Station' now, so lost work is easy to find again later.
- 2. Initialize Variables. Explain that 'mode' is like a channel selector and 'reading' holds whatever the sensor measures. Write the four mode numbers on the board: 1 temperature, 2 light, 3 sound, 4 movement.
- 3. Configure Button A. Model dragging the 'on button A pressed' block and setting mode to 1. Stress the block comes from the Input category, not the code being typed.
- 4. Configure Button B. Have pupils copy the pattern themselves for Button B and mode 2, then check a few screens before moving on.
- 5. Configure Buttons A and B. Point out that A+B is a separate block from A and B alone. Pupils often miss the 'A+B' option in the dropdown.
- 6. Configure Loud Sound Detection. Show that this trigger uses sound, not a button. If using simulators, tell pupils where the sound slider is so they can test mode 4.
- 7. Create a Forever Loop. Slow right down here. Build the if / else-if chain together, one mode at a time, testing after each branch rather than typing the whole thing.
- 8. Test Your Program. Have pupils press each button and trigger a sound, checking the display changes for all four modes. A mode that never shows usually means a wrong number in the if-check.
- 9. Reflect on Your Learning. Ask aloud where a real weather station would use each sensor, and what fifth reading pupils would add. Keep it a spoken discussion.

WHAT TO WATCH FOR

- Pupils think the code runs the moment they build it, and forget it must be downloaded or the simulator started. Show that nothing happens until the program is downloaded to a Microbit or the simulator is active, and check each pupil has done this before they test.
- Pupils confuse the A+B combination block with pressing A and B one after the other. Demonstrate that A+B is a single event requiring both at once, and that the dropdown must read 'A+B', not two separate blocks.
- A mode never displays because the number in the if-check does not match the number the button sets. Have pupils read each button block and each if-branch aloud together, checking the mode numbers line up exactly.

DIFFERENTIATION

- Emerging: Pair them with a partner and give them just Button A and mode 1 to get one sensor working before adding more. Provide the block categories they need named on the board so they are not hunting through every menu.
- Developing: Let them build Buttons A and B independently once you have modelled Button A, checking in only at the forever loop. Ask them to explain back what 'mode' is doing before they test.
- Proficient: Challenge them to add a fifth mode using another sensor and choose which button combination triggers it. Ask them to make the display clearer, such as showing an icon before the reading so a user knows which sensor is active.