

LESSON 14

Microbit Light Clapper

40 minutes

Microbit Adventures

WHAT THIS LESSON DOES

Follow this guide to build a project with your Microbit that turns LED lights on and off with a clap. Start by creating a new project, setting up variables, detecting sound, and testing the code on your device.

WHAT STUDENTS SHOULD BE ABLE TO DO

- Understand and apply the concept of variables in coding.
- Set and utilise sound thresholds for input detection.
- Implement conditional statements (if-then-else) to control LED light responses.
- Test and debug code in a simulator environment.
- Transfer and apply code to a physical Microbit device.

BEFORE THE LESSON

- Open makecode.microbit.org on your own device and make a new project to check the site loads and is not blocked by the school filter.
- Have a device per pupil or per pair, each able to reach the MakeCode site.
- Have physical Microbits and USB cables ready for the final download step, and check pupils know how to send code to the board.
- Test a clap on your own Microbit beforehand so you know the threshold value 128 works in your room.

Microbit Light Clapper

HOW THE LESSON RUNS

Create a new project
Create a variable
Sound threshold
Detect a clap
Add the if then else
Turn it on
Turn it off
Test it in the simulator
Send the code

TEACHING MOVES

- 2. Create a variable. Explain the variable in plain terms: lightOn is the code's memory of whether the light is currently on. Setting it to false at the start means we begin with the lights off.
- 3. Sound threshold. Show that 128 sits halfway on the 0 to 255 range. Tell pupils this is how loud a sound must be to count as a clap, and that they may change it later if the room is noisy.
- 5. Add the if then else. Read the condition aloud as a sentence: if the light is not on, turn it on, otherwise turn it off. The 'not' is what flips the light each clap.
- 8. Test it in the simulator. Have pupils drag the simulator's sound level up past 128 and back down repeatedly, watching the LEDs toggle. Confirm one clap on, next clap off before touching hardware.
- 9. Send the code. Circulate as pupils download to the Microbit. If clapping does not trigger it, guide them back to the threshold block and nudge the value up or down rather than rewriting code.

WHAT TO WATCH FOR

- Pupils forget the 'not' in the condition and wire it so the light only ever turns on, never off. Ask them to trace what lightOn equals after one clap, then read their if condition aloud. The check must be 'not lightOn' for the toggle to work both ways.
- Pupils set the LEDs but forget to update the lightOn variable, so the next clap does the wrong thing. Point out that each branch does two jobs: change the lights and change the memory. If lightOn is not updated, the code loses track of the current state.
- Pupils think the simulator working means the Microbit will work identically, and give up when clapping fails. Explain that the physical microphone depends on room noise. A failed clap usually means the threshold needs adjusting, not that the code is wrong.

DIFFERENTIATION

- Emerging: Pair them with a partner and work through creating the variable and setting it to false together before moving on. Have them build one branch at a time and test it in the simulator before adding the else part.
- Developing: Ask them to explain in their own words what lightOn holds at each point, so the toggle logic becomes clear rather than copied.
- Proficient: Challenge them to change the threshold and describe how it changes what counts as a clap. Ask them to design a different LED pattern for the 'on' state and predict what will show.