

Microbit Magic 8 Ball

60 minutes

Microbit Masterclass

WHAT THIS LESSON DOES

Embark on a fun journey to create your own digital Magic 8 Ball using Microbit. You'll start by creating a new project, then program your Microbit to display the number 8. You'll learn to detect a shake gesture, create a variable for random numbers, and assign different messages to each number. Finally, download your code, and enjoy your personalised Magic 8 Ball!

WHAT STUDENTS SHOULD BE ABLE TO DO

- Understand and utilise the Microbit project creation process.
- Implement code to display a number on the Microbit.
- Apply gesture detection functionality in Microbit programming.
- Create and manipulate variables to generate random numbers.
- Develop conditional statements to check variable values and display corresponding messages.

BEFORE THE LESSON

- Open makecode.microbit.org yourself first and confirm your school filter allows it and the simulator runs.
- One device per pupil or pair, plus a physical Microbit and its USB cable for the download in step 8.
- Know your school's download route: MakeCode saves a .hex file that must be copied onto the Microbit drive.
- Have your own finished Magic 8 Ball saved so you can demonstrate the shake and a response.

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HOW THE LESSON RUNS

- Create a new Microbit project
- Show the number 8
- Detect a shake
- Create a variable called 'Random Number'
- Check the value of the variable
- Add the messages
- More messages
- Download the code to your Microbit and play

TEACHING MOVES

1. Create a new Microbit project. Make sure everyone reaches the same blank workspace before moving on. Point out the simulator on the left so they can test without a physical Microbit until step 8.
2. Show the number 8. Show that forever keeps the 8 on screen at rest, mirroring a real Magic 8 Ball. Test it in the simulator so they see the 8 before adding any interaction.
3. Detect a shake. Frame onGesture Shake as the trigger: nothing changes until the ball is shaken. Have them shake the simulator to confirm the block fires.
4. Create a variable called 'Random Number'. Stress the counting from 0, not 1. Say aloud that 0 to 4 gives five slots for five responses, so the range and the number of messages must match.
5. Check the value of the variable. Model reading if/else-if as a chain of questions asked in order. They extend the two given blocks to cover 0 to 4, watching they use else if, not new separate ifs.
6. Add the messages. Let them write their own vague answers, but check every condition has a showString inside its own braces before testing in the simulator.
7. More messages. Only reach this once the five-message version works. Remind them the range and the number of condition blocks must always grow together.
8. Download the code to your Microbit and play. Walk the class through the download and copy-to-drive route together, then let them shake the real device and ask it questions.

WHAT TO WATCH FOR

- Pupils count their responses from 1 and set the range to 1 to 5, so one shake outcome (0) never displays a message. Return to step 4 and count the slots aloud: 0, 1, 2, 3, 4 is five numbers. Match the range exactly to the number of message blocks.
- Pupils add a fresh if block for each number instead of using else if, or leave a condition empty, so some shakes show nothing. Have them read the chain back to you as questions. Check every branch contains a showString and that they used else if throughout.
- Pupils expect the download to run instantly and think it failed when nothing changes, not realising the .hex must be copied onto the Microbit drive. Show the copy-to-drive step once on the board and wait for the light to stop flashing before shaking.

DIFFERENTIATION

- Emerging: Give them the range fixed at 0 to 4 and the empty if/else-if chain already built, so they only fill in the messages. Pair them with a partner who has the trigger working and let them test in the simulator before touching the physical device.
- Developing: Have them read their condition chain back to you out loud to confirm each number has a message before downloading.
- Proficient: Point them to step 7: widen the range and add extra condition blocks so their ball gives more than five answers, keeping range and blocks in step.