

LESSON 4

Higher or Lower Game

60 minutes (2 periods)

Introduction to Micro:bit Basics

WHAT THIS LESSON DOES

Follow this guide to build an engaging game on your Microbit. Start by creating a new project, setting up variables, and coding the gameplay mechanics to guess if the next number is higher or lower.

WHAT STUDENTS SHOULD BE ABLE TO DO

- Develop skills in creating and manipulating variables within a Microbit project.
- Understand and apply the concept of random number generation in game development.
- Gain proficiency in programming button inputs to trigger specific actions.
- Learn to implement scoring systems and game over conditions in a game project.
- Enhance problem-solving skills by debugging and testing a game on a Microbit device.

BEFORE THE BELL

- Count out micro:bits and USB cables the day before, one set per student or pair, and check batteries or charge level.
- Open <https://makecode.microbit.org> on a classroom machine and confirm it loads on the school network.

Higher or Lower Game

HOW THE LESSON RUNS

Create a new Microbit project

Create 2 variables

Setup the start of the game

Choosing lower

Scoring a point

Resetting the numbers

Game over

Choosing higher

Download and play

TEACHING MOVES

- 1. Create a new Microbit project. Open makecode.microbit.org together. Have every student start a new project and name it Higher or Lower so downloads stay easy to find.
- 2. Create 2 variables. Show the Variables toolbox. Create number and nextnumber together, saying both names aloud so spellings match when they hook up buttons later.
- 3. Setup the start of the game. Build the start live: set both variables to random 1 to 100, then showNumber for number. Run it once so a value appears on the display.
- 4. Choosing lower. Program button A with a short pause, then an if that checks nextnumber less than or equal to number. Yes icon on success, No on failure.
- 5. Scoring a point. On the correct branch only, under the Yes icon, add change score by 1 from Advanced, Game. Point at that toolbox if students cannot see it.
- 6. Resetting the numbers. Still on the correct path: set number to nextnumber, roll a new nextnumber at random, then showNumber again so the next round is ready.
- 7. Game over. On the else path after No: pause, show the real nextnumber so they see why they lost, pause again, then end the game. Wrong guess stops the run.
- 8. Choosing higher. Duplicate the whole A handler, switch it to B, and flip the if to nextnumber greater than number. Place the ghost copy before editing.
- 9. Download and play. Download to the micro:bit and play. Challenge pairs to beat a class high score and to notice any button or reset bugs while they play.

WHAT TO WATCH FOR

- Students mix up number and nextnumber, so the display and the comparison use the wrong value. What to do: Have them point at the screen and say current guess versus hidden next before they touch the if block.
- Students may think: After duplicating for button B they change the button but leave the lower-or-equal test, so higher guesses score wrong. What to do: Ask them to read the if condition aloud as higher than before they test on the device.
- Students may think: They add score or reset on the wrong branch, so a bad guess still awards points or the game never ends. What to do: Trace one correct and one incorrect press on the board, marking which blocks run on each path.

DIFFERENTIATION

- Emerging: Pair them with a student whose start blocks already show a number, and stay for the first variable and button A if. Let them follow your board build block by block for the A path before they try B.
- Developing: Ask them to walk one full A press out loud (pause, compare, score or game over) before they duplicate for B. If download works but play feels random, have them show number and nextnumber with showNumber once while testing.
- Proficient: Send them to coach a pair still wiring the B condition or the game-over path. Challenge a clean high score and ask them to explain why number must become nextnumber after a correct guess.