

LESSON 5

Microbit Paddle Ball

60 minutes (2 periods)

Intermediate Projects

WHAT THIS LESSON DOES

Get started with creating a fun paddle ball game using Scratch and a Microbit. Follow step-by-step instructions to build your game, from setting up sprites and coding ball movement to controlling the paddle with Microbit tilts.

WHAT STUDENTS SHOULD BE ABLE TO DO

- Develop skills in creating and managing a new Scratch project.
- Understand and apply the concept of adding and positioning sprites in Scratch.
- Gain proficiency in coding for sprite movement, interaction, and control using Scratch blocks.
- Learn to integrate and use a Microbit with Scratch for real-time control of sprites.
- Enhance critical thinking and problem-solving skills by identifying potential improvements to the game.

BEFORE THE BELL

- Count out one micro:bit per student or pair, USB cables, and charged battery packs. Flash the Scratch micro:bit .hex the day before and confirm Scratch Link runs on the school network.
- Open Scratch on the teacher machine, add the micro:bit extension once, and test tilt left/right so you can demo a working paddle before students connect.
- Have spare micro:bits and cables ready: pairing failures are the usual stall in a 60-minute slot.

Microbit Paddle Ball

HOW THE LESSON RUNS	
	Create a new Scratch project
	Add the paddle sprite
	Add the football sprite
	Position the ball
	Make the ball bounce around
	Connect your Microbit
	Control the paddle
	Make the ball bounce off the paddle
	Add a backdrop
	Add the game over line
	Program game over
	Improve the game?

TEACHING MOVES

- 1. Create a new Scratch project. Have everyone open a new Scratch project and delete the cat at once. Say this wipe-and-start habit will show up every time they build a game.
- 2. Add the paddle sprite. Add Paddle from the library and drag it near the bottom, leaving a clear gap above the stage edge. That gap is for the game-over line later.
- 3. Add the football sprite. Add Soccer Ball from the library. Check every project has both paddle and ball before anyone writes movement code.
- 4. Position the ball. On the ball, use go to x:0 y:170 under the green flag. Point at the stage as a grid and have students call out where other x,y pairs would land.
- 5. Make the ball bounce around. Under the go to block, add point in direction 120, then forever move 10 and if on edge bounce. Run it and watch for stuck corners before adding paddle code.
- 6. Connect your Microbit. Walk the three setup pieces in order: Scratch Link on the computer, the special .hex on the micro:bit, then the micro:bit extension in the project. Do not skip ahead to tilt code.
- 7. Control the paddle. On the paddle, forever check tilted left and right and move -10 or 10 steps. Green-flag it and have students tilt slowly so they see live control, not random jumps.
- 8. Make the ball bounce off the paddle. On the ball, forever if touching paddle then turn 180 and move 10. Stress they must click the ball sprite first or the blocks land on the wrong sprite.
- 9. Add a backdrop. Open the backdrop library and pick Stars. Keep this short so time stays for the game-over line and colour sense.
- 10. Add the game over line. Select the backdrop, open the Backdrops tab, and draw a solid red line in the gap under the paddle. The line must be continuous or colour touch will miss.
- 11. Program game over. Still on the ball, inside the same forever, if touching the red colour then stop all. Explain stop all freezes every script, which is game over here.
- 12. Improve the game? Ask aloud what they would add or change in the code. Keep ideas spoken: score, speed, lives, or a second tilt control. No written hand-up.

WHAT TO WATCH FOR

- Students treat x and y as screen pixels from the top-left, so the ball starts in the wrong place. Remind them Scratch zero is stage centre. Have them green-flag after each coordinate change and point to where 0,170 sits.
- They put paddle tilt code on the ball, or bounce code on the paddle, then say the micro:bit is broken. Before green flag, ask which sprite is selected. If tilt does nothing, move the blocks onto the paddle and reconnect Scratch Link once.
- Turning 180 on paddle touch sends the ball along the paddle or through it instead of a clean bounce. After the turn, the extra move 10 steps separates the sprites. If it still sticks, check the paddle is not covering the red line.

DIFFERENTIATION

- Emerging: Pair them with a student whose micro:bit already tilts the paddle, and have them rebuild only the paddle forever loop while the partner watches the sprite list. If setup stalls, let them finish bounce-on-edge and paddle bounce with arrow keys temporarily, then swap in tilt when the link works.
- Developing: Have them explain why the gap under the paddle matters before they draw the red line. Ask them to change only direction or step size and say what happened to the bounce.
- Proficient: Challenge them to name one code change that would improve play (faster ball, score, narrower paddle) and try a single change. Have them help a neighbour debug sprite selection or colour touch without taking the mouse.