

## LESSON 2

# Variables and input in Scratch

40 minutes

Strand 1: Introducing computer science

Built in Scratch

Outcome 1.7

### WHAT THIS LESSON DOES

Students build a Paddle Ball game in Scratch, using a speed variable with assignment and arithmetic, and mouse input to control the paddle.

### CURRICULUM OUTCOMES

| Outcome | What the specification asks for                                                                                                                   |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.7     | discuss and implement core features of structured programming languages, including variables, operators, loops, decisions, assignment and modules |

### WHAT STUDENTS SHOULD BE ABLE TO DO

- Store and change a value in a variable using assignment and arithmetic operators (LO 1.7)
- Use input to change what a program does (LO 1.7)

#### BEFORE THE BELL

- Students logged in to the Coding Ireland platform on their devices, with Scratch ready to open in the browser
- Data projector or board ready so you can model the first blocks before pairs work independently
- Check that students can create a new Scratch project and find the sprite library
- Decide which way you want students to save at the end, signed in to Scratch or saved to a folder on the device, so you can tell them which of the two options on the last step applies

### WHAT YOU NEED

| Item                          | Qty | Per  | If you do not have it                                |
|-------------------------------|-----|------|------------------------------------------------------|
| tablet or laptop with Scratch | 1   | pair | run the lesson on the IWB with students taking turns |

## Variables and input in Scratch

### HOW THE LESSON RUNS

|              |              |                                     |
|--------------|--------------|-------------------------------------|
| <b>4 min</b> | introduction | Start: what we're building          |
| <b>2 min</b> | content      | The plan: four parts to build       |
| <b>2 min</b> | content      | Create a new Scratch project        |
| <b>2 min</b> | content      | Add the paddle sprite               |
| <b>2 min</b> | content      | Add the ball sprite                 |
| <b>3 min</b> | content      | Position the ball                   |
| <b>3 min</b> | content      | Make the ball bounce around         |
| <b>3 min</b> | content      | Create a speed variable             |
| <b>3 min</b> | content      | Control the paddle                  |
| <b>3 min</b> | content      | Make the ball bounce off the paddle |
| <b>2 min</b> | content      | Add a backdrop                      |
| <b>2 min</b> | content      | Add the game over line              |
| <b>3 min</b> | content      | Program game over                   |
| <b>3 min</b> | content      | Make sense: what worked, what broke |
| <b>2 min</b> | content      | Reflect                             |
| <b>1 min</b> | summary      | What you covered                    |

### TEACHING MOVES

- Model creating the speed variable and dropping the round speed reporter into the move block's number slot on the board before students try it
- Ask pairs to predict what happens if they change the set speed value from 10 to 20 before they run it
- When the ball first moves, expect questions about it passing through the paddle; park that until the bounce step
- For independent practice, invite students who finish early to add a second variable, for example a score that increases on each paddle hit
- If you are running short: drop the backdrop step and, if you must, the game over line and its code as well. A paddle that bounces a speeding ball is a complete, working game. Keep the full time for Create a speed variable, because storing and changing that value is what the rest of the lesson and the closing discussion rest on.

### WHAT TO WATCH FOR

- Speed reporter dropped beside the move block instead of into its number slot: show the white highlight on the slot and have them drag again
- Code added to the wrong sprite (paddle blocks on the ball or the reverse): check the sprite list highlight before adding blocks
- Touching-colour sensor not matching the red line: use the eyedropper so the block samples the exact line colour on the backdrop

### DIFFERENTIATION

- Support: Pair students and model the variable create-and-insert steps once more on the board; leave a working set-speed example visible
- Extension: Add a second variable such as score that increases when the ball hits the paddle, or make speed increase by a different amount
- Extension: Change the starting direction or add a second ball that also uses the speed variable