

LESSON 2

Penalty Shootout

60 minutes

Coding and Interactive Creators

WHAT THIS LESSON DOES

In this step-by-step lesson, you'll create a penalty shootout game using Scratch. You'll learn how to set up a new project, add a goal backdrop, and incorporate a soccer ball sprite. You'll also code the game mechanics, including choosing your shot, moving the ball, adding a goalkeeper sprite, and detecting if the keeper makes a save or if the ball hits the post. Finally, you'll add the code for scoring a goal.

WHAT STUDENTS SHOULD BE ABLE TO DO

- Develop skills in creating and managing a new Scratch project.
- Learn to download and add backdrops to a Scratch project.
- Understand how to add and manipulate sprites in Scratch, including movement and size changes.
- Gain knowledge on how to use mouse clicks to interact with a Scratch project.
- Acquire the ability to implement conditional statements in Scratch to detect interactions between sprites and backdrop.

BEFORE THE LESSON

- Open scratch.mit.edu on the projector and test that it loads through the school filter and that pupils can create a new project.
- Have the goal backdrop image ready, and know the starter project link (scratch.mit.edu/projects/573459765/editor) as a fallback if uploading the image fails.
- One device per pupil or per pair, with sound not required but Scratch fully working.

Penalty Shootout

HOW THE LESSON RUNS

- Create a new Scratch project
- Download and add the goal backdrop
- Add the Soccer Ball sprite
- Choose your shot
- Move the ball
- Add the Casey sprite
- Make the goalkeeper dive
- Detect if the keeper makes a save
- Detect if it hits the post
- Score a goal

TEACHING MOVES

- 1. Create a new Scratch project. Show pupils how to delete the cat sprite by right-clicking it. A blank stage now is much easier to build on than tidying up later.
- 2. Download and add the goal backdrop. Walk the room during the upload. If any device blocks the download, point that pupil straight to the starter project link rather than losing time troubleshooting.
- 3. Add the Soccer Ball sprite. Stress that x 0 y -130 places the ball at the bottom middle. Have pupils click the green flag to check the ball snaps to the right spot before moving on.
- 4. Choose your shot. Make clear this code goes on the backdrop, not a sprite. Pupils often put it on the ball. Explain that clicking the stage broadcasts the shoot message everything else listens for.
- 5. Move the ball. Point out that shrinking the ball as it moves creates the illusion of distance. Test a shot and watch the ball travel towards wherever the mouse was clicked.
- 6. Add the Casey sprite. Explain the left-right rotation style keeps Casey upright when diving. Green-flag test that the keeper starts centred in the goal.
- 7. Make the goalkeeper dive. Highlight pick random -180 to 180: this makes the keeper unpredictable so no two shots feel the same. Test several shots to see the keeper dive different ways.
- 8. Detect if the keeper makes a save. Make sure the if block sits inside the repeat loop so it checks on every move. Emphasise that stop this script freezes the ball once caught.
- 9. Detect if it hits the post. Show pupils how to grab the exact post colour with the colour picker rather than typing a value. A wrong colour here means the post detection never fires.
- 10. Score a goal. Draw out the logic: the goal message only runs after the loop finishes, meaning it was not saved and did not hit the post, so it must be a goal. Test all three outcomes.

WHAT TO WATCH FOR

- Pupils place the shoot broadcast code on the ball sprite instead of the backdrop, so clicking does nothing. Remind them the click happens on the stage, so the broadcast block belongs on the backdrop. Have them check which item is selected before adding blocks.
- Pupils put the save and post if-blocks outside the repeat loop, so the ball is only checked once and passes straight through the keeper. Show them the if block must sit inside the repeat so it re-checks on every one of the thirty moves. Test a shot straight at the keeper to prove it.
- The post detection never works because pupils typed a colour value rather than sampling the actual post colour. Use the eyedropper in the colour block to click directly on the goalpost. The colour must match the backdrop exactly.

DIFFERENTIATION

- Emerging: Pair them with a partner and check they have the ball and keeper starting positions working before adding any shooting logic. Offer the starter project so they begin from a working backdrop and focus on the code.
- Developing: Have them test each new block set with the green flag before moving to the next step, so errors are caught early. Ask them to explain aloud what the shoot broadcast does before you confirm it.