

LESSON 3

Racing Car

60 minutes

Coding and Interactive Creators

WHAT THIS LESSON DOES

Get started with creating a fun racing game in Scratch. Follow step-by-step instructions to build a car sprite, design a racing track, and programme the controls to drive your car around using arrow keys.

WHAT STUDENTS SHOULD BE ABLE TO DO

- Develop skills in creating and managing a new Scratch project.
- Understand and apply the process of adding and modifying sprites in Scratch.
- Gain knowledge in drawing and editing backdrops in Scratch.
- Learn to create and manipulate variables to control sprite properties.
- Acquire skills in programming sprite movements and interactions using Scratch blocks.

BEFORE THE LESSON

- Check scratch.mit.edu opens and is not blocked on the school network, and test it on a pupil device.
- One device per pupil, logged in to Scratch so projects can be saved.
- Download the red car picture file to devices beforehand, or confirm pupils can right-click and save it themselves.
- Have the finished car game working on your own screen so you can demonstrate the drive and the slow-on-grass effect.

Racing Car

HOW THE LESSON RUNS

Create a new Scratch project

Add the car sprite

Shrink the car

Draw a racing track

Place your car on the track

Create a speed variable

Detect where the car is

Move forwards and backwards

Move left and right

Drive your car!

TEACHING MOVES

1. Create a new Scratch project. Show that a new project always arrives with the cat. Deleting an unwanted default sprite is a routine they will use constantly, so name it as a normal first step, not a mistake.
2. Add the car sprite. Model the two-part move slowly: right-click and Save image as to get the file onto the device first, then Upload Sprite into Scratch. Pupils often try to upload before saving.
3. Shrink the car. Point out that set size to 10% only fires when the green flag is clicked. Have them click the flag and watch the car shrink so they connect the block to the effect.
4. Draw a racing track. Do this on the big screen together. Show Convert to Bitmap, fill the whole backdrop green, then draw the black track. Make the track wide enough for a small car to fit.
5. Place your car on the track. Stress the order: drag the car onto the track first, then add the go to x y block so it captures that position. Adding the block first records the wrong spot.
6. Create a speed variable. Explain a variable as a named box that holds a value you can change. Use the score-in-a-game example. Show the new variable blocks appearing in the toolbox once one is made.
7. Detect where the car is. Show pupils how to click the colour swatch and eyedrop the exact green of their own grass. If their green differs from the example, the sensing will not work until they resample it.
8. Move forwards and backwards. Highlight that these key checks go inside the forever loop, under the colour check. Test up and down before adding more, so a broken key is caught early.
9. Move left and right. Point out turn ccw is counter-clockwise. Add left and right and test steering before the full drive so pupils fix one key at a time.
10. Drive your car! Have pupils click the green flag and drive. If a key does nothing, send them to that key's if block to check it. Celebrate the slow-on-grass effect as proof the sensing works.

WHAT TO WATCH FOR

- Pupils expect the car to move as soon as blocks are added, not realising nothing runs until the green flag is clicked. Reinforce that when green flag clicked is the trigger. Have them click the flag after each stage and watch what changes.
- The colour sensing fails because the green they drew does not match the green in the touching colour block. Show them to use the eyedropper on the touching colour block and click their own grass, so the two greens match exactly.
- Pupils drop the arrow-key if blocks outside the forever loop, so the keys only respond once. Zoom in on the block stack and show the if blocks nested inside forever. Explain forever means Scratch keeps checking the keys.

DIFFERENTIATION

- Emerging: Pair them with a partner who has the car uploaded and shrunk, so they start the coding steps from the same point. Pre-load the car picture on their device so they can focus on the blocks rather than the download and upload.
- Developing: Ask them to build one arrow key fully and test it before copying the pattern to the next, so each key is confirmed working. Have them explain aloud what the forever loop is checking on each pass.