LESSON 53

Studio: Autonomous Car

40 minutes | Project studios (optional extension sessions) | Built in Scratch | Outcome 1.7 | Outcome 1.8

WHAT THIS LESSON DOES

Students build a self-driving car in Scratch that uses colour sensors and conditionals to stay on a track, then discuss how sensing and decisions create smart-looking behaviour.

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
1.8	test the code to determine its functionality and to identify and manage errors

WHAT STUDENTS SHOULD BE ABLE TO DO

- Build a car that senses and steers by itself using conditionals (LO 1.7)
- Explain how sensing plus decisions makes behaviour look smart (LO 1.8)

BEFORE THE BELL

- Students logged in to Scratch at scratch.mit.edu with devices ready
- Model opening Scratch and deleting the cat sprite on the board before pairs begin
- Check that students can open the backdrop editor and use the rectangle and paint tools

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

Studio: Autonomous Car

HOW THE LESSON RUNS

4 min	introduction	Start: what we're building
2 min	content	How an autonomous car works
2 min	content	Create a new Scratch project
2 min	content	Add the car sprite
2 min	content	Shrink the car
3 min	content	Draw a test track
3 min	content	Place your car on the track
2 min	content	Create a speed variable
3 min	content	Drive forward
2 min	content	Turn right
2 min	content	Turn left
2 min	content	Speed up and slow down
3 min	content	Reverse
2 min	content	Wrap up
3 min	content	Make sense: what worked, what broke
2 min	content	Reflect
1 min	summary	What you covered

TEACHING MOVES

- Stress that students place the car on the track first, then add the go-to block so the start coordinates match their track
- When colour-touching blocks are added, have students click the colour swatch and sample from the car sensor and the track or grass on the stage, not from memory
- Keep speed low at first so the sensors have time to turn the car before it leaves the black road
- If a pair finishes early, invite them to redraw a tighter bend and test whether the same turn angles still work

WHAT TO WATCH FOR

- Colour values do not match the sprite or backdrop: re-sample the red, blue and orange sensors and the black and green areas directly from the stage
- Car starts off the track or facing the wrong way: position it on the road, then refresh the go-to and point-in-direction blocks from that pose
- Car shoots off when speed is high: drop speed back toward 5 and check that the reverse-on-grass condition is inside the forever loop

DIFFERENTIATION

- Support: Provide a simple oval track and model sampling one sensor colour together before pairs continue
- Extension: Challenge students to tune turn angles or speed so the car handles sharper corners without leaving the road
- Extension: Ask confident pairs to add a second, narrower lane and see whether the same sensor logic still holds