

LESSON 9

Studio: Autonomous Car

40 minutes

Build and Show

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.

WHAT STUDENTS SHOULD BE ABLE TO DO

- Students build an autonomous car that senses colour and steers with conditionals, and can explain how sensing plus decisions makes the behaviour look smart.

BEFORE THE BELL

- Students logged in to Scratch at scratch.mit.edu with devices ready
- Car sprite image available for download from the platform step so students can upload it
- 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

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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