

Studio: Rocket Lander

40 minutes

Project studios (optional extension sessions)

Built in Scratch

Outcome 1.7

Outcome 1.8

WHAT THIS LESSON DOES

Students build a Scratch rocket-lander game with gravity, thrust, fuel and landing checks, then test and tune the controls until a fair landing feels achievable.

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 physics game where variables control thrust and fuel (LO 1.7)
- Test and tune the landing until it feels fair (LO 1.8)

BEFORE THE BELL

- Students logged in to Scratch on classroom devices, with the starter project link ready to open.
- Have the board ready so you can model the first gravity and booster blocks for the room.
- Check that students can already open a Scratch project and run the green flag.

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

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HOW THE LESSON RUNS

4 min	introduction	Start: what we're building
3 min	content	The Space X Falcon 9
2 min	content	Open the starter project
2 min	content	Program gravity
2 min	content	Program booster
2 min	content	Paint the rocket thrust
2 min	content	Show the rocket thrust
2 min	content	Move left
2 min	content	Move right
2 min	content	Program the ship sprite
2 min	content	Land on the ship
3 min	content	Explode
2 min	content	Crash into the sea
2 min	content	Fuel
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

- Model gravity and the up-arrow booster on the board first so students see why move steps can beat the downward change y.
- Stress that the rocket must be nearly vertical on touch for a safe landing; link that to the angle variable check.
- When fuel is added, pause for a quick run so the class feels freefall after fuel hits zero.
- Leave a few minutes for pairs to tune fuel start value, thrust strength or ship speed until the landing feels fair.

WHAT TO WATCH FOR

- Booster code on the wrong sprite: move blocks back to the rocket and retest the green flag.
- Landing never succeeds because the angle range is too tight or direction is not near 0: check the angle variable and the -5 to 5 condition while the rocket is straight.
- Fuel never drops or booster still works at 0: confirm the fuel greater-than check sits with each arrow key and that fuel decreases when thrust is used.

DIFFERENTIATION

- Support: Provide the costume names and stand with students while they place switch costume and the first forever loops.
- Extension: Invite stronger pairs to tune fuel, thrust or ship speed, or add a simple score for successful landings.
- Extension: Challenge them to make a harder second level by lowering fuel or speeding the ship.