

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 a structured programming language: variables, operators, loops, decisions, assignment and modules.
1.8	Test code to find 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.
- Open Scratch in the browser; have the board ready to model the first gravity and booster blocks.
- 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.