

An inquiry into ramps and rolling



Lesson at a glance

Open with a hands-up guess: steep hill, gentle hill, or big push for a longer roll. Name force and compare, then agree one class question — higher vs lower ramp, or bigger vs smaller push. Practise a slope compare on the ramp-and-roll interactive, then groups run Try A and Try B with boards, books, toy cars and tape, measuring floor distance in centimetres. Record both distances and a short finding on the Investigation Journal page, pool numbers on the board, and close with talk on what the change did.

Learning objectives

- Ask a simple question about how a force changes how far something rolls
- Predict, try two conditions, measure distance and say what they found

Before the bell – prep

Pre-stage one station per group: board or stiff folder, stack of books, one toy car, masking tape, metre stick. Clear ~2 m smooth floor lanes. Investigation Journal pages ready at stations. Open the ramp-and-roll interactive on the IWB (explore mode, tiles on, slope 2, smooth) before the bell.

Materials

Item	Qty	Per	Source	Low-cost substitute
toy car	1	group	school kit	small wheeled toy or block with bottle-top wheels
board ramp (about 50–80 cm long)	1	group	classroom	a stiff cardboard folder or the hard cover of a large book
books to raise the ramp	4	group	classroom	small boxes or wooden blocks of similar height
masking tape	1	group	classroom	chalk marks on the floor or sticky notes as markers
metre stick or measuring tape	1	group	classroom	a 30 cm ruler used end to end, counting how many lengths
Investigation Journal page	1	pupil	classroom	plain A4 paper with the class question written at the top



Safety watch-point

Roll cars away from feet and faces; no running in the lane; crouch to pick up cars. Keep walkways clear at tidy-up.



Teaching moves

- **Forces on a ramp:** Board only force and compare plus one ramp bridge line. Model one full cycle aloud with one car and one ramp: wonder, predict, test one book then three books from the same start mark, observe both rolls, say what you think. Head off changing height and push together — one change only.
- **Our question and prediction:** Let the class vote one shared question: higher vs lower ramp, or bigger vs smaller push. Jot it in child-friendly words on the board. Whisper-pair predictions, take three or four aloud, and remind them everything except that one thing stays the same.
- **Practise a compare on the board:** Frame clearly: board practice always uses slope; stations still follow the class question. Loud prediction before every release. Run slope 2, leave the stop marker, change only slope (try 1 then 3), keep surface smooth, then ask what the two markers show. Fold desk watchers in after each run.
- **Try it with real ramps:** Enforce the shared rule: start mark on the floor at the bottom of the ramp; measure only along the floor in centimetres. Success bar is one go each way — Try A, change only the class thing, Try B. Circulate asking what is changing, what stays the same, and which roll went further. Capture both numbers before tidy-up.
- **Record our results:** Distances should already be jotted from the floor — this beat is copy, tidy, prediction and finding only. Offer the stem The ____ went further, or allow a circled higher/lower (or bigger/smaller) plus the two numbers if a full sentence is too heavy for 2nd class.
- **Share our distances:** Two board columns only: What we tried and Distance (cm). Every group contributes at least one distance; protect three minutes for the close. Ask which number is biggest, whether most groups found the same pattern, and who was surprised. Say each way we tried, not condition.
- **What you covered:** Revoice one or two pupil findings with force, further and compare. Ask why two tries beat one, and what they would keep the same next time. Invite pairs to name a ramp or slope at school or home, then collect cars, tape and metre sticks.

What it should show

A higher or steeper ramp, or a bigger push, should send the car further along the floor. If both runs look the same, the ramp is too low or the floor is rough — add one more book or clear a longer smooth lane. Oddly long carpet-side rolls often mean the car was pushed, not released from rest.



Misconceptions & interventions

- **Children want to change the ramp height and the push at the same time.** — Stop the group and point at the class question on the board: which one thing are we changing? Have them reset so only height or only push differs, then re-run.
- **Pupils measure from the top of the ramp or along the board instead of along the floor.** — Point to the shared start mark at the bottom end of the ramp. Re-model: tape goes on the floor where the car leaves the ramp; the metre stick runs only along the floor to the stop mark.
- **Pupils think only a hand push is a force, so the ramp does not count.** — Hold the car at the top of a higher ramp and release with no push. Name the stronger start from the higher slope as the force change they are comparing.

Differentiation

Emerging	Developing	Proficient
• Fix the start mark and release the car for the group; help read the metre stick to the nearest centimetre. • Allow a circled higher/lower (or bigger/smaller) plus the two numbers instead of a full finding sentence.	• If time allows, run a second pair of trials and check the distances still match the same pattern.	• Try a third book height, or check the same two tries on a slightly rougher floor strip, still changing only one thing. • Fast finishers sketch the ramp set-up on the journal page and label the one thing they changed.

Cross-curricular hook

Tie to Maths measures — pupils read centimetres on a metre stick and compare which distance is bigger.