

Friction: which surface grips most?

Lesson at a glance

Open with wet tarmac versus wet leaves on the school yard and a quick hands-up on which grips more. Teach friction and grip, then drive the fair-test-planner interactive so the class places surface, feel-of-pull, loaded shoe and pull style into Change, Measure and Keep the same. Groups predict on the Investigation Journal, pull a loaded shoe with an elastic band across carpet, sandpaper, tile and towel, mark easy/medium/hard, then rank most-to-least grip. Close with display-only talk linking grip to wet roads, icy paths and GAA boots.

Learning objectives

- Describe friction as a force that can slow a moving thing
- Rank surfaces by how much grip they give in a fair comparison
- Link grip to everyday Irish examples such as wet roads and GAA boots

Before the bell – prep

Evening before: count one full surface set (carpet scrap, sandpaper, smooth tile, towel), one loaded shoe and one elastic band per group, and pace clear floor patches. Short of sets or space? Use sequential stations (Option A) or half-class hands-on then swap (Option B). Print Investigation Journal pages; have the fair-test-planner interactive ready.

**Materials**

Item	Qty	Per	Source	Low-cost substitute
old shoe or small sturdy cardboard box	1	group	brought from home	a hardcover book or a small lunchbox
weight to load the shoe (bag of rice, filled water bottle, or two heavy books)	1	group	classroom	a stack of exercise books taped lightly so they stay put
surface set: carpet sample or carpeted floor area, smooth tile or laminate sample (or classroom tile), sandpaper sheet, folded towel	1	group	classroom	last resort only: sequential stations with shared samples (not full-class parallel testing; drop towel or split rotations — allow adjusted time)
thick elastic band or short length of string	1	group	classroom	a strip cut from a clean old pair of tights, knotted into a loop
Investigation Journal page	1	pupil	provided printable	plain paper with surface names, a prediction line, easy/medium/hard marks, and a rank list drawn by the pupil

Safety watch-point

Pull away from faces and feet; keep fingers out from under the shoe; never aim or stretch elastic bands at anyone. Collect bands and weights at tidy-up.

Teaching moves

- **Getting Started:** Keep the kit out of sight. Hold up a dry shoe and wet cloth if you like, ask which is safer after rain — dry tarmac or wet leaves — and take a quick hands-up. Note ideas like 'rough always grips' without correcting yet.
- **What is friction?:** Project only the short board text. Hold up each surface sample while pupils predict which will grip most. Revoice: friction is rubbing that slows things; grip is how strongly a surface holds. Save 'fair comparison' for the planning step.
- **Plan the fair grip test:** Drive the interactive yourself; pupils call placements. Name bins in kid language, then guide cards to Change = the surface, Measure = how hard it feels to pull, Keep the same = the loaded shoe and how we pull. Lock the same puller and slow steady style for every surface before groups leave the board.
- **Drag and feel the grip:** Hand out journals; groups write a short prediction first. Model one full cycle on carpet only — wonder, predict, steady pull until the shoe just moves, mark medium/hard. Circulate: same shoe, weight, elastic, puller; no yanks. After each surface the whole group agrees easy/medium/hard and writes it before moving on.
- **Rank and record the surfaces:** Ranks come straight from the written feel marks — most grip to least — before any why-sentence. If marks are missing or a yank spoiled one surface, calm re-test that pair with you watching the same puller. Offer the board starter: Most grip: ... Least grip: ...
- **What does the grip tell us?:** Sample evidence fast: hands-up for most- and least-grip surfaces, two or three groups only if ranks differ. Revoice harder pull as more friction. Spend the remaining minutes on grit, wet leaves, GAA studs and slippery hall floors in socks — do not tour every group's full rank list.

What it should show

Tile usually feels easiest (least grip); sandpaper or carpet often hardest. Towel can surprise if it bunches. Shared pattern across groups matters more than identical ranks — different shoe soles still count if each group kept its own shoe, weight, puller and pull steady. Odd ranks often mean a yank or a swapped puller; re-run that pair from a still start.

Misconceptions & interventions

- **Friction is like a magnet or sticky glue that pulls the shoe backwards.** — Trace the shoe sole on the surface with a finger: the surfaces are rubbing, and that rubbing is friction. Point back to the harder pull they felt as evidence of more rubbing, not magnetism.
- **Measure must mean a number on a ruler, so a felt pull does not count.** — At the planner board, revoice Measure as what we notice or feel today — easy, medium or hard — and place 'how hard it feels to pull' in that bin before groups start.
- **Anyone in the group can pull on different surfaces and the ranks still compare fairly.** — When 'how we pull' goes in Keep the same, say aloud: same person, same slow steady style every time — or ranks compare two pairs of hands, not two surfaces.



Differentiation

- {'emerging': ['Drop the towel so the group tests three surfaces only and has time to agree a feel mark for each.', 'Offer the board sentence starter Most grip: ... Least grip: ... when ranking.'], 'developing': ['After ranks are down, add one short why-sentence linking the hardest pull to more friction grip.', 'Check the group prediction written before the pulls against the final order.'], 'proficient': ['Repeat each surface a second time with the same puller; if the feel mark changes, say what changed about the pull.', 'During tidy, whisper one way to make the grip test even fairer next time.']}



Cross-curricular hook

Link to PE and GAA: studs on boots add grip on wet grass the same way rough surfaces gripped the loaded shoe.

