

Friction: which surface grips most?

Lesson at a glance

Open with wet leaves versus dry tarmac on the yard and a hands-up vote on which grips more. Teach friction and grip, then drive the fair-test-planner interactive so the class places change, measure and keep-the-same cards. Groups predict on the Investigation Journal, then pull a loaded shoe with an elastic band across tile, carpet, sandpaper and towel, marking easy/medium/hard. They rank surfaces from the feel marks and close with talk on 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

Night before: load one old shoe per group with a bottle or bag of rice; gather elastic bands and four surface samples each (tile, carpet scrap, sandpaper, towel). Count full sets — if short, plan sequential stations now. Open the fair-test-planner interactive; print Investigation Journal pages.

**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 snap elastic bands at anyone. Wipe sandpaper grit off the floor at tidy-up.

Teaching moves

- **Getting Started:** Keep the kit packed away. Hold up a dry shoe and wet cloth if useful, then ask which is safer after rain — dry tarmac or wet leaves. Take hands-up and note prior ideas (rough always grips; heavier always sticks) without correcting yet.
- **What is friction?:** Project only the short board text. Hold up or point to each surface sample while you name friction and grip. Take a quick prediction vote; leave guesses uncorrected. If someone asks why you are not timing a slide, revoice: the same rubbing that makes the shoe hard to start also slows it once it slides.
- **Plan the fair grip test:** Drive the fair-test-planner 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 puller aloud: same pupil, slow steady style, every surface.
- **Drag and feel the grip:** Hand out journals; groups write a short prediction first. Model one full cycle on carpet only, then release groups. Circulate for steady pulls not yanks, same shoe/weight/elastic/puller. After each surface the whole group agrees easy, medium or hard and writes it before moving on.
- **Rank and record the surfaces:** Pupils turn written feel marks into most-to-least grip order; optional why-sentence only after ranks. If marks are missing or a yank spoiled one trial, invite one calm re-test of the disputed pair with you watching. Board starter for stuck writers: Most grip: ... Least grip: ...
- **What does the grip tell us?:** Quick hands-up for most- and least-grip surfaces; hear two or three groups only if ranks differ. Protect time for Irish links — grit on icy paths, wet leaves on the yard, GAA studs, slippery hall floors in socks. Point predictions back to the journal note from the drag step.

What it should show

Expect tile near least grip (easiest pull) and sandpaper or carpet near most grip (hardest pull). Towel may surprise if it bunches. Groups can differ slightly with different shoe soles — still fair if each kept its own shoe, weight, puller and pull the same. A surface that feels oddly easy usually means a yank or a swapped puller; re-run that pair steady.

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; that rubbing is friction. Revoice harder pull as more grip from the rub, not a magnet.
- **Measure has to be a number on a ruler, so feeling the pull does not count.** — At the planner, revoice Measure as what we notice or feel today — easy, medium or hard. The fair rule is the same person and the same slow pull each time.
- **Different children can pull on different surfaces because everyone gets a turn.** — Name how we pull in Keep the same: one puller for all four surfaces (or each child does all four and records their own ranks). Swapping mid-test breaks the feel comparison.

**Differentiation**

Emerging	Developing	Proficient
• Use three surfaces only (drop the towel) and offer the board starter Most grip: ... Least grip: ... • Pair a less confident pupil as watcher-recorder first, then swap so they pull with you coaching the steady start.	• Repeat each surface twice and check the easy/medium/hard mark still matches before ranking. • After ranks, add one short journal sentence on whether the group prediction matched.	• Whisper one way to make the grip test even fairer next time (without adding new kit). • Spot three grip helpers already in the room — door mat, trainer soles, rubber feet on a chair — and link each to friction.

Cross-curricular hook

Link to PE and GAA: studs on boots add grip on wet grass so players can turn without sliding.