

materials

Our first fair test: which place melts ice fastest?



Lesson at a glance

Open by holding two same-size ice cubes and asking whether a windowsill or shaded corner would melt them faster, and how to find out fairly. Pupils predict for three places, then sort Change / Measure / Keep-the-same cards on the IWB fair-test planner and copy the plan into the Investigation Journal. Groups place identical cups at the three shared stations, start the class stopwatch together, and check every five minutes. They record melt times or ice-left ranks, then talk about which place was fastest and what kept the test fair.

Learning objectives

- State what makes a test fair: change one thing, measure one thing, keep the rest the same
- Plan and run a fair test of which place melts ice fastest
- Record melt times and say which place was fastest and why the test was fair

Before the bell – prep

Freeze same-size ice cubes overnight in identical bottle caps. Set out identical cups and mark three shared stations (windowsill, shaded corner, heater-side tray — cups not touching hot surfaces). Open the fair-test-timer on the IWB before any cube is placed.

Materials

Item	Qty	Per	Source	Low-cost substitute
same-size ice cubes (from one tray)	3	group	school kit	freeze water overnight in identical bottle caps or ice-cube trays so every cube matches
identical clear cups	3	group	classroom	identical clean yoghurt pots or bottle bottoms
class stopwatch (fair-test-timer on the IWB)	1	class	classroom	classroom clock with a second hand; optional table stopwatches per group if available
cloth or paper towels for spills	1	group	classroom	a spare tea towel per table
Investigation Journal page	1	pupil	provided printable	plain paper ruled into a small plan section and a three-row results table



Safety watch-point

Ice only — no hot water or flame. Cups beside the heater must not touch hot surfaces. Wipe melt water as it appears so floors stay safe.



Teaching moves

- **Getting Started:** Hold up two same-size ice cubes (or two identical empty cups) and ask only the screen question. Take three or four quick ideas without correcting; leave the rest of the kit out of sight and avoid the word variable.
- **Question and predict:** Agree the board question and confirm the three place names match your room. Capture spoken predictions as place names only. Say clearly that a surprising result is still good data — predictions need not be right. Keep Investigation Journals closed.
- **Plan the fair test:** Drive the five-card sort on the IWB first: place → Change; melt time → Measure; cube size, cup, start time → Keep the same. Give one short meaning as each card lands. Only after the sort is agreed, give a quiet minute for pupils to copy the finished plan into the Investigation Journal. Keep the design teacher-led — this is their first fair test.
- **Class stopwatch:** Open the fair-test-timer on the IWB now, before cups leave the tables. Keep it visible the whole melt. Start it on one shared class signal once every cup is in place; use the mark control when a place finishes.
- **Run the melt test:** Reassure first: if time runs out you stop together and rank ice left — still fair. Each group lines one identical cup at each shared station. Start the board timer the moment every cube is down. Call a shared check every 5 minutes. At about 10–15 minutes, decide with the class whether full melts will finish; if not, freeze at one agreed clock time and rank remaining ice for every place.
- **Record the melt times:** Pupils fill the three-row results table on the same Investigation Journal page as the plan — place name plus minutes to full melt, or rank/ice left if you stopped early. Circulate and prompt: numbers only in the boxes for now, not ideas about why.
- **Make sense of the results:** Pull times or ranks from two or three groups onto the board. Separate what we saw from what we think: name warmth from the evidence, not from station labels. Re-voice unfair examples (bigger cube, later start, different cups). If groups differ, treat that as data — draft, cube size — and check fairness.
- **Reflect and tidy:** Quick pair-share of the fair-test rule: change one thing, measure one thing, keep the rest the same. Wipe melt water, stack cups, wash hands if needed. Keep any reversible-change freeze remark to a passing line so it does not compete with today's rule.

What it should show

Expect the warmest place (often near the heater, sometimes a sunny windowsill) to finish first or leave least ice; the shaded corner is often last. Times vary with the room — trust what your room shows. Odd results usually mean cubes were not the same size, a cup sat closer to heat, or one group started late; re-check those controls.



Misconceptions & interventions

- **Pupils think a prediction must be correct or the science went wrong.** — Say before the run that a surprising result is still good data. After recording, celebrate a wrong prediction that the numbers overturned.
- **Pupils change more than one thing at once (different cube sizes or start times) and still call the test fair.** — Point back to the three Keep-the-same cards on the IWB sort. Ask: if the shaded cube was bigger, could we still blame the place?
- **Pupils think a little cold water left in the cup means the cube has not finished melting.** — Define fully melted as no solid ice left — cold water is fine. Model checking one cup together at the first finish.

Differentiation

Emerging	Developing	Proficient
• Offer the stem I think the ... will melt first because ... for predictions; assign one pupil per group as timekeeper if movement is limited.	• At the mid-run checkpoint, ask why ranking ice left is still a fair comparison if full melts will not finish.	• Before the planner opens, ask what would make the comparison unfair; fast finishers sketch unfair setups (different cube sizes, staggered starts) in the journal margin.

Cross-curricular hook

Tie to Maths Measures — pupils read elapsed minutes from the class stopwatch and compare times or ranks across the three places.