

materials

# Our first fair test: which place melts ice fastest?



### Lesson at a glance

Open by holding up two same-size ice cubes and asking whether a windowsill and a shaded corner would melt them at the same speed. Pupils predict which of three room places will be fastest, then sort Change / Measure / Keep-the-same cards on the IWB and copy the agreed plan into the Investigation Journal. Groups place identical cups at the shared stations, start the class stopwatch together, and record melt times or ice-left ranks. Close with talk on which place won and why the test was 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 (identical bottle caps work). Gather identical cups, three station trays (windowsill, shaded corner, heater-side – warm but safe), paper towels, and optional table stopwatches. Open the fair-test-timer and card-sort interactive on the IWB before the lesson.

### 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 and cold water only — no hot water or flame. Cups near the heater must not touch hot surfaces. Wipe melt water promptly so floors stay non-slip.



### Teaching moves

- **Getting Started:** Hold up two same-size ice cubes and ask only whether the windowsill and shaded corner would melt them at the same speed, then how we could find out fairly. Take three or four quick ideas without correcting; keep the full apparatus off the table.
- **Question and predict:** Agree the board question exactly: Which place melts an ice cube fastest? Name the three real room places and keep those labels visible. Each pupil whispers a prediction and reason; capture place names only. Stress that a surprising result is still good data.
- **Plan the fair test:** State the one fair-test rule first, then drive the full card sort on the IWB: place → Change; melt time → Measure; cube size, cup, start time → Keep the same. Say one short meaning as each card lands. Only after the sort, give a quiet minute for pupils to copy the plan onto the Investigation Journal page.
- **Class stopwatch:** Open the fair-test-timer on the IWB before any cups leave the tables. Keep it live for the whole melt and start it on one shared class signal once every cup is in place.
- **Run the melt test:** Mark three shared stations only; each group lines one identical cup at each. Start the board timer together, call a shared check every 5 minutes, and at about 10–15 minutes decide whether to finish full melts or freeze and rank remaining ice. Fully melted means no solid ice left.
- **Record the melt times:** Pupils fill only the three-row results on the same Investigation Journal page — minutes to full melt, or the same rank/ice-left rule for every place. Circulate and prompt: numbers only in the boxes; save why-ideas for the talk.
- **Make sense of the results:** Pull times or ranks from two or three groups onto the board. Draw out that warmer places usually finished first, that only place changed, and unfair examples (bigger cube, later start, different cups). Separate what we saw from what we think about warmth.
- **Reflect and tidy:** Pair-share the fair-test rule: change one thing, measure one thing, keep the rest the same. Wipe melt water, stack cups, and wash hands if needed. Keep any reversible-freeze aside brief so the fair-test rule stays the star.

### 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 usually last. Times vary by room — trust what your room shows. Odd results often mean a larger cube, a delayed start, or a draft; check whether only place truly differed.



Misconceptions & interventions

- Pupils think a prediction must be right, so a surprising melt order means they failed. — Say clearly before the run that surprising results are still good data. In the make-sense talk, celebrate a wrong prediction that the numbers overturned.
- Pupils change more than place — different cube sizes, cups, or start times — and still call it fair. — Point back to the three Keep-the-same cards on the board. Ask: if two things changed, can we tell which one caused the faster melt?
- Pupils write why-ideas (it was sunny) in the results boxes instead of times or ranks. — Prompt at the journal: Is that a time you measured, or an idea about why? Numbers or ranks only now; save thinking for the class talk.

Differentiation

| Emerging                                                                                                                                                                                                 | Developing                                                                                                                                                                             | Proficient                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Offer the stem: I think the ... will melt first because ...</li><li>• Assign one pupil per group as timekeeper so others focus on watching their cups.</li></ul> | <ul style="list-style-type: none"><li>• At the mid-run checkpoint, ask whether full melts will finish or whether the class should rank ice left — same rule for every place.</li></ul> | <ul style="list-style-type: none"><li>• Before the planner opens, ask what would make the comparison unfair.</li><li>• Fast finishers sketch unfair versions (different cube sizes or start times) in the journal margin.</li></ul> |

Cross-curricular hook

Tie to Maths measures and data — pupils record minutes or ranks and compare which place was fastest.