

materials

Repeat, evaluate and share

Lesson at a glance

Open by holding up one group's first-trial reading and asking whether a single number is enough to trust. Groups reassemble the same heating or cooling fair test, run Trial 2 and Trial 3, and log readings straight onto the DataTable. Model ordering three matching times and circling the middle value, then pupils complete the Results and Conclusion page. Pool trustworthy numbers on the data-recorder interactive and close with one-minute group shares of prediction, evidence and one method improvement.

Learning objectives

- Repeat a fair test and explain why repeats make results more trustworthy
- Pool, chart and evaluate evidence to decide whether the prediction held
- Present findings and one improvement to the method

Before the bell – prep

Return each group's own cups or wrappings and timers from earlier in this project. Have fresh ice from one tray ready, and pour any warm water yourself only. Check every FairTestPlanner already names today's measure or fixed observation window before the bell.

**Materials**

Item	Qty	Per	Source	Low-cost substitute
identical ice cubes from the same tray	8	group	school kit	freeze water in identical bottle caps the day before (same count: enough for every cup on two further full runs)
warm water in a jug (teacher-poured only)	1	class	classroom	use ice-cube investigations only if warm water is awkward
assorted wrapping materials (wool, foil, paper, bubble wrap)	1	group	classroom	scraps of fabric, newspaper and kitchen foil from home
identical cups	3	group	classroom	identical clean yoghurt pots
stopwatch or classroom timer	1	group	school kit	shared classroom clock with a second hand
thermometer	1	group	school kit	same pupil judges warm, cooler, cold by fingertip on every trial
cloths for spills	2	class	classroom	newspaper layers under cups
Investigation Journal pages from earlier in this project (Investigation Journal page and Investigation Journal page with first readings)	1	pupil	classroom	group plan sheet and trial table kept from the previous session
Investigation Journal Results and Conclusion page	1	pupil	classroom	ruled page with headings: Matching trials, Middle value or pattern, Did prediction hold?, One improvement

Safety watch-point

You pour any warm water — warm to the hand, never hot. Wipe spills at once. No tasting ice or water from the test; wash hands after wet kit.

Teaching moves

- **Getting Started:** Keep it light: hold up one first-trial reading (or invite a volunteer to name theirs) and ask if they would trust a big decision on a single number. Seat groups with the same partners and open FairTestPlanner plus first DataTable so the plan is in front of them — do not re-stage apparatus yet.
- **Why repeats matter:** Model the worked cycle aloud with one volunteer's first-trial story: same ice amount, same place, same timer; run Trial 2 and 3; take the middle value. Stress that the middle value (or clear pattern) is what we trust even when it disagrees with Trial 1. Keep evaluate off the board until Step 4.
- **Repeat our fair test:** Say the same-measure rule once, then start straight on set-up and Trial 2 — no plan conferences. Circulate asking 'Is this trial the same as the other repeats in every way that matters?' Raw numbers stay on the DataTable only. Pupils who should not handle ice or water become timer or recorder.
- **Record results and decide:** Board-model for about two minutes: order 8, 12, 11 → circle middle value 11. Pupils work the Results and Conclusion checklist only — matching trials, middle value or two-trial pattern, whether the prediction held, one concrete improvement. Offer stems: 'Our middle value shows... so our prediction did / did not hold because...'
- **Pool and chart the class results:** Drive the data-recorder on the IWB. Enter each group's trustworthy number only. Chart ice-wrap and warm-cup groups as separate runs if measures differ — never mix unlike units under one class average. Ask: 'What does the chart show, not what did we hope?'
- **Share findings and one improvement:** Keep the four-beat frame visible: question phrase → prediction held? → middle value or pattern → one concrete improvement. About one minute per group; if more than eight groups, tighten to middle value plus improvement only. After every two or three turns, ask one listener for 'one thing that was clear.'

What it should show

Trustworthy numbers come from matching trials only — middle value of three ordered times, or a stated pattern/halfway figure from two. Conclusions should tie to those numbers, not hope. Odd results usually mean a group mixed Trial 1's different window with later trials, or failed to reset starting temperature or place between runs — re-check same-measure and full reset.

**Misconceptions & interventions**

- **Children treat Trial 1 as the 'real' answer and see repeats as optional extras.** — Point back to the board model: order the three matching times and circle the middle value. Say aloud that this is what we trust even when it disagrees with Trial 1.
- **Pupils mix Trial 1 with later trials when the measure or observation window changed.** — Restate the same-measure rule: only matching trials go into the middle value or pattern; leave the odd trial as a note on the DataTable and use Trial 2 and 3 only.
- **A pupil says 'I still think wool is best' without looking at the numbers.** — Gesture to their Results and Conclusion page and the class chart: 'Evidence is what the measurements show — what do your matching-trial numbers actually say?'

**Differentiation**

Emerging	Developing	Proficient
• Pair as timer or recorder rather than handling ice or water; sit at the teacher table for the middle-value ordering with the board sample numbers first. • Offer the spoken stems for the conclusion sentence so they only fill the blanks from their DataTable.	• Prompt a second look at whether every matching trial truly kept place, amount and start the same before they lock the middle value. • Ask them to name which bar on the class chart matches their group and what that bar shows.	• Stretch the improvement into a fair-test critique: which single variable still wobbled, and how would the next plan lock it? • When sharing, revoice their evidence in full scientific language and invite them to say why an unexpected result is still useful data.

**Cross-curricular hook**

Tie to the Maths Data strand — ordering values, finding the middle value, and reading which bar stands out on the class chart.