

**materials**

Testing a property fairly: which is the most absorbent?

Lesson at a glance

Open with a small bench spill and ask which soaks up more, paper towel or tea towel, and how to compare fairly. Pupils sort Change / Measure / Keep-the-same cards on the fair-test-planner interactive, then groups run the class method: same-size dry pieces, 10 ml from a syringe, 30-second wait, tip-and-draw free water, ml held = 10 – free. They record two trials per material and averages on the Investigation Journal page. Class averages feed the data-recorder bar chart for a talk on ranking and fairness.

Learning objectives

- Plan a fair test by naming what to change, what to measure and what to keep the same
- Compare absorbency of materials using the same method, repeats and an average
- Explain what would make the absorbency test unfair

Before the bell – prep

Cut paper towel, cotton, felt and nylon into matching ~10 cm squares (spares for wet mistakes). One tray, marked syringe and shallow dish per group; small jug of water ready. Leave 10 ml, 30 s and ml held = 10 – free on the board before groups start.



**Materials**

Item	Qty	Per	Source	Low-cost substitute
paper towel pieces (same size, about 10 cm square)	3	group	classroom	kitchen roll squares brought from home
cotton fabric samples (same size as paper pieces)	3	group	classroom	cotton scraps from home, all cut to the same size
felt fabric samples (same size as paper pieces)	3	group	classroom	felt scraps from home or craft offcuts, all cut to the same size
nylon fabric samples (same size as paper pieces)	3	group	classroom	nylon or waterproof fabric scraps from home, all cut to the same size
jug of water	1	group	classroom	a large bottle of water per group
plastic syringe or dropper marked in ml	1	group	school kit	a teaspoon used with careful counting (whole class only; record teaspoons held, not ml)
shallow tray or dish	1	group	classroom	a clean plastic takeaway lid or deep plate
kitchen or balance scales (optional — only if the whole class has agreed the mass-gain method; omit for the preferred syringe leftover method)		group	school kit	skip weighing; measure ml offered minus ml left free on the tray (preferred class method)
stopwatch or timer	1	group	classroom	the classroom clock or teacher's phone timer called aloud
cloths for wiping spills	2	class	classroom	extra paper towel kept only for clean-up
paper towel and tea towel for the hook demo	1	class	classroom	any two different absorbent cloths

Safety watch-point

Wipe spills as they happen; walk with water; keep trays and syringes away from devices and electrical sockets.



Teaching moves

- **Getting Started:** Dab a small spill once with paper towel and once with a tea towel. Take two or three quick fairness ideas only — same size, same water, same time — without correcting every answer or laying out the full kit.
- **Question and Predict:** Show the four dry same-size pieces. Partners whisper which will hold most and why. Note one or two pupil reasons on the board; do not reveal a winner.
- **Plan the Fair Test:** Drive the fair-test-planner interactive: Change = the material; Measure = how much water it holds; Keep the same = amount offered, piece size, time. Fold in fair test, absorbency and average as cards land. Check Investigation Journal plans match the board before anyone wets a piece.
- **Model the Method:** Think aloud with one material only. Offer 10 ml, wait 30 s, tip free water and draw it back; say ml held = 10 – free and model average from two dry pieces. Pupils watch — no journal numbers yet. Stick to one class method for every group.
- **Run the Absorbency Test:** Groups test one material at a time with two dry pieces each. Walk the room for size drift, reused wet pieces and numbers written trial-by-trial. If the clock bites, finish two materials thoroughly and pool class data rather than rush sloppy trials.
- **Check and Average Results:** Send any one-reading group back for a second dry trial before they rank. Check $\text{sum} \div 2$ and ml units. Stretch: how much more did the top material hold than the bottom?
- **Make Sense of the Data:** Pool one class average per material into the data-recorder interactive and show the bar chart. Prompt what changed, what was measured, what stayed the same, and what would make the test unfair. Link the tallest bar briefly to tiny spaces in paper towel if it fits.
- **Reflect and Tidy:** Three or four voices on fairness, then oral exit checks — What did we change? Measure? One keep-the-same? Empty trays, dry tables, bag damp fabrics.

What it should show

Expect paper towel and cotton to hold more water than nylon; felt sits between or near cotton depending on thickness. Ranking and a fair method matter more than exact ml. Odd ties at 10 ml mean both pieces took all the water — re-run those only with a slightly larger offer, same size and time. A piece that underperforms was often still damp or a different size.



Misconceptions & interventions

- **A fair test means everyone gets a turn or we all agree on the winner.** — Point back to the planner cards: fairness here is changing only the material and keeping size, water and time the same so the evidence can be trusted.
- **A bigger or thicker-looking piece must be more absorbent, so size need not match.** — Hold two different-size scraps: the bigger one can hold more water even if the material is weaker. Revoice why every piece is the same ~10 cm square.
- **One reading is enough, or a wet piece can be reused as the second trial.** — Show a damp piece already holding water. Insist on two dry pieces, then average = (reading 1 + reading 2) ÷ 2 so one fluke does not decide the rank.



Differentiation

Emerging	Developing	Proficient
• Pair for syringe reading and averaging; allow pointing to Change / Measure / Keep-the-same on the board when filling the Investigation Journal plan. • If needed, complete two materials thoroughly with support rather than the full set.	• Prompt why each keep-the-same matters if a trial looks odd, and check the ranking matches their own averages.	• Ask how much more the top material held than the bottom, and name one change that would make the class test unfair. • Critique a volunteer group's method against the board checklist before the bar chart.



Cross-curricular hook

Tie to Maths Data and Measures — averages from two readings and a bar chart of ml held per material.

