

materials

Properties and the right material for a job

Lesson at a glance

Hook with a soggy lunch bag or cracked egg and ask what the material had to do well. Groups take one job card (keep a sandwich dry, protect an egg, or make a strong bag handle), predict which tray materials will work, then run the fair-test starter on the card. They sort by the properties the tests showed, record choices on the Investigation Journal page, and share one chosen and one rejected material with evidence.

Learning objectives

- Test materials against a real job and match properties to the job's needs
- Justify material choices with evidence from simple tests
- Explain how new materials change what people can make

Before the bell: prep

Print Investigation Journal pages and job cards. Set shared material trays. Half-fill water trays only for sandwich groups; cool hard-boiled eggs and towels for egg groups; bag equal weights and one bag shell (a paper bag or a folded stiff sheet) per handle group. Paper towels ready for spills.

**Materials**

Item	Qty	Per	Source	Low-cost substitute
assorted material samples (foil, paper, card, cloth, plastic bag, bubble wrap, kitchen towel, string), cut or torn to similar sizes	1	group	classroom	scrap packaging and fabric from home collections
shallow water tray	1	sandwich-job group	classroom	a deep plate or lunchbox lid
spoon for water tests	1	sandwich-job group	classroom	a bottle cap used as a scoop
paper towels for sandwich stand-ins and spills	6	group	supermarket	scrap paper or old tea towels for drying only
hard-boiled egg	1	egg-job group	supermarket	a small ball of plasticine or playdough marked as the fragile object
folded cloth or towel drop zone	1	egg-job group	classroom	a folded jumper or stacked newspaper
small identical weights (coins in bags, metal washers, or small books)	5	handle-job group	classroom	identical wooden blocks or unopened food tins of the same size
bag shell for handle tests (a paper bag, or a stiff sheet folded into a simple bag)	1	handle-job group	classroom	a small empty tub or yoghurt pot with two punched holes for handle ends
job cards with fair-test starter (keep a sandwich dry; protect a fragile egg; make a strong bag handle)	1	group	provided printable	jobs and starter lines written on sticky notes
blank property label cards or sticky notes	8	group	classroom	scrap paper strips
Investigation Journal page	1	pupil	provided printable	plain paper ruled into a simple table by the pupil



Safety watch-point

Teacher or SNA nearby for egg drops; wipe spills at once; wash hands after egg contact; no tasting; keep loads low and feet clear of weights.

Teaching moves

- **Getting Started:** Keep it light: hold up a soggy paper bag only if ready, otherwise the question is enough. Ask what the bag or wrap needed to do well; collect two or three words (dry, strong, soft) and hold them for the next step. Leave trays in place and do not name the tests yet.
- **Properties that matter:** Six minutes on the board before job cards go out. Define property and match-to-the-job; model an evidence sentence with a bookmark example so no real job is solved. Say the order twice: what I did, what I saw, what I chose and why. If a child answers a real job, take it as a prediction only.
- **Our jobs and predictions:** Hand one job card per group so the three jobs spread around the room. Place job-specific kits only with matching groups. Think-pair-share: press gently for a property word. Look for the job need named before the material, and every pupil able to restate the group's prediction.
- **Test materials for the job:** You set the jobs, fairness rule and method skeleton; groups choose materials, success judgment and test order. Circulate asking what stayed the same and which property is really under test. If two things change at once, stop and reset. Coach only that job's controls: water amount and wait; drop height; same weights and fixings.
- **Sort by the properties that matter:** Sorting after testing only. Ask: are you sorting by how it looks, or by what the test showed? Insist each pile has a property label tied to the job: block one big unmarked 'good' pile.
- **Record our choices:** Point pupils to the Investigation Journal layout: material, property noticed, chosen or not, short reason from the test. Circulate and push 'point to what you saw.' Fast finishers add a second-choice material and when it might still help.
- **Justify our choices:** Two or three groups present first; fold others in with 'Do you agree with their property? What would make their test unfair?' Draw out that foil can win waterproofing and fail cushioning. Read the short raincoat passage: newer materials let people make things older ones could not, such as lighter waterproof coats. Then ask the classroom or journey-to-school question. Exit check: two pairs share the partner sentence.

What it should show

Sandwich groups should pick waterproof samples (e.g. foil/plastic) over towel or open cloth. Egg groups should favour soft, cushioning wraps over stiff card or thin foil. Handle groups should favour strong, non-tearing strips that hold the target load. Odd results usually mean uneven water, different drop height, or unequal fixings: re-run with one control named aloud.



Misconceptions & interventions

- **Pupils pick a material because it 'looks strong' or 'looks nice' without linking a tested property to the job.** Ask them to point to what the test showed. Prompt: 'Say the job need first, then the property, then the material' before they write the Journal reason.
- **Pupils think plastic is always best for every job.** Hold up a foil or plastic win on the sandwich job beside a soft cloth or towel win on the egg job. Say: the job decides. Plastic may waterproof well but cushion poorly.
- **Groups change water amount, drop height or fixings between materials and still call it a fair test.** Stop the table, reset, and re-voice the card starter: only the material changes. Have them name the one control they will keep the same on the next trial.



Differentiation

Emerging	Developing	Proficient
• Board stems: 'Our job needs a material that... We predict ... because...' • Sort into two piles only (helps the job / does not help) with one property label each.	• Name two materials to compare and say which property they will watch during the test. • Three-way sort (best / partly useful / not useful) with a property note on each pile.	• Add a second-choice material on the Journal and say when it might still be useful. • Critique another group's test: name one change that would make it unfair.



Cross-curricular hook

Link to English oral language: groups justify with the evidence sentence structure modelled on the board.