

materials

Comparing properties

Lesson at a glance

Open with a cotton sock beside a plastic lunch box and ask which bends and which would hold soup. After naming property and compare, pupils predict which of four labelled strips — card, plastic, cotton, foil — will bend most. Groups run a shared bend test (same overhang under a book), plus quick see-through and gentle-pull checks, then rank the strips. Class bend centimetres go into the data-recorder interactive; pupils write bend ranks and a natural-versus-made-by-people note in the Investigation Journal.

Learning objectives

- Compare and contrast materials by testing the same property across several samples
- Rank materials and say how natural materials and materials made by people compare

Before the bell – prep

Night before, cut and label four matching strips (~20×3 cm) per group: card, clear document-wallet plastic, cotton cloth, foil folded once lengthways. Tray each group a hardback book, ruler, pencil and scrap note. Hide the strips until after the sock/lunch-box hook.

**Materials**

Item	Qty	Per	Source	Low-cost substitute
soft everyday fabric item for the hook (cotton sock or tea towel)	1	class	classroom	any soft clean cotton cloth from the classroom
stiff everyday plastic item for the hook (opaque plastic lunch box or bottle)	1	class	classroom	any stiff empty opaque plastic container from the classroom
card strip (about 20 cm by 3 cm, cut from a cereal box or scrap card)	1	group	classroom	strip cut from a corrugated cardboard box
plastic sheet strip (cut from a clear document wallet or empty water bottle)	1	group	classroom	strip from a clear food bag (thicker freezer bag works best)
cotton cloth strip (about 20 cm by 3 cm)	1	group	classroom	strip from an old clean tea towel or cotton t-shirt
aluminium foil strip (about 20 cm by 3 cm, folded once lengthways for strength)	1	group	supermarket	foil from a clean used food tray, flattened and cut
30 cm ruler	1	group	classroom	a marked paper strip with centimetres copied from the board
hardback book (to pin one end of each strip at the desk edge)	1	group	classroom	a ring-binder or several stacked reading books
label stickers or masking-tape labels (card, plastic, cotton, foil)	4	group	classroom	write names in pencil on the strips themselves
pencil and scrap note for bend numbers	1	group	classroom	one sticky note or the back of a spare label strip
Investigation Journal page	1	pupil	classroom	plain paper for bend ranks and one short comparison note

Safety watch-point

Gentle pull only, away from faces; no snapping strips toward eyes. Stop at the first tear. Keep any paperclips in the tray.

Teaching moves

- **Getting Started:** Hold up only the sock (or tea towel) and the opaque lunch box; keep the test strips out of sight. Stay three minutes on bending and holding water — accept every idea, then move on once children start asking their own questions.
- **Properties we can compare:** Board-copy the two short definitions: property and compare. If a child says one material is 'better', revoice 'better at bending' or 'better for a job'. Link quickly to a raincoat versus a jumper.
- **What do we think will happen?:** Flash the four labelled strips, then lock the class on the bend prediction only. Note two or three spoken stems on the board in the children's words. Add one line: card and cotton are natural; plastic and foil are made by people. Mention the two glance-and-go checks so they do not steal the bend prediction.
- **Test the materials:** Model live with card then plastic only: same ~15 cm overhang under the book, measure desk-top to tip, say the centimetres aloud. Send groups to all four; one child jots bend numbers on the scrap note. See-through and gentle pull are glance-and-go — no writing. If all readings match, lengthen the free end; floppy cotton/foil that hangs straight down is a real result ('hangs fully' or free length in cm).
- **Rank the materials:** Lead with bend only: strips in a desk line, scrap note still on the tray. Spot-check one group — 'Show me how you know foil is bendier than card.' Equal materials may sit side by side. Add see-through then strength orders only if time allows, naming the property each switch.
- **Chart our bend results:** Open the data-recorder interactive; groups call scrap-note centimetres while you type one class figure per material (middle value if they differ; free length for 'hangs fully'). Show the bar chart and ask tallest/shortest, then a short natural-versus-made-by-people glance — mixed is fine.
- **Record on your journal page:** Keep the ask narrow for 2nd class: bend ranks matching the class chart plus one short natural/made-by-people note. Leave the four sentence starters on the board. Stretch only for early finishers: one job a material would suit, linked to a property.
- **What did we find out?:** Display-only make-sense talk: bendy wraps, stiff holds shape, see-through lets light in, strong carries a load. Glance around the room at window, jumper and chair. Collect strips into the class tray; check the floor for foil scraps.

What it should show

Expect cotton (often foil) most bendy — large drop or 'hangs fully' — and card least bendy; plastic usually between. See-through: clear plastic highest; cotton/card/foil low. Pull: foil tears or stretches easiest; card and plastic stay firmer. Oddly similar bend numbers usually mean the free length was too short — let more strip stick out and re-measure.

**Misconceptions & interventions**

- **Children say one material is 'better' overall instead of better at a named property or job.** — Revoice on the spot: 'Better at bending, or better for holding soup?' Point back at the sock versus lunch box and the property word on the board.
- **Groups change how far the strip sticks out, so bend differences come from the hold, not the material.** — Stop the group, point at the book edge, and re-model the same free length on two strips before they measure again.
- **Children think natural materials always 'win' or always lose against materials made by people.** — On the bar chart, place card and cotton beside plastic and foil and ask whether the pattern is mixed — cotton very bendy, card stiffer is a fair finding.

**Differentiation**

Emerging	Developing	Proficient
• Pair at the teacher table for the bend hold; adult steadies the book while the child reads the ruler, then the pair places the four strips in a most-to-least line together. • Journal: copy the class most-bendy and least-bendy labels and finish one starter sentence only.	• After bend ranks, add the quick see-through order using the same four strips and say one reason aloud. • On the journal, complete the natural and made-by-people starters with one observed property each.	• Write one job a material would suit linked to a tested property (e.g. foil for wrapping because it bends around things). • Fair-test critique aloud: what must stay the same next time so bend results can be trusted.

**Cross-curricular hook**

Tie to Maths Measures and Data — centimetre bend readings become class bars; compare tallest and shortest.

