

Test, improve and share

Lesson at a glance

Groups open with their existing prototype and Design Brief success criteria on the table. After a quick teacher model of a book-rest load test, each group runs its own first checks with weights, ruler and timer, then records pass/not-yet plus one observation per criterion in the Investigation Journal. They name and make one evidence-based change from a limited improve kit, re-test the same way, write a one-sentence evidence claim, and share via short front talks plus a desk-round gallery.

Learning objectives

- Test the prototype against the success criteria agreed earlier in this project
- Make one improvement, re-test and record what changed
- Present the design and the evidence of how well it worked

Before the bell – prep

Return each group's prototype and Design Brief to their table. Set a per-group test kit (3 small books or bean tins, metre stick or 30 cm ruler, stopwatch or shared clock). Pre-cut card strips and triangles; hold masking tape, straws and scrap until the improve step. Clear floor space and walkways.

**Materials**

Item	Qty	Per	Source	Low-cost substitute
group prototypes from earlier in this project	1	group	classroom	if a prototype was damaged, allow a 5-minute rebuild from the original Design Brief sketch before testing
Design Brief pages from earlier in this project	1	group	classroom	a fresh sheet where the group rewrites the three success criteria from memory under teacher check
small test weights (books or bean tins, about 200–400 g)	3	group	classroom	a filled water bottle with the lid on, same bottle for every trial in that group
metre stick or 30 cm ruler	1	group	classroom	a marked string or footprint paces agreed by the group for distance checks
stopwatch	1	group	school kit	classroom clock with a second hand or a phone timer operated by the teacher
masking tape	1	group	classroom	sticky tack or string ties for light joins
drinking straws	6	group	classroom	rolled paper tubes from scrap paper
card offcuts (include pre-cut strips and triangles)	4	group	classroom	cereal-box card brought from home, pre-cut where possible
round-tip scissors	1	group	classroom	teacher makes cuts at a cutting station
sticky notes	4	group	classroom	small scrap-paper slips and pencils; or keep peer feedback spoken only
Investigation Journal pages	1	pupil	classroom	plain paper ruled into first-test / re-test / conclusion sections by the pupil

Safety watch-point

Stand back in load or collapse tests; keep fingers out from under structures; adult-supervise scissors and make difficult cuts; keep walkways clear.

Teaching moves

- **Success criteria and a fair test:** Project only the success-criteria definition. Give every group time to read their three Design Brief checks aloud to a partner. Do not model the full fair test yet, and hold groups to testing only — no rebuilding in this beat.
- **First test against the criteria:** Open with a one-minute worked model on a spare prototype: predict, load one book then two, name the failed criterion. Release groups to parallel table tests. Circulate asking which criterion they are on and what counts as a clear pass; stop anyone who starts rebuilding mid-test.
- **Record the first test:** Mirror the three write-fors on the board: criterion, pass or not yet, what we saw. Insist on a specific observation for every check, including fails. When most are done, hear two groups share one result only to seed the improvement choice.
- **One improvement:** Release the limited improve kit. Before tape or scissors, every group writes one planned change and why the first-test result chose it. Hold the one-change rule; prefer pre-cut pieces and send only one planned cut per group to the supervised station.
- **Re-test after the change:** Say aloud: same criteria, same method, only one design change. Groups fill first-test beside re-test on the Investigation Journal page and write one evidence sentence. Ask whether the aimed-at criterion improved and whether anything unexpected got worse.
- **Present the design and the evidence:** Hear four or five groups for about one minute each on the four-beat prompt: user, build, one improvement, first-test to re-test evidence. Then run a desk-round so every prototype is seen; peers leave one like and one question, spoken or on a sticky note.

What it should show

A successful outcome is a first-test record against every written criterion, one change tied to a failed check, a matched re-test, and a short evidence sentence. Many first builds will fail at least one load, stability or time check — that is useful data. A re-test that looks worse often means the method drifted (different weight or start) or more than one change was made.

Misconceptions & interventions

- **Pupils want to rebuild the whole design instead of testing first.** — Hold materials back and restate the three jobs: test, one change, then present. Point them at the failed criterion on their Design Brief before any rebuild talk.
- **Pupils pile on three fixes at once so they cannot tell what helped.** — Ask which single change would help the failed criterion most, and have them write only that sentence on the Investigation Journal page before tape comes out.
- **Pupils claim success because the model looks neat, without pointing to a result.** — Prompt: show the pass/not-yet or the number from the journal. A claim without a result is only an opinion — evidence is what you measured or saw.

**Differentiation**

Emerging	Developing	Proficient
• Re-run the failed criterion once with the teacher watching, then choose the simplest stabilising change from the kit (wider base, tape join or triangle brace). • Accept clear pass/not-yet plus a short spoken observation if written notes are thin; scribe the one change sentence with them.	• Prompt a labelled before-and-after note on the journal page while they wait after the improve step. • Ask whether anything unexpected got worse on the re-test and add that to the evidence sentence.	• Critique fairness: did method stay identical apart from the one change, and would the user trust this evidence? • In the share, name what they would improve next and which new criterion they would add.

Cross-curricular hook

Link to oral language: one-minute evidence talks using the four-beat prompt, with kind peer questions tied to results not looks.

