

engineering

Plan and draft the helper

Lesson at a glance

Open with the idea that guessing is not enough: someone in school has an awkward job and makers ask and watch first. Model empathy with a large reading book, then pairs take turns as user and maker, writing the user, the awkward job and one thing they noticed on the Design Brief page. Guided one beat at a time, they sketch two quick ideas, choose one, label two parts and list materials from the sample tray. Close with a kind pair-share of plans before making next time.

Learning objectives

- Use empathy to confirm a real user's problem by asking and watching, not guessing
- Draft two or more helper ideas, choose one, and label a plan with the materials to use

Before the bell – prep

Decide the user setup before the bell (default: pairs as user/maker). Print one Design Brief page per pupil. Place a large reading book by the board for the live model. Set a sample tray of card, tape, sticks and fabric on each table — handle only, no building today.

**Materials**

Item	Qty	Per	Source	Low-cost substitute
Investigation Journal Design Brief page	1	pupil	provided printable	a blank A4 page with headings User, Problem, Drafts, Chosen plan, Materials
large reading book (demo prop for live model)	1	class	classroom	a large workbook, atlas, or ring binder that is awkward to hold open with one hand
clipboard	1	group	classroom	a hardback book or firm cardboard sheet to lean on
design paper for extra ideas	2	pupil	classroom	the back of used worksheets
coloured pencils	1	group	classroom	ordinary pencils only
sample build materials tray (card offcuts, paper strips, masking tape, lolly sticks, string, cardboard tubes, fabric scraps, bottle tops)	1	group	classroom	card from cereal boxes, used envelopes, elastic bands and spare pencils as stand-ins

Safety watch-point

No filming users and no making anyone feel silly. Keep helper ideas simple and safe for classroom use; sample-tray materials are for handling and listing only — no building or cutting today.



Teaching moves

- **Ask and watch first:** Project only User and Ask and watch. With a volunteer and the large book, think aloud: ask one question, watch the job, notice what is awkward. Sketch two rough helpers on the board, name one good and one tricky point each, choose one and add two labels plus a material. Finish choose-and-label even if time is tight so pairs see the full sequence.
- **Ask and watch:** Run pairs at tables: one shows an awkward classroom job, the other asks and watches. Coach stems: What job feels awkward? Can you show me? What would make that easier? Each pair settles on one named user and one job, then fills the Investigation Journal user section straight away — no helper drawings yet. Take two quick whole-class shares of real needs.
- **Draft, choose and label the plan:** Show your sample plan (folded-card prop, stick stand, then clearer L-stand with base, back rest, card/tape/sticks). Reveal one board beat at a time only. Protect two quick ideas, one clearer chosen drawing, two labels and a short materials list from the tray. Good/tricky talk is a 30-second whisper — no writing. Steer toward simple holding or standing helpers makeable next time; stop anyone who starts building.
- **Share our plans:** Pair the pairs with a visible two-minute timer each way. Pupils name user, awkward job and materials; listeners give one I like... or I wonder... comment. If a pair still cannot name the user or job, send them back to the Journal user box rather than polishing the drawing. Store pages for the making session.

What it should show

Every pair leaves with a named real user, one awkward job drawn from watching (not inventing), two quick idea sketches, and one clearer plan with at least two part labels and a short tray materials list. Plans should be simple classroom helpers (book stand, brush pot, wedge, hook). If a plan is a huge gadget with no link to what the user showed, send them back to the user box.

Misconceptions & interventions

- **I'll just invent a clever gadget — I already know what they need.** — Ask what did your user say or show? Send them back to watch the job again and write one real difficulty before any helper sketch.
- **One idea is enough; drawing two wastes time.** — Point back to your board model: two rough boxes first, then choose. Ask why makers draw more than one idea before they choose, and require the second sketch before labels.
- **We're making it now — let's stick the card together.** — Remind them the tray is for choosing and listing materials only. Cover or lift tape if needed and restate: clear plan today, build next time in this project.

**Differentiation**

Emerging	Developing	Proficient
• Sit at the teacher table; allow tracing a simple L-shape or folded stand, then add two labels and copy materials from the sample tray list. • Provide the sentence stems on a card so they can complete the user, job and one noticed difficulty boxes.	• After the clearer plan, add one extra label or name a backup material from the same tray. • Prompt: which part of your plan matches what your user showed was hard?	• Add a second view of the chosen helper or note one part that might move. • In the pair-share, offer an I wonder... about whether the plan still meets the real user need and the makeable-from-tray constraint.

Cross-curricular hook

Links to oral language: kind I like... / I wonder... feedback and clear talk when naming the user and the awkward job.

