

Drawing a design others can build

Lesson at a glance

Show one finished postcard stand, then put it away and ask what a page would need if the designer could not talk. Model a live side-view sketch on the board with parts labelled, card named and rough sizes in centimetres plus one join note. Pupils sketch only in the Investigation Journal — free-standing L-fold or lean-back stand, no build. Partners swap journals and describe the build steps from the sketch alone. Close with a display-only talk on what made sketches easy or hard to follow.

Learning objectives

- Draw a labelled design sketch with parts, materials and rough sizes
- Read a partner's sketch and describe or build from it
- Explain why clear plans help engineers share ideas

Before the bell – prep

Print one Investigation Journal page per pupil. Have one simple finished postcard stand ready to show, then put away. For the sketch step put only journals, pencils and rulers on desks; keep card, tape and scissors off tables until after the describe test. One blank postcard per pair for size-checking.

Materials

Item	Qty	Per	Source	Low-cost substitute
Investigation Journal page	1	pupil	provided printable	plain A4 paper with a hand-drawn box for the sketch
30 cm ruler	1	pupil	classroom	a marked strip of card with centimetre marks
paper or thin card offcuts	4	pair	classroom	used cereal-box card cut into rough rectangles by an adult
masking tape	1	pair	classroom	sticky tape or glue stick
scissors	1	pair	classroom	pre-cut strips prepared by an adult
blank postcard or photo-sized card	1	pair	classroom	a 10 cm by 15 cm piece of card or stiff paper
teacher model postcard stand	1	class	classroom	a shop photo frame stood on the desk for the hook only

**Safety watch-point**

Default path is sketch and describe only. If the optional stretch build runs: supervise scissors, adult makes awkward cuts, keep tape strips short, and keep swinging card edges clear of eyes.

**Teaching moves**

- **Getting Started:** Hold up the finished postcard stand briefly, then put it away so nobody copies it. Ask: what would need to be on the page if I could not talk to you? Accept parts, materials and sizes. Do not hand out build materials yet.
- **What makes a design sketch clear?:** Board the three must-haves: parts labelled, materials named, rough sizes in cm. Model an L-shaped card stand live — think aloud as you label base and upright, write card, mark about 12 cm and 10 cm, and add fold once, tape both sides. Ask which of the three partners miss most often when they get stuck.
- **Design and sketch your stand:** State the challenge: free-standing postcard stand, sketch so a partner could build without you talking — do not build yet. Leave the checklist visible. Circulate: name that blank piece; about how wide is the base; could I follow this with no questions? Stop two minutes early so every page has labels and at least one size.
- **Can a partner follow your sketch?:** Pairs swap journals. Person holding the partner's page speaks first and describes build steps in order from the sketch alone; partner listens. Then swap. Keep card, tape and scissors away unless you open the optional shared stretch build. Last three minutes: one quick missing label or size only — no full redraw.
- **What made a sketch easy or hard to follow?:** Whole-class talk under Helped / Needed. Steer to labels, material names, centimetre sizes and join notes, not neatness. Revoice concrete examples: the arrow stopped you guessing which rectangle was the base; without a width you did not know how wide to cut.

What it should show

A successful sketch labels base and upright (or fold line), names card or paper, marks rough sizes in cm, and has at least one fold or tape join note. Partners should name parts, know the material and rough cut or fold size without asking. If a partner freezes, the usual gaps are a missing label (cannot tell which shape is which) or a missing width.

Misconceptions & interventions

- **A neat or pretty picture is enough — decoration will help my partner build it.** — Point at a tidy unlabelled drawing and ask: could I follow this if I could not ask you anything? Hold the three must-haves checklist beside it and have them add the missing label, material or size on the spot.
- **A fancy 3D-style drawing is better than a simple side view with labels.** — Praise a plain complete side view over an ornate incomplete one. Revoice: builders need parts, materials and sizes they can trust — clarity beats decoration.



Differentiation

Emerging	Developing	Proficient
• Copy the three must-haves from the board checklist and design a simple folded L-stand only; teacher table prompts for one missing label or size.	• After the describe test, add one repair — a missing join note or a second size — while the partner's question is still fresh.	• Add a top view as well as the side view, or number the fold order; if stock allows, lead one quick shared build from one of the pair's sketches.

Cross-curricular hook

Tie to Maths Measures — rough sizes marked in centimetres and checked against a real postcard length.