

Drawing a design others can build

Lesson at a glance

Open by showing a finished postcard stand briefly, then hide it and ask what would need to be on a page if the designer could not speak. Model a clear side-view sketch on the board with labelled parts, named materials and rough centimetre sizes plus one join note. Pupils sketch their own free-standing card stand in the Investigation Journal (no building yet), then swap pages so each partner describes the build steps from the sketch alone. Close with a 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. Make one simple folded-card postcard stand to show once, then put away. Keep one blank postcard per pair for size-checking. Hold card, tape and scissors off desks until after the partner describe test (or for the optional stretch build only).

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**

If the optional stretch build runs: supervise scissors (adult makes awkward cuts), keep tape strips short, and stand clear of swinging card edges near eyes.

**Teaching moves**

- **Getting Started:** Hold up the finished postcard stand briefly, then put it away so pupils design their own idea. 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 kit or start sketching yet.
- **What makes a design sketch clear?:** Board the three must-haves first: parts labelled, materials named, rough sizes in centimetres. Model a quick L-shaped side view live, thinking aloud as you add labels, card, sizes (e.g. base ~12 cm, upright ~10 cm) and one build note: fold once, tape both sides. Stress that clarity beats a pretty unlabelled picture.
- **Design and sketch your stand:** Desks hold only journals, pencils, rulers and one blank postcard per pair. State the challenge: free-standing stand for a postcard; simple L-fold is enough; sketch only. Leave the checklist visible. Circulate with prompts: What is this piece called? About how wide is the base? Stop two minutes early so everyone has labels and at least one size on the page.
- **Can a partner follow your sketch?:** Pairs swap journals. No talking about your own design. Person holding the partner's page speaks first and describes build steps in order; partner listens for gaps. Then swap roles. Keep card, tape and scissors away unless you open the optional one-sketch stretch build. With three minutes left, allow one quick improve: add a missing label or size.
- **What made a sketch easy or hard to follow?:** Collect concrete examples under Helped / Needed. Revoice toward labels, material names, centimetre sizes and join notes rather than neatness. Praise the simple complete side view over a fancy incomplete drawing.

What it should show

A successful sketch shows labelled parts (base, upright, fold), material named (card, tape), rough sizes in cm, and at least one join or fold note. In the partner test, the reader should name parts, pick a material and know roughly how big to cut or fold without asking. If a partner freezes, the usual gap is a missing size or unclear join — not a bad drawing style.

Misconceptions & interventions

- **A neat or fancy 3D-style picture is better than a plain side view, even with no labels or sizes.** — Hold up two board sketches side by side — one decorative with no labels, one simple L with labels and cm. Ask which a silent partner could actually build from, and praise the complete simple one.
- **I can explain it when we swap, so the sketch does not need every detail.** — Remind them the rule is no talking about your own design until both describe tests are done. Point to a blank part and ask: could your partner name this without you?



Differentiation

Emerging	Developing	Proficient
• Allow a simple folded L-stand only; pupils may copy the three must-haves checklist from the board onto their sketch. • Sit at the teacher table and prompt one label and one size at a time before they add a join note.	• After the describe test, add the one missing label, size or join note that stuck their partner. • Ask: which of the three must-haves helped your partner most, and which was weakest?	• Add a top view as well as the side view, or number the fold order on the sketch. • In the class talk, critique a sketch for fair followability: what one change would stop a builder guessing?

Cross-curricular hook

Tie to Maths Measures — pupils mark rough lengths in centimetres and compare the upright to a postcard height.