

engineering

A helper for a friend: plan and make

Lesson at a glance

Open by framing a kind classroom helper: choose a friend, one small desk problem, plan and make. Pairs share ideas (crayons rolling, books snapping shut), then you think aloud on paper — problem, sketch, materials — before junk comes out. Each child draws the helper on the Investigation Journal page, names two materials, then pairs build a first junk model from pre-loaded trays, fixing wobbles as they go. Close by labelling and storing models and journals for the share lesson.

Learning objectives

- Choose a small problem that would help a friend and sketch a plan
- Make a first model from junk-modelling materials, fixing it as they go

Before the bell – prep

Day before: sort junk into one shared tray per table (base boxes, short tubes, card strips, lolly sticks, tape, glue). Set a teacher cutting station and a labelled project tray or shelf for storage. Investigation Journal pages and name labels ready. Hold junk back until plans are drawn.

**Materials**

Item	Qty	Per	Source	Low-cost substitute
Investigation Journal page	1	pupil	provided printable	a blank A4 sheet with headings the teacher reads aloud: who it is for, the problem, my drawing, materials
cardboard boxes and card offcuts (clean cereal boxes, small delivery boxes; shared table tray for the pairs at that table)	3	group	brought from home	folded newspaper bricks taped into block shapes
paper tubes (kitchen or wrapping-paper tubes cut to short lengths; shared table tray for the pairs at that table)	4	group	brought from home	rolled sheets of scrap paper taped into tubes
paper and card scraps (shared table tray for the pairs at that table)	1	group	classroom	used worksheets cut into large pieces
lolly sticks (shared table tray for the pairs at that table)	10	group	school kit	strips of stiff card
masking tape (shared table tray for the pairs at that table)	1	group	classroom	sticky tape or glue sticks (weaker joins)
glue sticks (shared table tray for the pairs at that table)	2	group	classroom	masking tape only
round-tip scissors	1	pair	classroom	teacher pre-cuts openings and slots pupils request at one cutting station
name labels or sticky notes for finished models	1	pair	classroom	masking-tape name tags
project tray or shelf space to store models until the next part of this project	1	class	classroom	a large cardboard box lid as a store tray

Safety watch-point

Round-tip scissors only at tables; adult makes sharp or thick cuts at one station. Mind eyes when tape snaps; keep walkways clear of boxes and scraps.

Teaching moves

- **Getting Started:** Sit the class with junk still packed. Name the challenge in plain words: Choose a friend. Find one small problem. Plan and make a helper. Model the stem “a friend who...” so ideas stay kind; allow a first name only if that child is happy to be named.
- **Imagine: a friend and a problem:** Push desks slightly for face-to-face talk. Run think-pair-share: 30 seconds quiet think, one minute partner talk, then four or five ideas on the board. If ideas balloon to whole-school fixes, steer back to something one pair can build from cardboard and tape today.
- **What makers do first:** Keep the board light — Problem, Plan, Model. Hold a blank sheet and think aloud for about a minute on one idea (e.g. a book that snaps shut → folded-card prop, stiff card and tape, success = book stays open a few seconds). Do not build the full model; send pairs to their own journal page.
- **Plan on your journal page:** Hold up one box, tube, card strip, lolly stick and tape so choices are real. Pairs pick one friend and one problem; each child still fills their own journal (who for, problem, drawing, materials). Circulate asking where the strong base is and which two materials come first. Cue the make only when most plans are workable.
- **Make the first model:** Open pre-loaded trays. State three rules: scissors stay put, adult does tricky cuts at the station, tape sparingly, fix the base if it topples. Hand stuck pairs one base box and two tubes so they start without queuing. Praise fixing mid-build; early finishers test the one job and add one improvement, not a new invention.
- **Keep it safe for next time:** Five minutes: show the project tray, names on every model, models into your controlled shelf, journals with the models. One optional pair may say “It is for ____ and it helps with ____.” Labels and storage beat scrap tidy if the clock runs out.

What it should show

Expect small, buildable desk helpers (crayon catcher, book prop, bottle stabiliser, pencil home) with a journal plan showing who/problem, a drawing with at least two parts, and two materials named. First models will wobble and need re-taping — that is success. A pair with only a pretty picture and no base or materials named needs a quick re-plan before building.

Misconceptions & interventions

- **“We’ll make the whole school quieter” or another huge redesign one pair cannot build today.** — Point at the junk tray and ask: What can we build from boxes and tape in this lesson? Offer a ready shortlist (crayons roll, book won’t stay open, bottle tips) if they stay stuck.
- **The journal drawing is a finished pretty picture with no parts, base or materials.** — Ask them to point to the wide or strong part and name two materials they will pick first before any junk leaves the side table.
- **Pupils think a first model must look neat and finished, so they freeze when it flops.** — Name it aloud: first models wobble — fixing is the work. Have them stand back, strengthen the base, and try the one job again.

**Differentiation**

Emerging	Developing	Proficient
• Offer three ready problems and scribe a short dictated phrase on the journal; hand one base box and two tubes first so making starts without a materials queue.	• After the one job works, add a single label or one small improvement (taller wall, wider base) while still matching the plan.	• Ask them to say how the build changed from the plan and why, and to check whether the helper still does the one job for their friend.

**Cross-curricular hook**

Links to SPHE friendship and care, and to oral language: each pair names who it helps and the one problem in a full sentence.

