

# Build the prototype

## Lesson at a glance

Groups name their user and the one job the prototype must do, then reopen the Investigation Journal design page (Design Brief) from earlier in this project. After appointing a materials collector and brief-keeper, they build a junk-modelling prototype from the kit bag—card, tubes, bottles, tape, string—jotting build changes on sticky notes as they go. A short oral check lines the model up against the brief, then pupils record a sketch plus two short notes on the Investigation Journal page before a timed gallery walk and careful storage for the next test.

## Learning objectives

- Build a working prototype from the plan sketched earlier in this project
- Note build changes against the original Design Brief
- Work safely with junk-modelling materials and scissors under adult supervision

## Before the bell – prep

Day before: pack one kit bag/tray per group (card, tubes, bottles, tape, string, elastic bands, sticky notes, two round-tip scissors). Pre-score thick card and pre-cut string. Set an adult cut-station tray. Have each group's Design Brief ready. Clear floor space. Print Investigation Journal pages for step 5 only—not during the build.

**Materials**

| Item                                                                                | Qty | Per   | Source             | Low-cost substitute                                                                                        |
|-------------------------------------------------------------------------------------|-----|-------|--------------------|------------------------------------------------------------------------------------------------------------|
| group Design Brief (Investigation Journal design page) from earlier in this project | 1   | group | classroom          | a fresh sketch on plain paper if a brief was lost, rebuilt from the group's memory of the user and problem |
| prepared junk-modelling kit bag or tray                                             | 1   | group | classroom          | loose materials in a shared box if bags are not available, still issued only when collectors are sent      |
| cardboard boxes, tubes and scrap card                                               | 1   | group | classroom          | cereal boxes and kitchen-roll tubes brought from home                                                      |
| newspaper sheets                                                                    | 6   | group | classroom          | scrap plain paper or old worksheets                                                                        |
| masking tape                                                                        | 1   | group | classroom          | sticky tape or string for lashing joints                                                                   |
| string                                                                              | 1   | group | classroom          | wool or strips of fabric                                                                                   |
| elastic bands                                                                       | 6   | group | classroom          | extra string ties                                                                                          |
| clean plastic bottles or cups                                                       | 2   | group | supermarket        | yoghurt pots or cardboard cups                                                                             |
| round-tip scissors for simple table cuts                                            | 2   | group | classroom          | one shared scissors tray per two groups with the same adult cut-station burst routine                      |
| sticky notes                                                                        | 6   | group | classroom          | small scrap paper slips and a pencil                                                                       |
| Investigation Journal page                                                          | 1   | pupil | provided printable | plain paper labelled with the pupil's name and group                                                       |

**Safety watch-point**

Round-tip scissors only at tables; tricky cuts go to the adult cut station. Watch eyes when structures collapse; no running with materials. Wash hands after dusty card or tape residue.



### Teaching moves

- **Getting Started:** Start the turn-and-tell at once—no kits on tables. After 30 seconds, invite one or two groups to name their user and what “fixed” will look like. Hold up one Design Brief (with permission) and say once that this Investigation Journal design page is also called the Design Brief. Keep scissors stored until the build.
- **Read your Design Brief again:** Every group names a materials collector and a brief-keeper before any kit moves. Model one short cycle aloud: check user, success line, then decide which part to build first. Only then does the materials collector fetch one prepared kit bag from the side table. Remind them a sticky-note jot marks any build change.
- **Build the prototype:** Circulate with three prompts: Which part of the brief are you building now? Does this still help your user? What would make a next test unfair? Prompt a sticky note the moment a sketch changes. Clear the cut-station tray in one-minute bursts between tables; groups use table scissors for simple cuts only. If a group freezes, send them back to the success line and build only the part that proves it.
- **Check against the Design Brief:** Pause all making. Model one oral check: match to user and problem, name one build change, name one gap before test. Visit each group once. If the model has drifted into something fun but unrelated, ask: Would your user still recognise this as a fix for their problem? Nearly-finished groups strengthen weak joints, not decorations.
- **Record your build notes:** Hand out Investigation Journal pages now. Show the board example once—a quick sketch plus two short lines is enough. Pupils lift build changes from sticky notes: what it does for the user, what changed and why, what still needs finishing before test. Early finishers label the prototype with the user’s name. Pages stay with the classroom-stored prototype.
- **Share how far we got:** Hard timing: 90-second gallery walk past two tables only, then stop. Sample three groups on the stems—Our user is... / Our prototype tries to... / One thing we changed...—about 45 seconds each. Fold in one class question: Can you still hear the user’s need in that design? Praise brief-links over neat finish. No load test today.

### What it should show

A successful outcome is a junk-modelling prototype that still serves the named user and job on the Design Brief, stands or stays in place the way the brief describes without being held, and has sticky-note build changes ready to copy into the journal. Groups whose model looks fun but drifts from the user need a steer back to the success line; weak floppy joints usually mean they skipped a wide base or tube upright.



### Misconceptions & interventions

- **We have to copy the sketch exactly or the prototype is wrong.** — Point at the Design Brief success line and say the job is to solve the user's problem, not photocopy the drawing. Praise one build change on a sticky note and ask why it helped the model stand or hold.
- **If it isn't neat and finished, we can't show it yet.** — During the gallery walk, name that engineers show a first messy model so the next test gets better. Praise a clear link back to the user over tidy decoration.
- **We can add extra fun parts even if they don't help the user.** — Hold the brief beside the model and ask: Would your user still recognise this as a fix for their problem? Send them back to strengthen the one part that proves the success line.



### Differentiation

| Emerging                                                                                                                                                                                                                                                                                    | Developing                                                                                                                                                            | Proficient                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• Build only the one part of the idea that would prove the success line on the Design Brief; teacher table helps set the first joint.</li><li>• Recording scaffold: sketch plus one sticky-note build change copied as a single short line.</li></ul> | <ul style="list-style-type: none"><li>• After the main part works on its own, strengthen one weak joint and jot why on a sticky note before the oral check.</li></ul> | <ul style="list-style-type: none"><li>• Add a second feature only after the first part works alone, and name one thing that would make a next test unfair if materials changed.</li></ul> |



### Cross-curricular hook

English oral language: the three share stems give a short structured report linked to a real classroom user.