

Build the prototype

Lesson at a glance

Open with each group's Design Brief and one question: what job must this feeder do for a robin or blue tit. Name prototype, Design Brief and design change, then think aloud on a sample bottle before trays go out. After the safety brief, groups build a rough bottle feeder—body, seed opening, perch, hang or stand, rain lip—using adult help only for hard cuts. They check the build against the plan, record matches and changes in the Investigation Journal, share one sentence, and store labelled prototypes for the test session.

Learning objectives

- Build a feeder prototype from the planned Design Brief
- Use materials safely under adult supervision for cutting
- Record build notes and any changes made to the original plan

Before the bell – prep

Rinse and dry one or two bottles per group and pre-start the main seed openings the day before. Lay trays (bottle, string, sticks, sticky tape, round-tip scissors, small seed cup) ready off desks. Set an adult cutting station; arrange a second adult if cuts still need finishing. Have wipes or a sink routine for hands after seed.

**Materials**

Item	Qty	Per	Source	Low-cost substitute
clean empty plastic bottle (500 ml to 1 l)	2	group	brought from home	one larger bottle shared carefully, or a clean juice carton
garden string or strong twine	1	group	hardware shop	wool or leftover parcel string doubled for strength
lollipop sticks or thin garden sticks	6	group	supermarket	straight twigs collected and dried, or wooden coffee stirrers
sticky tape (roll)	1	group	classroom	masking tape or packing tape
scissors	1	group	classroom	one shared class set at a cutting station with the teacher
bird seed (small cup for dry fit)	1	group	supermarket	dry rice or dried lentils for indoor dry-fit only (not for outdoor feeding)
group Design Brief from earlier in this project	1	group	classroom	a quick labelled sketch remade at the start if a brief is missing

Safety watch-point

Only adults finish hard bottle cuts; scissors closed when walking; no tasting seed; wash hands after handling seed; keep hanging string short on desks.



Teaching moves

- **Getting Started:** Have each Design Brief ready (or a photocopy). Ask only: what is the one job this feeder must do? Draw out holds seed, keeps seed dry, and a perch a small bird can use. Point to one labelled part on a volunteered brief; keep junk-modelling trays off desks until after safety.
- **How engineers build from a plan:** Project the three short board lines only. Live-model with one bottle and a sample brief: predict starting with the body, check hole and perch on the plan, cut with adult help, then note a forced change (e.g. thinner stick). Name recording a change as honest engineering, not cheating.
- **Safety and materials:** State rules while trays stay off desks: scissors closed when walking; only an adult makes hard bottle cuts; wash hands after seed. Hand trays out, then have groups check contents. Ask two pupils to restate the rules. Flag seed allergies—structure-only role or dry rice as fill stand-in.
- **Build the feeder:** Circulate with scissors and craft knife for bottle mouths only you or a second adult use. Pace roughly: body and opening, then perch and rain lip, then hang or base, then dry seed fit. Ask which brief part they are on, whether the perch sits below the hole, and what will keep rain off the seed.
- **Check against your plan:** Desk check with brief beside prototype, then cold-call three groups for one match and one change. Prompt perch height, dryness idea, and what forced the change. Separate unfinished work from deliberate design change.
- **Record your build notes:** On the Investigation Journal page capture what the feeder can do so far, one match, one design change or no change, and one fix before testing. Push vague notes into clear ones. Start pack cues: group labels, upright storage, seal seed cups.
- **Share progress and pack away:** Three or four groups only if tight: A robin or blue tit could already... / We changed... because... Display-only. Then count scissors back, seal seed, wash hands, store upright labelled prototypes with briefs. Close with why engineers build a rough prototype first.

What it should show

A successful prototype is rough but real enough to test: holds a dry seed fill, has a perch a small bird could reach below the hole, and a hang loop or stable base, plus some idea of keeping seed dry. First builds often lean or place the perch too high—useful evidence, not failure. If a group hid changes or never checked the brief, prompt them to name and record one forced change before packing.

**Misconceptions & interventions**

- **Changing the plan means we cheated or the design failed.** — Hold up the sample brief and bottle from the worked model: the plan guides you; materials can improve it if you write the change down. Praise one group that names a change out loud.
- **It looks different from our drawing, so we failed.** — Reframe at the plan-check: a prototype that reveals a problem is doing its job. Ask what the later test will still check—holds seed, keeps dry, stable perch.

**Differentiation**

Emerging	Developing	Proficient
• Start with three must-haves only from the brief: container, hole, perch; pair a careful cutter with a careful taper. • Pupil who should not handle seed builds structure while a partner adds the dry fill, or use dry rice as stand-in.	• Add a simple rain lip or cover from bottle top, sticky tape or stick frame once the three must-haves work. • Push journal notes from it broke into a clear cause and fix (e.g. perch slipped, tape moved lower).	• Add a second perch or refine hang stability if time allows; sketch one improvement idea for the test session. • Help another group hold parts while tape sets; critique whether the perch height matches a robin or blue tit.

**Cross-curricular hook**

Link to Living things—Irish garden birds (robin, blue tit) and what a small bird needs to reach seed safely.