

Mechanisms: making things move

Lesson at a glance

Open with one short push on a finished lever-and-linkage bird so pupils see a side strip flap a wing, then freeze and gather everyday transfer-of-movement ideas. Name input, output, pivot and mechanism on the board, then model pinning a pre-cut bird live. Groups build a lever-and-linkage moving picture (cam stretch only if a finished cam is ready), change one input and note what happens on the Investigation Journal page, slow-watch the path, then draw and label input, output and pivot before a one-minute share.

Learning objectives

- Build a simple lever-and-linkage or cam mechanism
- Explain how an input movement produces an output movement
- Draw and label the mechanism showing input and output

Before the bell – prep

Pre-cut bases, simple body/scene shapes and long input strips for every group the day before so cutting does not eat the build. Gather stiff card, split pins, scissors, pencils, glue or tape. Optional stretch only: one finished cam toy, pre-snipped off-centre cam discs, blunt-tip dowels or skewers. Clear flat desk space per group of three; put Investigation Journal pages out with the kit.

**Materials**

Item	Qty	Per	Source	Low-cost substitute
stiff card (A4 or cereal-box card), including pre-cut bases and input strips	3	group	classroom	flattened cereal boxes cut into panels
split pins (paper fasteners)	6	group	school kit	short lengths of soft wire twisted as pivots (adult help)
scissors (pupil, round-tip preferred)	1	pupil	classroom	shared scissors per pair with adult cutting support
short wooden dowels or blunt wooden skewers	2	group	supermarket	thick drinking straws or rolled paper tubes for axles
glue stick or sticky tape	1	group	classroom	masking tape only
pencils	1	pupil	classroom	any writing pencil
Investigation Journal page	1	pupil	classroom	plain A4 sheet labelled Investigation Journal
finished lever-and-linkage example for the hook and demo	1	class	classroom	join the pre-cut linkage demo live in the demonstration step and skip a pre-made hook model
finished cam toy (stretch reference only)	1	class	classroom	skip if unavailable; do not offer cam stretch without a finished reference

Safety watch-point

Collect loose split pins first at pack-away — they scatter and are sharp. Supervise scissors; use only blunt-tip dowels or skewers for any cam stretch.



Teaching moves

- **Getting Started:** Show one finished lever-and-linkage (e.g. flapping bird). Give a single short push, freeze, and ask what the hand did, what moved, and what stayed still. Keep a finished cam aside for later if you have one — do not explain parts yet.
- **What is a mechanism?:** Point at the same bird and board only four words: input, output, pivot, mechanism. Trace the chain input → linkage → output so nobody thinks the picture moves by itself. Leave cam and follower off the board unless you later reveal a finished cam.
- **Watch one being made:** Join pre-cut base, body, wing and strip live facing the class, thinking aloud through wonder–predict–test–notice. Before the first push, take a hands-up prediction. If the wing barely lifts, move the strip pin further from the wing pivot or loosen a tight pin. Optional 20-second cam reveal only if a finished cam is on the side table.
- **Build your mechanism:** Default every group onto a lever-and-linkage moving picture with pre-cut base and strip. Circulate asking: show me the input, the output, what the pivot is doing. Watch for pins too tight, too loose, or a strip glued solid instead of pinned. Cam path only after a working linkage and only with the finished reference beside them.
- **Test the input and output:** Groups choose one input change at a time — how far, how fast, or which direction — keep the same start position, then jot prediction and notice on the Journal. If nothing seems to change, enlarge the push or free a binding pin and re-test. Fold watchers in: what is their input, and what if they push further?
- **Watch the movement path:** Half-speed only, look-and-talk: which parts stay still, which turn around a pivot, which travel in a straight line. If a path is hard to see, have a partner hold a pencil tip above the moving part so the arc is tracked in the air — no drawing yet.
- **Draw and label your mechanism:** Simple labelled diagram on the Investigation Journal: input, output and at least one pivot (cam and follower only if they built that stretch). Offer the starter: When I changed the input by... the output... If labels are missing, ask them to point first, then write the three words.
- **Share and pack away:** Collect loose split pins first, then skewers and scissors, before chairs move. One or two groups demo under a minute each; revoice input, output, pivot, mechanism. Close with the classroom door handle or latch: what is the input and what is the output?

What it should show

Success is one clear user-controlled input, one visible output, parts held at the pivots, and the group can point to input, output and pivot unprompted. A short push should lift or swing the moving part; pulling reverses it. If the wing barely moves, the strip pin is too close to the wing pivot or a hole is tight. A cam with no bob is usually centred on the axle — it must be off-centre.

**Misconceptions & interventions**

- **Pupils say the whole picture "moves by itself" once it is built.** — Trace the chain on their model with a finger: hand on the strip (input) → linkage around the pivot → wing or arm (output). Nothing moves without an input.
- **Pupils glue the input strip solid to the moving part instead of pinning it, so nothing can turn.** — Hold up a glued vs pinned join. Remind them the strip must swing at a split-pin pivot — unpin and re-join if needed, then re-test.
- **If the output looks the same after a change, pupils decide the mechanism "is broken".** — Check the input change was big enough and the pin is free. Enlarge the push or loosen a binding pivot, keep the same start position, and try again.

**Differentiation**

Emerging	Developing	Proficient
• Two-piece linkage only (base + one moving arm) on pre-cut parts; teacher or partner helps place the two pins. • Sentence starter on the Journal: When I pushed/pulled... the ... moved.	• After one working linkage, try a second input change (distance then direction) and note both results. • Add a second moving part so one push drives two outputs.	• Cut a full scene from blank card, or attempt a cam with axle, off-centre disc and follower using the finished side-table model as guide. • Critique fairness of their own test: did they change only one input and keep the start position the same?

**Cross-curricular hook**

Link to the classroom door handle or latch, a farm gate latch, or a bicycle brake lever — name each input and output in plain Irish-primary language.