Lesson 31 · engineering

Mechanisms: Make Something Move

Lesson at a glance

Open by pushing a paper strip so a card shape unexpectedly moves a different way, and ask how one gentle push makes a picture pop up. Teach input, output and mechanism, then model a card slider live before groups choose and build their own lever, pull-tab or wheel mechanism from card, split pins, strips and dowels. Groups watch closely and change one thing to improve the motion, then each pupil draws and labels input and output on the Investigation Journal page.

Learning objectives

- Explain how a simple mechanism turns one movement into another
- Build a working mechanism with an input and an output movement
- Improve the motion of the mechanism

Before the bell — prep

Make one card slider yourself beforehand so you can demonstrate input-to-output live — a strip through two slots with a card fish glued on. Per group gather card, split pins, paper strips, dowels or wooden skewers, glue and scissors. Pre-cut the trickiest slots for younger hands and keep a scissors for the tough cuts yourself.

Materials

Item	Qty	Per	Source	Low-cost substitute
A4 card sheets	3	group	classroom	cereal-box card or thick paper
split pins (paper fasteners)	6	group	classroom	a knot of string or a bent paperclip through a hole
paper strips (2 cm wide)	4	group	classroom	strips cut from any paper
wooden dowels or wooden skewers	2	group	school kit	a pencil or a rolled paper tube
glue sticks	1	group	classroom	sticky tape
round-tip scissors	2	group	classroom	teacher makes all cuts in advance

Safety watch-point

Wooden skewers and dowels are pointed — remind pupils to keep points down, and make the difficult or deep cuts yourself rather than letting children force scissors.

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Teaching moves

- **How Mechanisms Work:** Read the three-word table on screen, pointing at each word. Head off the big muddle: push the demo strip up and down (input) but show the picture swings side to side (output) — say 'the movement changed direction'. Ask 'where is the input, where is the output?' on your demo.
- **Watch Me Build One:** Model the full card slider slowly, thinking aloud: 'I put my movement in here, this is what moves out there.' Keep it to 7–8 minutes — model just one improvement (widening a sticky slot) rather than fully re-testing, so groups start building sooner.
- **Build Your Mechanism:** Hand every pupil their Investigation Journal page now so they know it's coming. Let groups genuinely choose their mechanism. Walk the room watching for a sticking strip (slot too tight or pin too loose) and for groups whose output moves the same way as the input — re-voice 'it should move differently'.
- **Improve the Motion:** Push groups to watch closely first, then change one thing. Ask 'what exactly is going wrong, and what one change will fix it?' For a mechanism not yet moving, finding the single thing stopping it and fixing it counts as observe-then-improve. Pacing is tight — keep groups moving.
- **Record Your Mechanism:** Each pupil draws their mechanism on the Investigation Journal page with an arrow for the input, an arrow for the output, and one line on their improvement. Circulate and check every child can point to input and output on their own drawing.

What it should show

A successful build turns one input movement into a clearly different output — an up-push becomes a sideways slide, a turn becomes a spin, a pull becomes a swing. A group whose output copies the input hasn't changed the direction of movement; steer them back to that. Sticking or wobble is usually a slot too tight or a split pin too loose — the improvement is fixing that one thing.

Misconceptions & interventions

- **Pupils think the input and output are the same movement — 'I push up so it goes up'.** — On the demo slider, show your hand pushes up but the fish slides sideways. Have them trace the input arrow and output arrow on their own build and say aloud how the two differ.
- **Pupils think a stuck mechanism means they should start over.** — Ask 'what exactly is stopping it?' and fix the single culprit — widen the slot or loosen the pin — then test. Name this as how engineers improve: watch, change one thing, test again.

Differentiation

Emerging	Developing	Proficient
• Give them a card slider with slots already cut so they only thread the strip and glue the shape. • Pair with the teacher table to name the input and output aloud before drawing.	• Challenge them to make the output move further or in a bigger arc, then test again. • Ask 'why does widening the slot help?' before they change it.	• Have them critique another group's mechanism: name the input, output and the one change that would smooth it. • Design a second mechanism that turns a turn into a slide.

Cross-curricular hook

Link to their own bike brake lever and a farm gate that swings open on a linkage — the same input-to-output idea in the Irish everyday world.