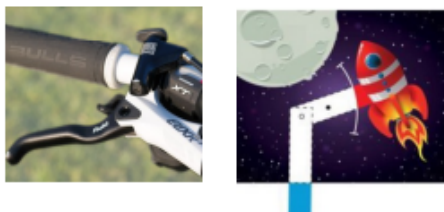


Years
3/4

Mechanisms Levers and linkages

Instant CPD

DESIGN &
TECHNOLOGY
ASSOCIATION



Tips for teachers

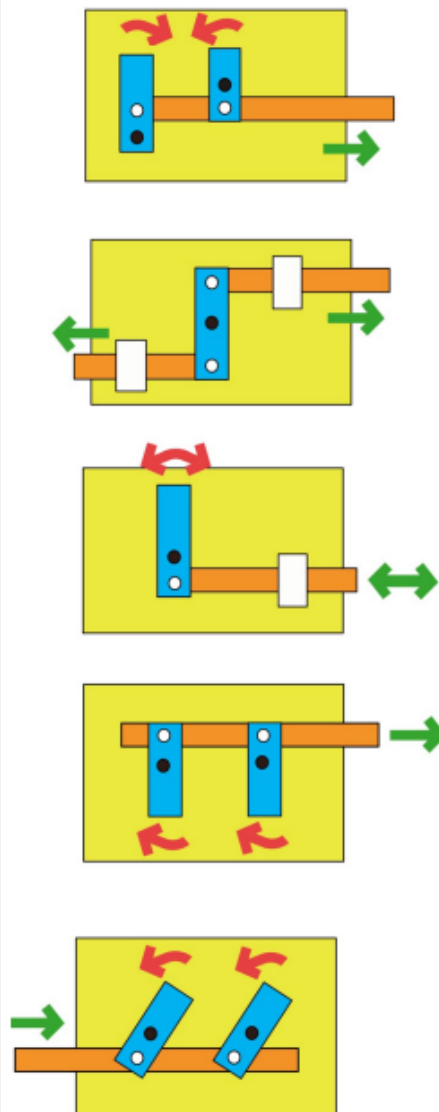
- Give children the opportunity to make examples of lever and linkage mechanisms through focused tasks.
- Preparing a plentiful supply of card strips can be useful to speed up the process.
- Card from recycled packaging is a cost-efficient way of providing enough material for children to experiment with different arrangements and to make mock-ups and prototypes.
- When working with thin card, a hole can be made for the paper fastener pivot by pressing a pencil through the card on to a piece of Plasticine or Blu Tack.
- A picture can be drawn on and cut out from another piece of card and glued on to the output levers.
- Windows can be cut out of the backing sheet or extra pieces added so that the picture on the output lever is hidden and then revealed.
- The backing sheet can be shaped to suit the picture.
- Guides/bridges can be made using strips of card fixed with masking tape e.g. white card on diagrams.
- Display technical vocabulary and encourage the children to use it when discussing mechanisms and when designing and making.
- Make sure the existing books children investigate include moving pictures that are similar to the teaching aids.

Useful resources at www.designtechnology.org.uk

- Levers and linkages - Poster and Support Pack
- Mechanisms with a message
- Moving history book
- Working with Sliders and Levers (Years 1/2)

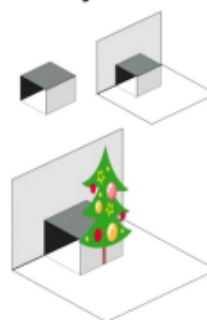
Teaching aids to demonstrate levers and linkages

- Fixed pivot
- Loose pivot



Pop-up mechanisms can be added to children's moving pictures as an enhancement. However, to build on work with simple levers and sliders in KS1, it is important to focus children's learning during this project on levers and linkages.

Making a pop-up from a small section of a recycled box:



1. Cut a slice off a small box.
2. Glue two sides to the paper.
3. Stick a picture to pop up on the front.

Lever and linkage mechanisms usually produce oscillating or reciprocating movement:

- Linear – in a straight line
- ↕ Reciprocating – backwards and forwards in a straight line e.g. a slider
- ↻ Rotary – round and round e.g. a wheel, cam, pulley, gear wheel
- ↺ Oscillating – backwards and forwards in an arc e.g. a lever

Designing, making and evaluating a greetings card with moving parts for family or friends

An iterative process is the relationship between a pupil's ideas and how they are communicated and clarified through activity. This is an example of how the iterative design and make process might be experienced by an individual pupil during this project:

THOUGHT	ACTION
What sort of greetings card shall I make and who will it be for?	Discussing ideas, drawing annotated sketches, generating design criteria.
What part will move? How will it appeal to the user?	
How will it move?	Discussing ideas, modelling possible lever and linkage mechanisms.
Which lever and linkage mechanism will work best for my greetings card?	Discussing and evaluating mock-ups and prototypes against design criteria.
What media and materials will I use?	Discussing, exploring and trialling media and materials.
Who will I work with? How long will it take? What order will I work in?	Negotiating, developing and agreeing a plan of action.
What tools and techniques will I use?	
More thoughts ... appraising, reflecting, refining.	More actions ... building, testing, modifying.
Will the greetings card meet the needs of the user and achieve its purpose?	Evaluating the greetings card with the intended user and against design criteria.

Glossary

- **Mechanism** – a device used to create movement in a product.
- **Lever** – a rigid bar which moves around a pivot. Levers are used in many everyday products. In this project children will use card strips for levers and paper fasteners for pivots.
- **Linkage** – the card strips joining one or more levers to produce the type of movement required. The term 'linkage' is also used to describe the lever and linkage mechanism as a whole.
- **Slot** – the hole through which a lever is placed to enable part of a picture to move.
- **Guide or bridge** – a short card strip used to keep lever and linkage mechanisms in place and control movement.
- **Loose pivot** – a paper fastener that joins card strips together.
- **Fixed pivot** – a paper fastener that joins card strips to the backing card.
- **System** – a set of related parts or components used to create an outcome. Systems have an input, process and an output. In a lever and linkage mechanism, the 'input movement' is where the user pushes or pulls a card strip. The 'output movement' is where one or more parts of the picture move.