



Subject: DT Topic: Space race Year group: 2 Term: Spring

National Curriculum Objectives

Design - design purposeful, functional, appealing products for themselves and other users based on design criteria
-generate, develop, model and communicate their ideas through talking, drawing, templates, mock-ups and, where appropriate, information and communication technology

Make - select from and use a range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]

Evaluate - evaluate their ideas and products against design criteria

Technical knowledge - explore and use mechanisms [for example, levers, sliders], in their products.

Prior Learning

In EYFS:

Fine motor activities

Using scissors and small tools

Future Learning

In Year three:

Make – select from and use a wider range of materials and components according to their functional properties and aesthetic qualities.

Technical knowledge - apply their understanding of how to strengthen, stiffen and reinforce more complex structures

-understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]

Key Questions

What sort of moving picture shall I make?
What part will move?
How will it appeal to the user?
How will it move?
What media and materials will I use?

Substantive Knowledge (key facts, dates and concepts)

Mechanisms are the part that make something work.

Mechanisms are all around us. Most objects that help in everyday life are made up of mechanisms.

Sliders – help to move things from side to side and up and down.

Levers – are slightly more complex, they used a fulcrum (a fixed point around which the lever can pivot) to make things move in an arc (curve).

Linkages – a simple mechanism made by connecting two or more levers together using joints called pivots. Pulling or sliding one lever causes the connected linkage to transfer motion or change direction to make a different action happen.

Design criteria – a simple, specific set of requirements that a product must meet to be considered successful.

Disciplinary Knowledge

(thinking and working like a designer)

To be able to construct a strong slider mechanism

To be able to assemble a lever using a fixed pivot point

To be able to connect levers together to make a working linkage mechanism

To be able to combine multiple mechanisms into a single space scene based on a plan

To be able to test, fix and evaluate a moving product against mechanical performance

Sequence of lessons

1. Sliders and straight lines

Sticky Knowledge

Name 3 objects that move (EYFS)

Cards, skateboard, trolley, car, bike etc

What mechanisms can we find on a car? (Y1)

Wheels and axles

What is the name of the stitch we used to make our pencil case?

Running stitch

Intent

Substantive knowledge

Mechanisms are the part that makes something work. Mechanisms are all around us. Most objects that help in everyday life are made up of mechanisms.

Sliders – help to move things from side to side and up and down.

Disciplinary knowledge

To be able to construct a strong slider mechanism

Demonstrate how paper can tear easily but card is sturdier. Model how to make and use a sturdy slider using card strips and guided card slots.

Make a vertical or horizontal slider card. Add an astronaut to the slider. Ensure the slider moves smoothly without getting stuck or falling out.

4. The final countdown – designing

Sticky Knowledge

Name 3 different construction materials (EYFS)

Bricks, blocks, crates, tubes, lines, fabric, pegs etc

What is an early model or sample of a product called? (Year 1)

Prototype

Name 3 different types of fastening. (Year 2)

Zip, Velcro, glue, button etc

Intent

Substantive knowledge

What does design criteria mean? How can I meet that criteria?

Disciplinary knowledge

To be able to combine multiple mechanisms into a single space scene based on a plan

Design and make design and make an interactive moving picture using a space theme – aliens, astronauts, satellites.

Select the favourite mechanism and sketch out their design

labelling the position of the slots/ split pins etc

2. Levers and curves

Sticky Knowledge

How can we join boxes together to build? (EYFS)

Tape, glue, by stacking

How do we make a fixed axle? (Y1)

The axle is joined to the chassis

Which direction do sliders move? (Y2)

Left to right/ up and down

Intent

Substantive knowledge

Levers - they used a fulcrum (a fixed point around which the lever can pivot) to make things move in an arc (curve).

Disciplinary knowledge

To be able to assemble a lever using a fixed pivot point

Teach the concept of fixed pivot - a point that is secured tightly to the backing card so it cannot change position, but does rotate.

Use card strips to make a lever arm. Punch a single hole through both the lever arm and background card, inserting a split pin to create a swinging arc movement. Use an alien cut out and a lever making the alien wave its arm.

5. The final countdown - making

Sticky Knowledge

How can we join materials? (EYFS)

Glue, staples, tape

What does balanced diet mean? (Year 1)

Eating a variety of different foods in the right amounts

What is an embellishment? (Year 2)

An embellishment is an extra decorative detail added to the fabric to make it look unique and colourful

Intent

Disciplinary knowledge

To be able to combine multiple mechanisms into a single space scene based on a plan

Using the plan create their final space themed moving picture using the selected mechanisms.

3. Introducing linkages

Sticky Knowledge

Name 3 materials

paper, card, metal, plastic etc

What is a chassis? (Y1)

The base frame of a wheeled vehicle

3 words to describe different textures (Y2)

Rough, fluffy, smooth etc

Intent

Substantive knowledge

Linkages – a simple mechanism made by connecting two or more levers together using joints called pivots. Pulling or sliding one lever causes the connected linkage to transfer motion or change direction to make a different action happen.

Disciplinary knowledge

To be able to connect levers together to make a working linkage mechanism

Model how to connect card strips to each other using a split pin to create links. (not attach to the back card),

Use card to make a linkage that makes two satellites pop out simultaneously.

6. Evaluation

Sticky Knowledge

What tool is used to cut paper? (EYFS)

Scissors

What tool is used to cut wood? (Y1)

Hacksaw

What tool is used to make a hole in fabric? (Y2)

Punch

Intent

Disciplinary knowledge

To be able to test, fix and evaluate a moving product against mechanical performance

Trouble shooting their design – debug and problems e.g split pins being too tight/ card strips being too flimsy

Run a 'structural' test on their picture.

Complete an evaluation sheet: Does the mechanism respond instantly when pulled? Do the parts hold together after 10 movements? What one thing would you change to make the motion smoother?

Knowledge organiser

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.

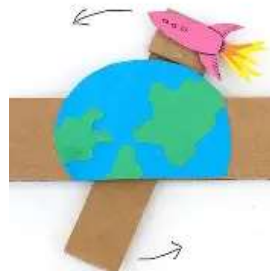
Loose pivot – a paper fastener that joins card strips together.

Fixed pivot – a paper fastener that joins card strips to the backing card.

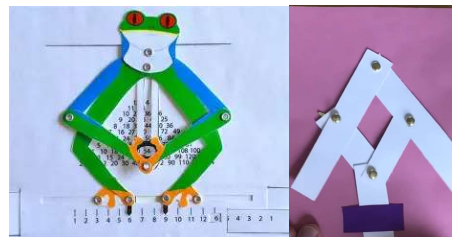
Sliders



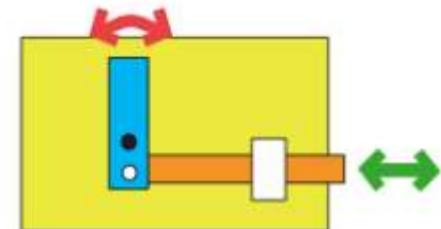
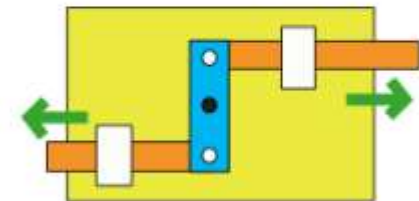
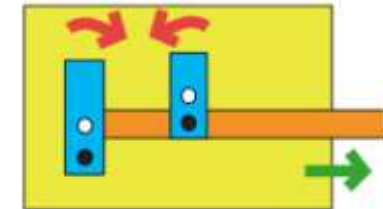
Levers



Linkages



Teaching aids to demonstrate levers and linkages



Video links

[Levers and Linkages - YouTube](https://youtu.be/SinLvPGySmQ)

<https://youtu.be/SinLvPGySmQ>

<https://www.youtube.com/watch?v=YwOxF7Pu0jl>