

Fairy-tale engineering

Knowledge organiser

Year 5

Fairy-tale model theatre



Construction means building and joining materials to make structures that are strong, stable, functional and appealing. Designers think carefully about how parts fit together, how materials behave.

In this project, you will design and build a small-scale model (maquette) of a fairy-tale theatre set with a moving part. Your model will solve a problem for a fairy-tale character (the user) using a pulley, lever or linkage. Designers test ideas using prototypes and exploded diagrams before building the final product.

Your theatre model will be inspired by toy theatres and stage design, including a foreground, midground, backdrop and a proscenium arch.

Key vocabulary

appealing 	force 	functional 	improve
lever 	linkage 	mechanism 	pivot
problem 	prototype 	pulley 	set
successful 	test 	user 	wheel and axle

Mechanisms

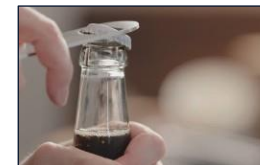
Mechanisms help things move using a force. Engineers use mechanisms to solve problems for a user in everyday life.

Pulleys change the direction of a force to lift or lower objects.



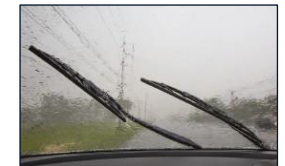
e.g. cranes, window blinds, flagpoles, theatre scenery

Levers use a pivot (fulcrum) to move or lift with less effort.



e.g. scissors, bottle openers, seesaws, door handles

Linkages transfer movement from one part to another.



e.g. bicycle brakes, windscreen wipers, desk lamps

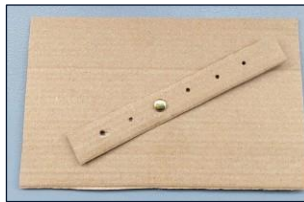
Prototypes

A **prototype** is a first version of something made to test how it works.

Pulley – a wheel and axle with a string that helps lift or lower objects



Lever – a rigid bar that moves around a pivot point (fulcrum)



Linkage – two or more bars joined by pivots that transfer movement. Changing the pivot position can change how a mechanism moves.



Prototypes help designers test movement, spot problems and make improvements before building the final model.

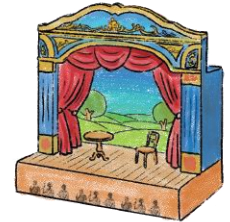
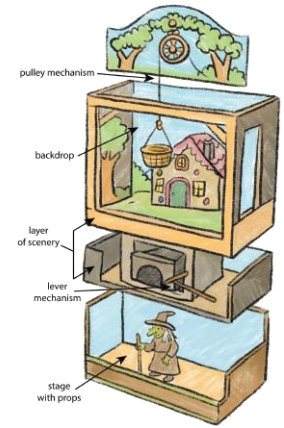
Theatre design

A **maquette** is a small-scale model used to plan a theatre set.

Theatre sets include a:

- **backdrop** (background scenery)
- **midground** (main action area)
- **foreground** (front of the stage)
- **proscenium arch** (frame around the stage)

Designers use **perspective** to make models look deep and realistic



Safety

Making **models in DT** is fun and creative, but we need to be careful to stay safe.

- cut safely: always away from yourself, fingers clear
- use glue guns with care - never touch hot glue
- be careful when inserting split pins, use sticky-tack behind to press into
- keep your workspace tidy to avoid accidents
- if unsure, stop and ask an adult



The design steps

Designers follow four steps:



1. **Research** – look at examples to see what works well



2. **Design** – draw and label ideas, thinking about looks and function



3. **Make** – use tools and techniques, keeping work neat and strong



4. **Evaluate** – test it, celebrate what worked and spot ways to improve