



DT

Mechanisms — Levers

In this unit, Year 3 will develop their problem-solving skills. They will learn how the Ancient Egyptians developed a mechanism called a Shaduf which allowed them to water their crops using the water from the Nile. They will develop their own lever mechanism to see if they can transport water.

Key Questions

- How does a lever work?
- What affects how well a lever works?
- What is a fulcrum and why is it necessary?
- How much load will I need on my lever to give me a mechanical advantage?
- How much force will I need to work my lever?
- What materials will be the best for building my model?
- What is a prototype for?



Key Vocabulary

Simple Machine	A machine with one moving part.
Lever	A beam, bar or rod that turns or rotates on or around a fixed point.
Fulcrum	A fixed point that allows the beam to rotate around it.
Work	The is of force to move an object.
Force	Any kind of push or pull on an object.
Effort	The force that is used to do the work.
Resistance	The force (load) the works against the effort.
Load	The object or resistance being moved by the effort.
Friction	The force that is caused when two surfaces rub together as an object moves.
Mechanical Advantage	How the simple machine (in this case the lever) increases the effort.

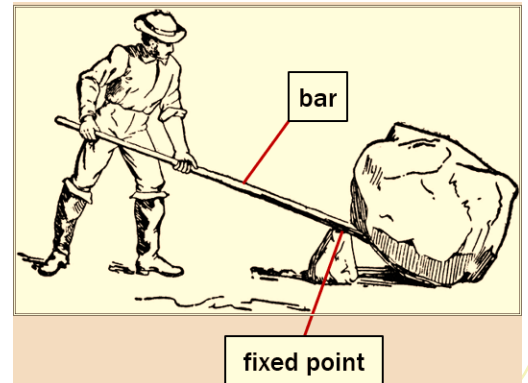
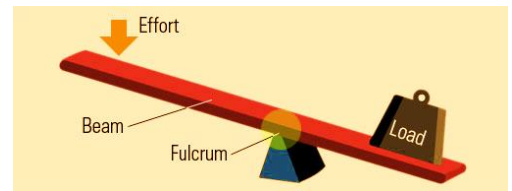
Levers

A lever is a simple machine that is designed to lift heavy objects. They are designed so that you don't need to apply as much effort to move the object you are trying to lift.

Each lever has four very important parts: the beam, bar or rod, the fixed point (known as a fulcrum), the place where the effort – or force – is applied and the load (that is trying to be lifted).

The beam is a long plank that can be made of any durable material. This then rests on the fulcrum which allows it to pivot. When you push down on one end of the lever, you apply a force known as an input. The beam pivots on the fulcrum creating an output force on the load.

The lever makes work easier by both increasing your input force and also changing its direction. It gives you a mechanical advantage over the load.



Class 1 lever



The fulcrum is between the effort and the load. The mechanical advantage is greater if the fulcrum is closer to the load. Examples include seesaws, scissors and crowbars.

The load is between the effort and the fulcrum. The mechanical advantage is if the load is closer to the fulcrum.

Examples include: wheelbarrows, bottle openers and nutcrackers.

Class 2 lever



Class 3 lever



The effort is between the load and the fulcrum. The mechanical advantage is if the effort is closer to the load.

Examples include: spades, staplers and tennis rackets.

Suggested Homework Projects

Where are all the levers?

Where can you find examples of levers in your own home?

Can you identify where the fulcrum is in each lever?

Can you work out which class of lever it is by where you apply the effort and where the load is?

Making life easier

Levers are designed to make life easier for ourselves.

Can you identify a problem where a lever may come in handy and then design one to solve the problem? Maybe bring it in to show?