Forces

KNOWLEDGE ORGANISER

Key Knowledge

Examples of forces in action:

Water resistance and air resistance are forms of friction. Friction is sometimes helpful and sometimes unhelpful. For example, air resistance is helpful as it stops the skydiver hitting the ground at high speed. Friction on a bike chain can make the bike harder to pedal so it is unhelpful.

Isaac Newton

Isaac Newton is famously thought to have developed his theory of gravity when he saw an apple fall to the ground from an apple tree.

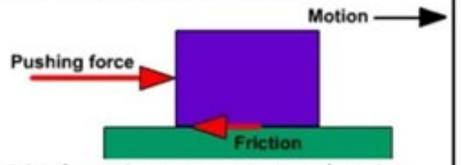
Vocabulary

attract	If one object **attracts** another object, it causes the second object to move towards it
friction	the **resistance** of **motion** when one object rubs against another
force	the **pulling** or **pushing** effect that something has on something else
gear	a part of a machine that causes another part to move because of teeth which connect the two moving parts
gravity	the **force** which causes things to drop to the ground
lever	a basic tool used to lift or pry things open
motion	the activity of changing position or moving from one place to another
opposite	**Opposite** is used to describe things of the same kind which are completely different in a particular way. For example, north and south are **opposite** directions
pulley	a simple machine that makes lifting something easier. A pulley has a wheel or set of wheels with grooves that a rope or chain can be pulled over
repel	When a magnetic pole **repels** another magnetic pole, it gives out a **force** that pushes the other pole away
resistance	a **force** which slows down a moving object or vehicle
spring	a spiral of wire which returns to its original shape after it is pressed or pulled
streamlined	A **streamlined** vehicle, animal, or object has a shape that allows it to move quickly or efficiently through air or water
surface	the flat top part of something or the outside of it

What will I know by the end of the unit?

What are forces?

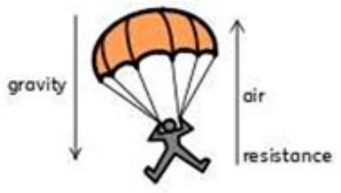
- **Forces** are pushes and pulls.
- These **forces** change the **motion** of an object.
- They will make it start to move or speed up, slow it down or even make it stop.
- For example, when a cyclist pushes down on the pedals of a bike, it begins to move. The harder the cyclist pedals, the faster the bike moves.
- When the cyclist pulls the brakes, the bike slows down and eventually stops.
- **Friction** is a **force** - it is the **resistance** of **motion** when one object rubs against another.



- Other **forces** that create **resistance** of **motion** include **water resistance** and **air resistance.**

What is gravity and air resistance?

- **Gravity is** the **force** that pulls objects to the centre of the Earth.
- Air **resistance** pushes up on the parachute, **opposing** the force of **gravity** . This makes the parachute land more slowly.



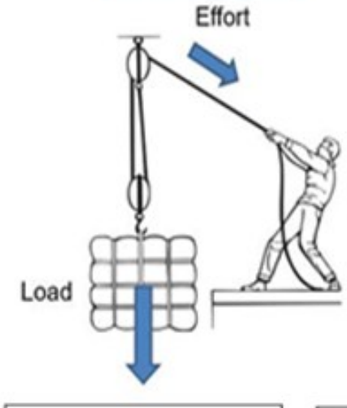
What is water resistance?

- Water **resistance** is the **friction** that is created between water and an object that is moving through it.
- Some objects can move through water with less **resistance** if they are **streamlined.**

What are examples of mechanisms?

- **Levers** allow us to do heavy work with less effort . For example, trying to pick up a large heavy box is difficult, however if a **lever** is used it becomes much easier to move it.
- **Pulleys** also allow us to do heavy work - objects are attached to ropes and **pulley** wheels, and so instead of lifting heavy object upwards, we can pull on the **pulley** rope downwards.
- **Gears** are toothed wheels. Their 'teeth' can fit into each other so that when the first wheel turns, so does the next one. This allows **forces** to move across a **surface.**
- **Springs** can be stretched by pulling them or squashed by pushing them. The greater the **force** pulling or pushing the **spring,** the greater the force the **spring** uses to move back to its normal shape.

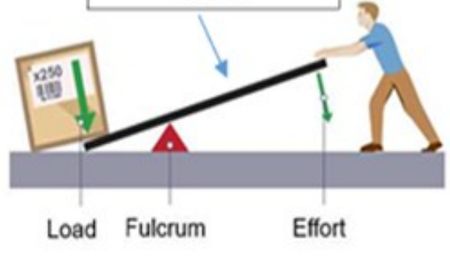
Pulleys



The **load** is the force being lifted

Levers

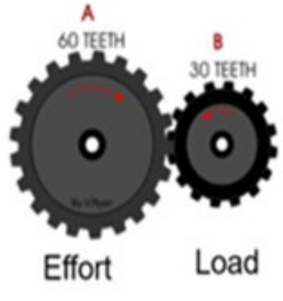
A **lever** is a long beam that rests on a **fulcrum.**



The **fulcrum** is what the **lever** turns on.

Effort is the force needed to move a

Gears



Gears or cogs can be used to change the speed, force or direction of a motion.