



What should I already know?

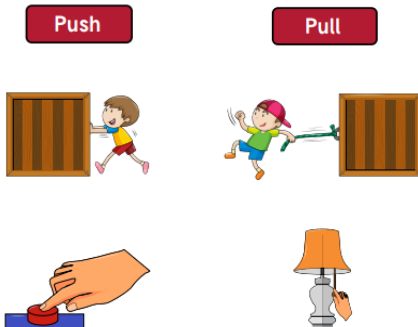
- I know what is meant by **force** and that a **push** or a **pull** is a type of force
- When a force is **applied** to an object, it stops the object or makes it move
- The **strength** of force determines how far and fast an object moves
- Friction** is the resistance of motion when there is contact between two surfaces
- The force that causes objects to move down towards the ground is called **gravity**
- Magnets have **poles**, and that opposite poles **attract**, while similar poles **repel**.

Did you know?



Isaac Newton was a scientist who developed the first description of the force of gravity. Newton said that he started thinking about gravity after watching an apple fall from a tree but it did not actually hit him on the head, as it is often claimed!

A **force** is a **push** or **pull** that acts upon an object. We can't see forces, but they are an important part of our everyday lives. We push and pull objects to do many different things. When we push or pull objects we can move the object, change the shape of the object or make the object change direction.



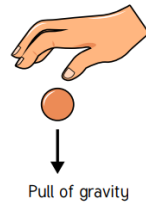
Key Vocabulary

force	a push or pull that acts upon an object that can cause it to move, change shape or change direction
friction	the force that acts upon one surface when it moves against another surface
gear	a part of a machine that causes another part to move because of teeth which connect the two moving parts
gravity	a pull force that acts at a distance
lever	a basic tool used to lift or pry things open
mechanism	machines or devices which help to achieve a result.
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.
resistance	an opposing or slowing force
weight	the measure of the force of gravity on an object, measured in Newtons (N)
mass	the measure of how much matter is inside an object, can be measured in g/kg etc
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
attract	to pull towards
repel	to push away
spring	a spiral of wire which returns to its original shape after it is pressed or pulled

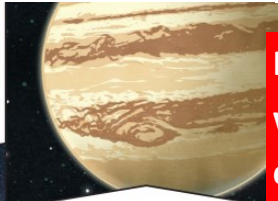
Key knowledge

Gravity

Gravity is a force which acts at a distance. It is a **pull** force that pulls objects towards the centre of the Earth. The planets and the Sun do not touch, yet the planets stay in orbit around the Sun due to the force of gravity



The Moon has a smaller **mass** than Earth so the **gravitational pull** on the Moon is smaller than it is on Earth.



Jupiter has a greater **mass** than Earth so the **gravitational pull** on Jupiter is stronger than on Earth.

Key question: How do we know that forces exist?

Friction

Friction is a force created between two **surfaces** when they rub together. Friction creates heat and always slows down an object. Rough surfaces create more friction than smooth surfaces.



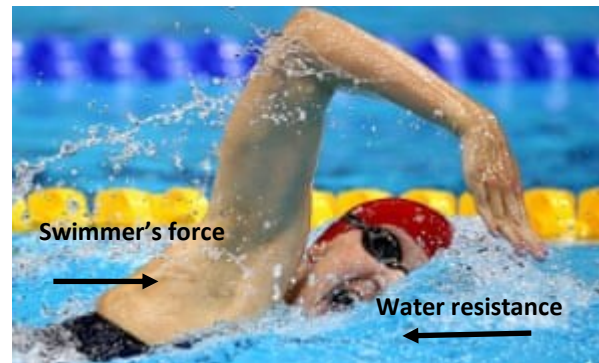
Air resistance

Air resistance is a force that acts in the **opposite** direction to gravity. It acts between a moving object and the air molecules around it, slowing the object down. Air resistance is a type of **friction**. Parachutes are used to increase air resistance and slow down the parachutist, so they can land safely. Modern cars and planes are **stream-lined** in design to reduce air resistance, allowing them to move faster



Water resistance

Water resistance is the force responsible for making it difficult for us to move through the water. It acts between a moving object and the water molecules around it, slowing the object down.



Mechanisms

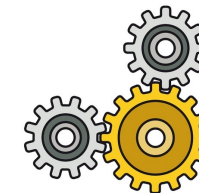
What are examples of **mechanisms**?



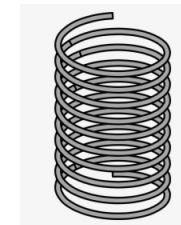
lever



pulley



gear



spring

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.