

# Science— Forces

## Key Vocabulary

air resistance	A type of friction caused by air pushing against a moving object.
buoyancy	An upward force that a liquid applies to objects.
force	A push or a pull against an object or thing.
friction	A force that acts between two surfaces or objects that are moving, or trying to move, across each other.
gravity	A pulling force exerted by the Earth (or anything else with a mass).
lever	A bar where one end is placed under a heavy object so that when you press down on the other end, you can move the object.
mass	The measure of how much matter (or 'stuff') is inside an object.
mechanism	Parts which work together in a machine e.g.. pulleys, gears and levers.
pulley	A device consisting of a wheel over which a rope or chain is pulled in order to lift heavy objects
water resistance	A type of friction caused by water pushing against a moving object.
weight	The measure of the force of gravity on an object.

## Key Facts

Forces can make an object start to move, change direction, change shape, stop moving, move faster and move more slowly.

Mass is how much matter is inside an object and is measured in kilograms (KG). Weight is how strongly gravity is pulling an object down and is measured in Newtons (N).

Mechanisms such as levers, pulleys and gears allow a small force to have great effect.

Air resistance and water resistance can make it hard for an object to move. It may slow the object down or stop it completely. When an object is streamlined, the air or water resistance is lessened.

Unsupported objects fall to the Earth because of gravity acting between the object and the Earth. The gravitational pull pulls the object to the Earth.

The moon has a smaller mass than the Earth and therefore has a smaller gravitational pull. Jupiter has a larger mass than the Earth and therefore has a greater gravitational pull.

Key people—Isaac Newton (1643-1727)



Newton described **gravity** as a pulling force that keeps people on the ground rather than floating off. He also noted that gravity keeps the moon in orbit. Newton told the story of **seeing an apple fall to the ground from a tree** which inspired him to wonder why it fell down, rather than up or across.

**Newton's 3 laws of motion:**

1. An object will keep moving in the same direction unless a force acts on it to make it change direction, speed up or slow down.
2. The bigger the mass of an object, the bigger the force is needed to make it accelerate and move.
3. 'For every action there is an equal and opposite reaction'.

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.

Gears, pulleys and cogs

Pulleys	Gears/Cogs	Levers
Pulleys can be used to make a small <b>force</b> lift a lighter load. The more wheels in a pulley, the less <b>force</b> is needed to lift a <b>weight</b> .	Gears or cogs can be used to change the speed, <b>force</b> or direction of a motion. When two gears are connected, they always turn in the opposite direction to each other.	Levers can be used to make a small <b>force</b> lift a lighter load. A lever always rests on a pivot.

**Tier 2**

**Vocabulary**

concept	An idea.
evidence	An object, writing, photo, picture, film or sound recording that you can use to find out about a period of history.
hypothesis	An idea that you think is true that you have some proof about.
interpret	To explain what you think something is or why you think something happened using evidence from the past
method	The steps that need to be followed.
predict	To guess what will happen using what you already know to be more accurate,