



Year 5 – Forces

Isaac Newton's book 'Principia' contained many theories of physics.

If your Weight is 100 N on Earth, your Weight will be 16 N on the Moon! Your mass (kg) will stay the same though as you will still be made up of the same amount of matter.

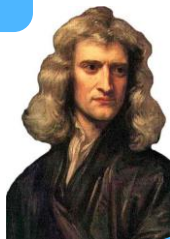
ROCKET WORDS

– learn these words and their definitions

Key Word	Definition
weight	The force due to gravity acting on an object. Measured in Newtons (N).
mass	The amount of matter (or 'stuff') contained in an object. Measuring in units such as g, kg.
gravity	The pull of attraction that exists between any two objects. It is the Earth's gravitational pull that keeps us on the ground.
resistance	A force exerted on something to slow it down or stop it.
streamlined	A shape this is designed to minimise resistance as an object flows through a gas or liquid.
Newtons	A unit of measure used to measure forces.
levers	A long pole and a pivot
pulleys	A rope running through a wheel
gears	Wheels with teeth that fit together

Sir Isaac Newton (1643-1726)

- Explained the three laws of motion.
- Explained the theory of **gravity**, including **gravitational pull** of the Earth.



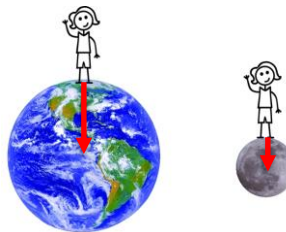
Gravity

Unsupported objects fall towards Earth because of the **gravitational pull** of the Earth.



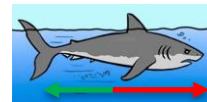
Wherever you are on Earth, objects are pulled towards the centre of the Earth.

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



Resistance

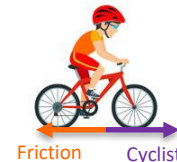
Water resistance and **air resistance** are forms of friction.



Water resistance Thrust force



Air resistance Weight



Friction Cyclists driving force

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 chains can make the bike harder to pedal so it is unhelpful.

Streamlined shapes move faster through air or water.



Gears, levers and pulleys

These mechanisms allow a smaller force to have a bigger effect.

Name	How it works	Picture	Used For
Lever	If you push with a small force on the long side of the lever , you produce a bigger force on the short side.		<ul style="list-style-type: none"> stapler door handle claw of hammer tweezers
Pulley	Pulling on the rope lifts the heavy object on the other end. It is easier to lift the object by pulling down on the rope than by picking it up.		<ul style="list-style-type: none"> elevator wells theatre curtains bulldozer
Gear	The 'teeth' on the gears turn one another, and in doing so, helps to increase the power of a turning force.		<ul style="list-style-type: none"> cars bikes pendulum clock vacuums