



# Year 5 – Forces

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

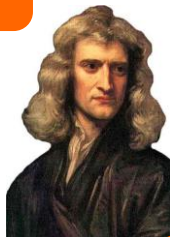
If your Weight is 100 N on Earth, your Weight will be 16 N on the Moon! Your mass (kg) will stay the same though as you will still be made up of the same amount of matter.

## Vital Vocabulary

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



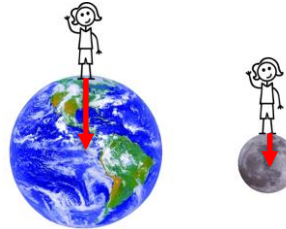
### Gravity

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



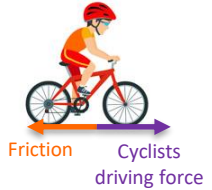
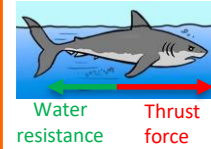
Wherever you are on Earth, objects are pulled towards the centre of the Earth.

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.



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