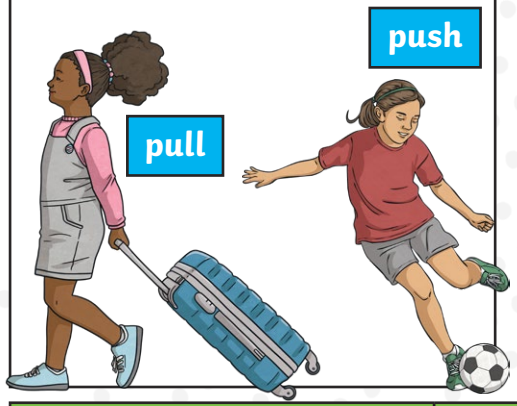
Key Vocabulary

force	A **force** is a push or pull that can cause an object to start or stop moving or change its speed, direction or shape.
gravity	**Gravity** is a pulling **force** exerted by the Earth (or any object with mass).
newton (N)	The **newton (N)** is a unit of measurement used to measure **force**, named after Sir Isaac Newton.
friction	**Friction** is a contact **force** that occurs between two touching surfaces that are either trying to move or are already moving across each other.
air resistance	**Air resistance** is a form of **friction** that occurs between air and an object moving through it. It can also be referred to as 'drag'.
water resistance	**Water resistance** is a type of **friction** that happens when water (or any liquid) pushes against an object moving through it.

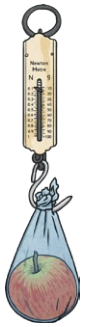
Forces

Forces can be categorised as pushes or pulls.



Mass is the measure of the amount of matter within an object and is typically measured in grams (g) or kilograms (kg).

Weight is the measure of the gravitational **force** acting on an object and is measured in **newtons (N)**.



Sir Isaac Newton	Galileo Galilei	Ibn al-Haytham
		
Newton theorised that a **force** must pull objects downwards after observing an apple fall from a tree. This sparked his curiosity about why objects fall downwards rather than sideways or upwards.	Galileo suggested that, if he were to drop two balls of different masses from the top of the Leaning Tower of Pisa with no **air resistance** to slow their fall, both balls would hit the ground at the same time.	Al-Haytham described **gravity** as the attraction between two masses and explored how the **force** of **gravity** causes objects to accelerate.

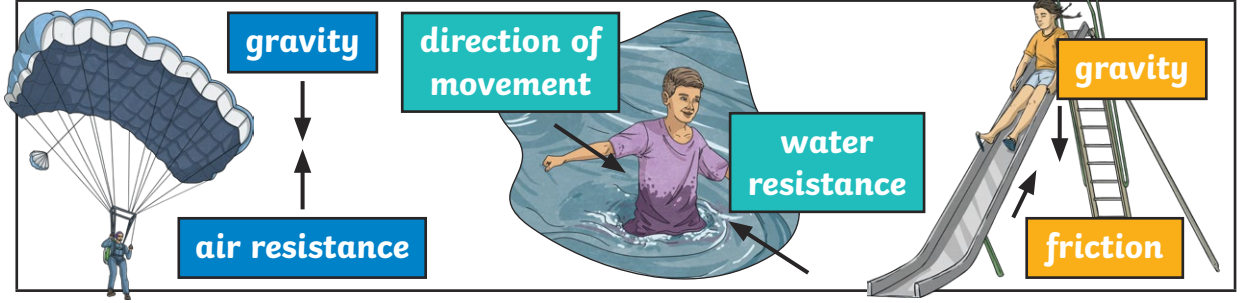
Key Vocabulary

streamlined	**Streamlined** objects have a shape that allows them to move more efficiently through air or water by reducing resistance.
mechanism	A **mechanism** is the smaller moving parts of a machine.
lever	A **lever** is a **mechanism** that uses a small **force** to move a heavier load by pivoting on a fixed point.
pulley	A **pulley** is a wheel (or set of wheels) over which a rope is looped, used to lift heavy objects with less effort.
gear	**Gears** are wheels with teeth that lock together and turn each other to transfer motion.

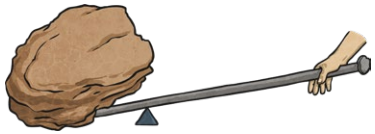
Streamlined shapes have a pointed front and a low, curved back to allow them to cut through air or water more efficiently, enabling faster movement.

Forces can be both helpful and unhelpful. For example, **air resistance** helps a plane stay in the air but it also opposes the driving **force**, slowing the plane down.

Forces in Action

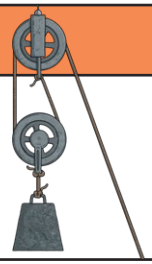


Levers



A **lever** has three main parts: the pivot point (where the lever rotates); the **force** applied to one end; and the load (object or resistance) being moved at the other end. The distance between the pivot and where the **force** is applied affects how easy it is to lift the load.

Pulleys



A **pulley** with a single wheel allows you to change the direction of the **force** applied when lifting. The more wheels added to a **pulley** system, the less **force** is needed to lift the load. For example, adding a second wheel halves the amount of **force** required.

Gears

When **gears** are connected, they always rotate in opposite directions, allowing them to change the direction of motion. If the first **gear** is larger than the second, the second **gear** will rotate faster, increasing the speed of motion.