Forces

Knowledge

Forces

I can explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object

I can identify the effects of air resistance, water resistance and friction, that act between moving surfaces

I can recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Working Scientifically

Exploring, designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective.

Explore resistance in water by making and testing boats of different shapes.

Design and make products that use levers, pulleys, gears and/or springs and explore their effects.

Hook into a Book

Activate Prior Knowledge

EY

- Explore and talk about different forces they can feel.
- Describe what they see, hear and feel whilst outside
- Understand the effect of changing seasons on the natural world around them.

KS1

- I can find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
- I can compare and group together a variety of everyday materials on the basis of their simple physical properties.

KS2

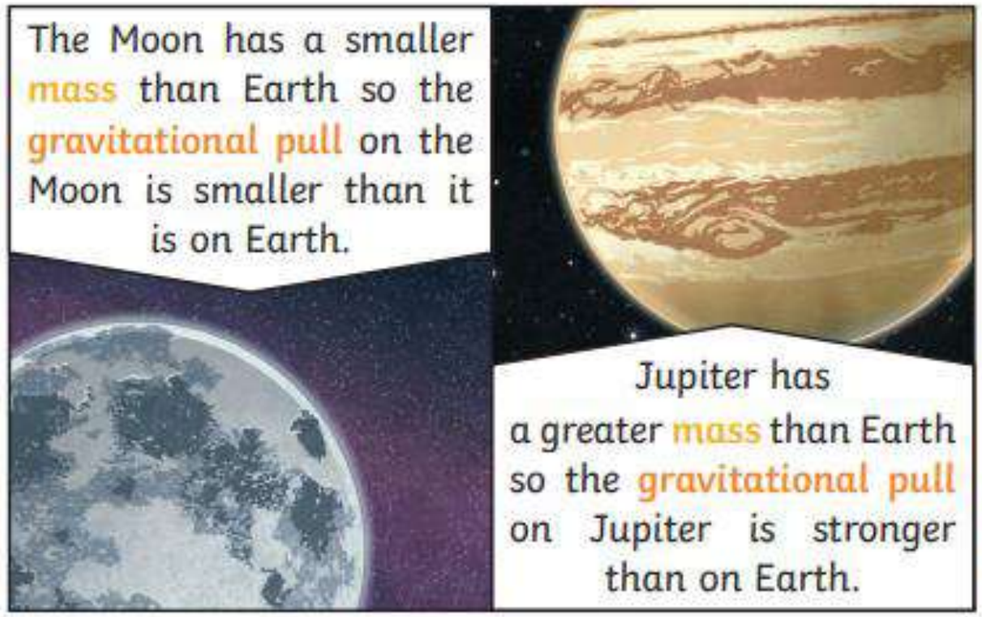
- I can compare how things move on different surfaces
- I can notice that some forces need contact between two objects, but magnetic forces can act at a distance
- I can observe how magnets attract or repel each other and attract some materials and not others
- I can compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- I can describe magnets as having two poles
- I can predict whether two magnets will attract or repel each other, depending on which poles are facing.

Investing in the UNIQUENESS of each individual

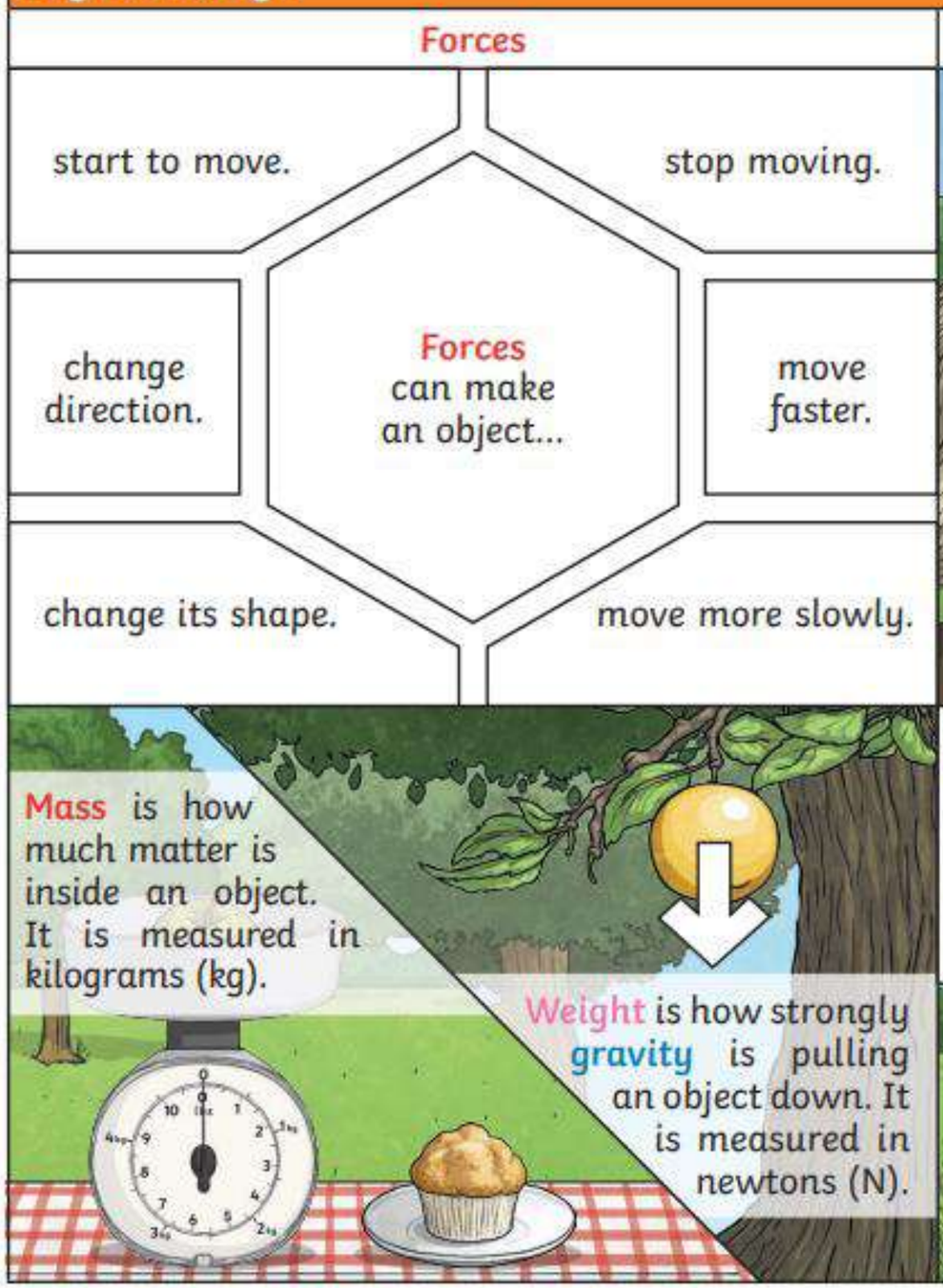
"I Am Fearfully And Wonderfully Made"
– Psalms 139 v14

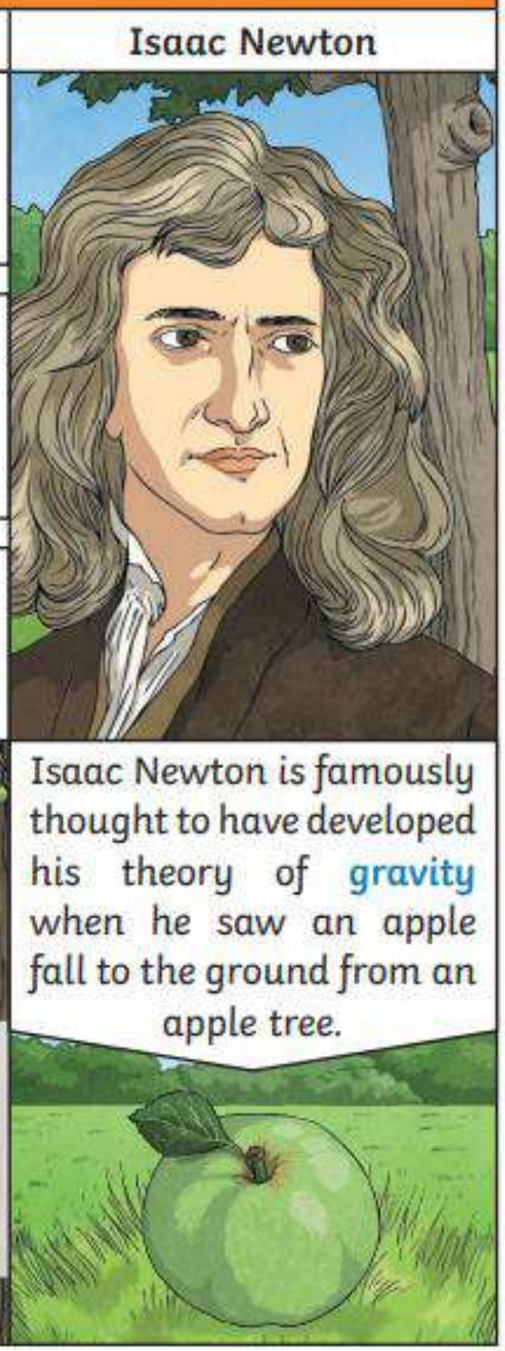
Key Vocabulary

forces	Pushes or pulls.
gravity	A pulling force exerted by the Earth (or anything else which has mass).
Earth's gravitational pull	The pull that Earth exerts on an object, pulling it towards Earth's centre. It is the Earth's gravitational pull which keeps us on the ground.
weight	The measure of the force of gravity on an object.
mass	A measure of how much matter (or 'stuff') is inside an object.



Key Knowledge





Key Vocabulary

friction	A **force** that acts between two surfaces or objects that are moving, or trying to move, across each other.
air resistance	A type of **friction** caused by air pushing against any moving object.
water resistance	A type of **friction** caused by water pushing against any moving object.
buoyancy	An object is buoyant if it floats. This is because the weight of the object is equal to the **upthrust**.
streamlined	When an object is shaped to minimise the effects of **air** or **water resistance**.
mechanism	Mechanisms are simple machines with moving parts that change input forces and movement into a set of useful output forces. Examples of **mechanisms** are pulleys, gears and levers.
upthrust	A **force** that pushes objects up, usually in water.

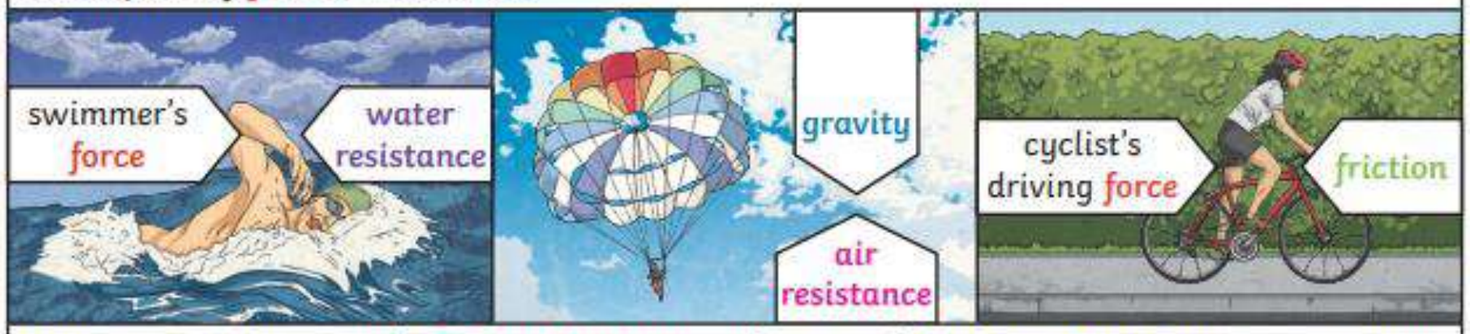
It has a pointed nose to cut through the water, and a smooth, low, curved back to allow the water to flow over and around it.

This shark is **streamlined**.

It does not create much **water resistance** so it can move through the water quickly.

Key Knowledge

Examples of **forces** in action:

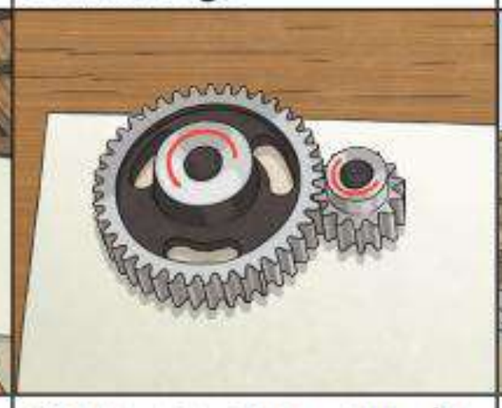


Water resistance and **air resistance** are forms of **friction**. **Friction** is sometimes helpful and sometimes unhelpful. For example, **air resistance** is helpful as it stops the skydiver hitting the ground at high speed. **Friction** on a bike chain can make the bike harder to pedal so it is unhelpful.

Pulleys

Pulleys can be used to make a small **force** lift a heavier load. The more wheels in a pulley, the less **force** is needed to lift a **weight**.

Gears/Cogs



Gears or cogs can be used to change the speed, **force** or direction of a motion. When two gears are connected, they always turn in the opposite direction to each other.

Levers

Levers can be used to make a small **force** lift a heavier load. A lever always rests on a pivot.