

Knowledge Organiser Focus:

gravity	A pulling force exerted by the Earth (or anything else which has mass).
weight	The measure of the force of gravity on an object
mass	A measure of how much matter (or 'stuff') is inside an object.
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.
friction	A force that acts between 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.
mechanism	Parts which work together in a machine. Examples of mechanisms are pulleys, gears and levers.
streamlined	When an object is shaped to minimize the effects of air or water resistance.
upthrust	A force that pushes objects up, usually in water.
Buoyancy	An object is buoyant if it floats. This is because the weight of the object is equal to the upthrust.

Forces



Thinking deeper
 Can you explain why astronauts float around in Space or move differently when they are on the moon?

The big picture

What I should know...

Year 3

- Compare how things move on different surfaces.
- Notice that some forces need contact between 2 objects but magnetic forces can act at a distance.

What I will know...

- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.
- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect

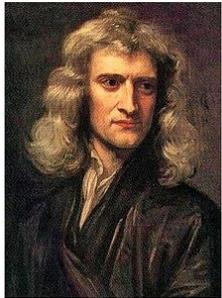
Links to future topics...

Year 7

- Experiment with Hooke's law to describe how forces deform objects.
- Use force diagrams to support an explanation of forces in action.

Friction

Friction is the force between two surfaces. This can take place as one object moves across another for example a car on a road. Wet or slippery surfaces can reduce the amount of friction between the two objects.

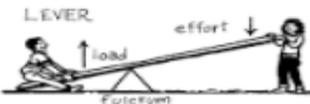
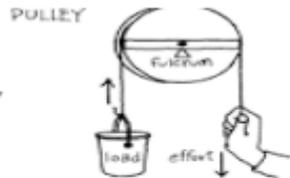
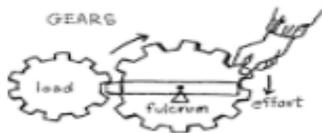
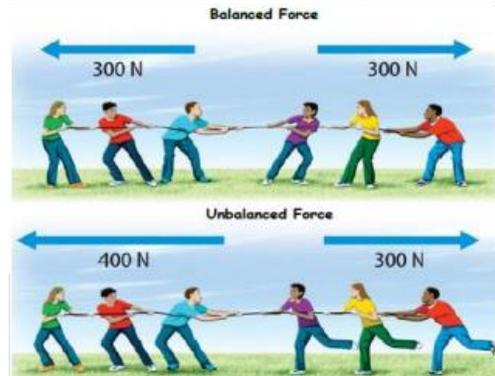


Gravity

Gravity is the force that pulls objects towards it. Isaac Newton is famously thought to have developed his theory of gravity when he saw an apple fall to the ground from an apple tree.

Force meter

This is used to measure force and the magnitude of that force. Force is measured in Newtons (N) and it can be read on the display.



Air resistance

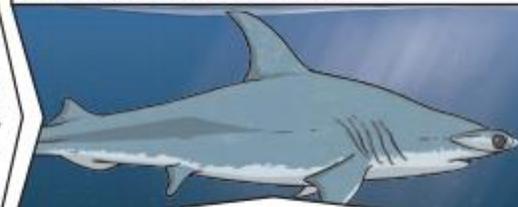
Air resistance can be seen in real life, with the example of a parachute opening up in the air as the jumper falls through the sky. The larger the surface area, the greater the amount of air resistance.

Water resistance

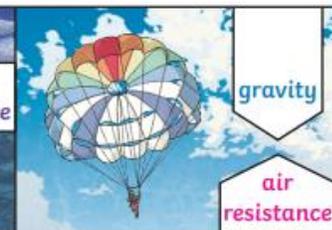
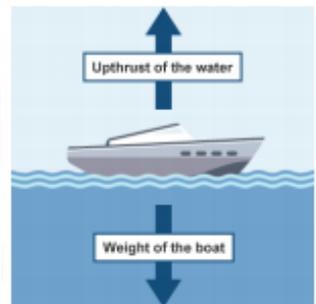
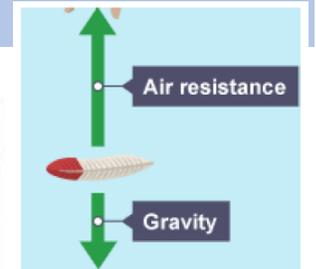
Water resistance is a type of friction that acts on an object as it travels through water.

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**.

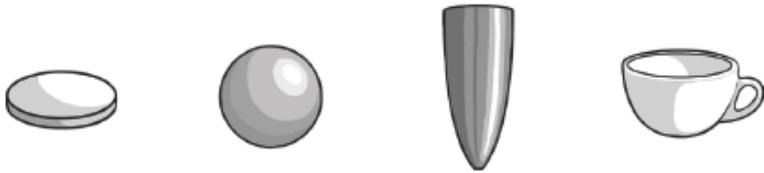


It does not create much **water resistance** so it can move through the water quickly.



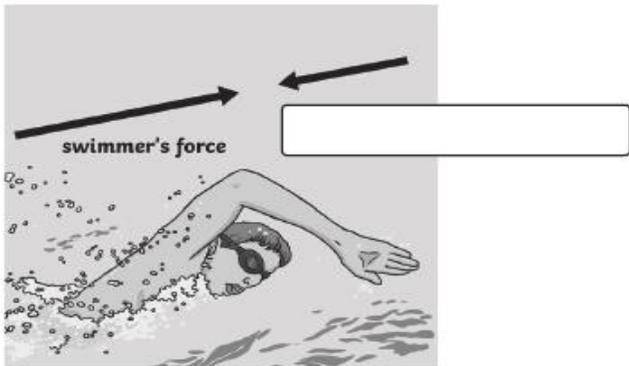
1) In what units do we measure force? _____

2) Circle the object that would fall the fastest in water.



Explain why:

3) Label the force that is pushing against this swimmer in the water.



4) What is the name of the force that pulls things towards the centre of the Earth?

5) Who discovered this force? _____

6) Explain why astronauts are able to float around in space.

7) Label **gravity** and **one other force** on the two diagrams below. Draw arrows to show the directions of these forces.

An aeroplane flying



Dropping a stone in water

