Enquiry Knowledge Organiser Year 5 What do forces actually do?

Vocabulary I need to know:

- force
- gravity
- push
- pull
- friction
- newton
- water resistance
- air resistance
- streamline
- lever
- pulley
- gear
- mechanism lever
- fulcrum

Isaac Newton was one of the great figures in the history of science. His ideas about motion and gravity are very important to the science of physics..

Born in 1643, Newton is famous for various scientific and mathematical contributions to our understanding of the world, including the three laws of motion.

- The first of his three laws of motion states that an object will keep moving in the same direction unless a force acts on it to make it change direction, speed up or slow down.
- The second law of motion is that the bigger the mass of an object, the bigger the force is needed to make it accelerate and move.

He created a mathematical formula for the second law of motion: F=ma (the force (F) needed is equal to the mass of the object multiplied by the rate of acceleration).

- His third law of motion says that 'for every action there is an equal and opposite reaction'.

Scientific definitions

Acceleration – the rate an object changes its speed at. It is calculated using the following formula: acceleration = change in speed ÷ time taken.

Calculus – a strand of mathematics that calculates rates of change and helps find lengths, volumes and areas.

Force – a push or pull on an object.

Gravity – a force that makes things to move towards each other.

Mathematics – the study of numbers, shapes and quantities.

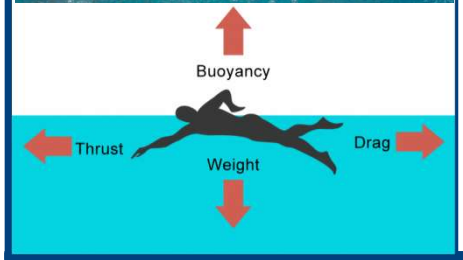
Motion – when something moves.

Physics – the study of matter and energy and how they interact.

Resistance - a force that opposes or slows down another force.

Friction - is the force resisting the movement of solid surfaces and materials sliding against each other

Water resistance



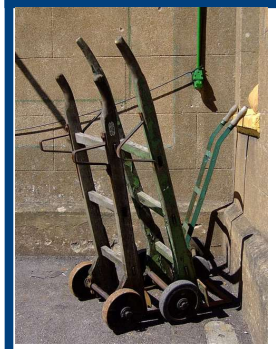
- Water resistance is the friction that slows down the movement of anything that is in water.
- Water resistance is a type of force that uses friction to slow things down that are moving through water. – Often called 'drag.'
- Water resistance doesn't have to be just water; however, it can happen to objects moving through any type of fluid. Water resistance happens because of the particles in water or the fluid. As the object moved through it collides with the particles which try to slow it down.

Prior Learning

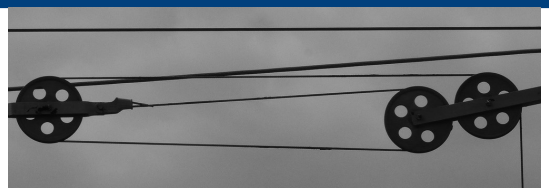
You should know:

- that a force can be thought of as a push or a pull
- that objects move differently on rough and smooth surfaces; objects resist movement more on rough surfaces because there is higher friction as the object moves
- that there are also non-contact forces that can act between objects without them touching and that magnetism is an example of a non-contact force
- that there is a magnetic field around a magnet which is strongest at each pole
- that some materials are magnetic, meaning that they are attracted to a magnet, while other materials are non-magnetic

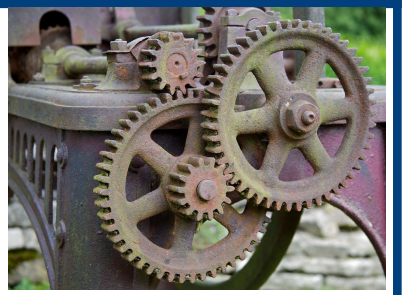
Levers, gears and pulleys



lever



pulley



gear

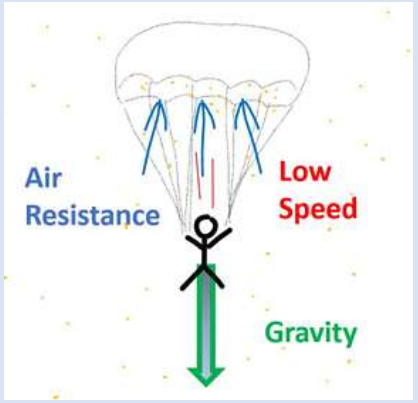
mechanism levers

When the fulcrum is close to the load, work/effort becomes easier.

Gravity and air resistance

When a parachute opens, it creates air resistance, also known as drag, which is the force that opposes the motion of an object as it moves through the air.

Air collects under the fabric parachute, pushing it up as gravity pulls the heavy object attached to it down. This pushing slows the fall of the object by resisting the air under the parachute.



scientist

engineer

author