St Peter's Primary School

Year 5 Science: Forces

What I should already know:

How objects move on different surfaces.

That some forces need contact between two objects, but magnetic forces can act at a distance.

A variety of everyday magnetic and non-magnetic materials.

How magnets attract or repel each other and attract some materials and not others.

The north and south poles of a magnet.

At the end of this topic, 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.

Key Facts:

Gravity

Gravity is a non-contact force caused by objects with mass pulling each other. Heavier objects do not fall to the ground faster than lighter objects. Objects with a different mass fall at the same rate.

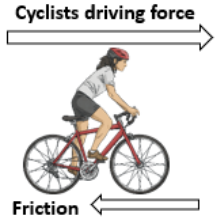
Sir Isaac Newton

Developed the theory of gravity.
It was said he was sitting under a tree when an apple fell on his head. He identified it was a force pulling it down.

Newtons (N)

Forces are measured in Newton's (named after Isaac Newton). They can be read and displayed on a newton meter. The bigger the force applied, the longer the spring stretches and the bigger the reading.

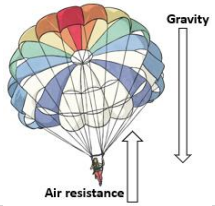
Friction



Friction is a contact force that is caused by one object being pushed across the surface of another. Friction can stop or slow down a moving object. A stationary object will only move when the force applied is greater than the friction, which acts in the opposite direction to the movement. Friction produces heat, which we feel when we rub our hands together. Friction can cause some materials to wear away, such as pencils. Friction has many useful applications, such as in vehicle brakes, using sandpaper to smooth a surface and walking on firm ground.

Water resistance

A type of force caused by friction slowing things down that are moving through a liquid. Water resistance occurs in all liquids, not just water. The more streamlined an object is, the less water resistance is acting upon it. This means that more streamlined objects will move through water more easily and with less effort.



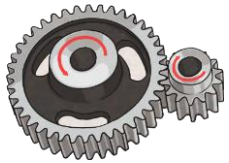
Air resistance

Air resistance is a friction force between the air and a moving object. Air resistance is greater when the surface area of the moving object is large. Parachutes have a large surface area, so they have a greater air resistance and slow the skydiver down. Air resistance increases with speed.

Simple mechanisms

Levers, pulleys and gears are all mechanisms that will allow a smaller force to have a greater effect.

Gears



Gears are wheels with teeth that allow a small force to produce a larger force to increase speed.

Levers

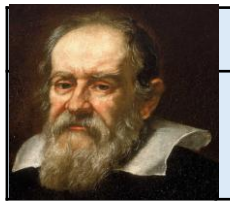
A lever is a mechanism that allows movement of heavy objects. It rests on a pivot.

Pulleys

Pulleys use a rope or cable through a wheel to allow lifting of heavy objects.

Vocabulary

force	Pushes and pulls in a certain direction. A force can change the speed, direction or shape of an object.
contact force	A force between two objects that are touching each other.
friction	The contact force that is caused by one object being pushed across the surface of another.
motion	The change in the position of an object.
air resistance	A type of friction between air and another object. Also known as drag.
streamline	Having a shape that has little resistance to a flow of air or water.
water resistance	A type of force caused by friction slowing things down that are moving through a liquid.
gravity	An invisible force that pulls things to the centre of Earth (or other planets).
weight	The measure of how strongly gravity is pulling an object down. It is measured in Newtons (N)
mass	A measure of how much matter (or 'stuff') is inside an object. It is measure in kilograms (kg).
newtons	The unit of measure for weight.
non-contact force	A force that does not require direct physical contact between two objects.



Significant scientist:
Galileo Galilei (1564-1642)

Dropped two balls from the Leaning Tower of Pisa and proved that all objects fall at the same rate no matter what their mass is.