



Buglawton Primary School

Be the Best We Can

Topic: Forces

Subject: Science

Year: 5

Term: Autumn

What should I already know?

- Compare how things move on different surfaces. (Y3 - Forces and magnets)
- Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets)
- Observe how magnets attract or repel each other and attract some materials and not others. (Y3 - Forces and magnets)
- 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. (Y3 - Forces and magnets)
- Describe magnets as having two poles. (Y3 - Forces and magnets)
- Predict whether two magnets will attract or repel each other, depending on which poles are facing. (Y3 - Forces and magnets)

What will I know and by the end of the unit?

- 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.

What will I be able to do by the end of the unit?

- Can demonstrate the effect of gravity acting on an unsupported object
- Can give examples of friction, water resistance and air resistance
- Can give examples of when it is beneficial to have high or low friction, water resistance and air resistance
- Can demonstrate how pulleys, levers and gears work
- Can explain the results of their investigations in terms of the force, showing a good understanding that as the object tries to move through the water or air or across the surface the particles in the water, air or on the surface slow it down
- Can demonstrate clearly the effects of using levers, pulleys and gears

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.

The Moon has a smaller **mass** than Earth so the **gravitational pull** on the Moon is smaller than it is on Earth.

Jupiter has a greater **mass** than Earth so the **gravitational pull** on Jupiter is stronger than on Earth.

Key Knowledge		Isaac Newton
<p>Forces</p> <p>start to move. stop moving.</p> <p>change direction. move faster.</p> <p>change its shape. move more slowly.</p> <p>Forces can make an object...</p>		<p>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.</p>
<p>Mass is how much matter is inside an object. It is measured in kilograms (kg).</p> <p>Weight is how strongly gravity is pulling an object down. It is measured in newtons (N).</p>		

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 upward force that a liquid applies to objects.
streamlined	When an object is shaped to minimise the effects of air or water resistance.
mechanism	Parts which work together in a machine. Examples of mechanisms are pulleys, gears and levers.

This shark is **streamlined**.

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.

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

Key Knowledge		
Examples of forces in action:		
<p>swimmer's force</p> <p>water resistance</p>	<p>gravity</p> <p>air resistance</p>	<p>cyclist's driving force</p> <p>friction</p>
<p>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.</p>		
<p>Pulleys</p>	<p>Gears/Cogs</p>	<p>Levers</p>
<p>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.</p>	<p>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.</p>	<p>Levers can be used to make a small force lift a heavier load. A lever always rests on a pivot.</p>

Agreed Real-life outcome:
 Research how the work of scientists such as Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.

