



Science Topic:

Forces

Year 5

Term: Spring

What should I already know and when did I learn this?

- I know how things move on different surfaces. (Y3 - Forces and magnets)
- I know that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets)
- I know magnets attract or repel each other and attract some materials and not others. (Y3 - Forces and magnets)
- I have compared and grouped together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identified some magnetic materials. (Y3 - Forces and magnets)
- I know magnets have two poles. (Y3 - Forces and magnets)
- I know whether two magnets will attract or repel each other, depending on which poles are facing. (Y3 - Forces and magnets)

What will I know by the end of the unit?

- 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.

<b>Forces</b>	The scientific word for the pulling and pushing effect
<b>Gravity</b>	A pulling <b>force</b> exerted by the Earth (or anything else which has <b>mass</b> ).
<b>Earth's gravitational pull</b>	The pull that Earth exerts on an object, pulling it towards Earth's centre. It is the Earth's <b>gravitational pull</b> which keeps us on the ground.
<b>Weight</b>	The measure of the <b>force</b> of <b>gravity</b> on an object. Measured in NEWTONS using a newton meter.
<b>Mass</b>	A measure of how much matter (or 'stuff') is inside an object.
<b>Friction</b>	A <b>force</b> that acts between two surfaces or objects that are moving, or trying to move, across each other.
<b>Air resistance</b>	A type of <b>friction</b> caused by air pushing against any moving object.
<b>Water resistance</b>	A type of <b>friction</b> caused by water pushing against any moving object.
<b>Buoyancy or up-thrust</b>	An upward <b>force</b> that a liquid applies to objects.
<b>Streamlined</b>	When an object is shaped to minimise the effects of <b>air</b> or <b>water resistance</b> .
<b>Mechanism</b>	Parts which work together in a machine. Examples of <b>mechanisms</b> are pulleys, gears and levers.
<b>Lever</b>	A basic tool used to lift or pry things open.
<b>Pulley</b>	A simple machine that makes lifting something easier.
<b>Gear</b>	A part of a machine that causes another part to move because of teeth which connect the two moving parts.

Forces

Forces are just pushes and pulls in a particular direction. Forces are shown by arrows in diagrams. The direction of the arrow shows the direction in which the force is acting. The bigger the arrow, the bigger the force.  
Forces change the motion of an object. They will make it start to move or speed up, slow it down or even make it stop.

Forces In Action

<p>Water resistance and air resistance are forms of friction. Friction can be both helpful and 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>		

Mechanisms	
	Pulleys can be used to make a small <b>force</b> lift a heavier load. The more wheels in a pulley, the less <b>force</b> is needed to lift a <b>weight</b> . The heavy load is attached to ropes and pulley wheels, and so instead of lifting the heavy object upwards, we can pull on the pulley rope downwards.
	Gears or cogs are toothed wheels and can be used to change the speed, <b>force</b> or direction of a motion. When two gears are connected, they always turn in the opposite direction to each other. Their 'teeth' can fit into each other so that when the first wheel turns, so does the next one.
	Levers can be used to make a small <b>force</b> lift a heavier load. Trying to pick up a large heavy box is difficult, however if a lever is used it becomes much easier to move it. A lever always rests on a pivot. A seesaw is an example of a lever.

Isaac Newton	Galileo Galilei
<p>Isaac Newton is considered one of the most important scientists in history. He was born in 1643 in England. He is famously thought to have developed his theory of gravity when he saw an apple fall to the ground from a tree. Newton understood that what makes things like apples fall to the ground is a specific kind of force — the force we call gravity. The large mass of the earth pulls objects towards it. That is why the apple fell down instead of up, and why people do not float in the air.</p>	<p>Galileo conducted a famous experiment in which he dropped two objects from the Leaning Tower of Pisa in 1589. He went to the top and dropped two balls that were the same size and shape, but one was heavier than the other. He believed that the heavier item would land first, but it didn't. They both landed at the same time.</p>

Investigate
<ul style="list-style-type: none"> <li>• Demonstrate the effects of gravity acting on an unsupported object.</li> <li>• Give examples of friction, water resistance and air resistance.</li> <li>• Give examples of when it is beneficial to have high or low friction, water resistance and air resistance.</li> <li>• Demonstrate how pulleys, levers and gears work.</li> </ul>