

KS3 Physics – Forces and Magnets

Subject curriculum intent:	<p>To develop in our students:</p> <ul style="list-style-type: none"> • An enjoyment of Science by providing relevant, interesting and challenging experiences and activities. • Observational skills, by looking for patterns and contrasts. • An inquiring mind and a logical approach to problem solving. • The ability to draw conclusions from simple experiments and, where appropriate, to devise suitable experiments for further investigations. • Communication skills in speaking and listening, written, diagrammatic and symbolic forms. • Co-operation and a respect for others by being able to work as part of a team – the development of appropriate social skills. • Confidence in their own abilities. • A respect for the environment and a careful use of resources. • An interest in the world about them and a greater understanding of it. 		
End of KS3 intent/outcome	End of KS4 intent/outcome	End of KS5 intent/outcome	
Students will build on their knowledge of science through the different areas – biology chemistry and physics. Students will ‘work scientifically’ to achieve the goals of each topic area they encounter.	Students will continue to develop their scientific knowledge through the different areas – biology, chemistry and physics. Students will ‘work scientifically’ to achieve the goals of each topic area they encounter. Students will be able to relate their scientific experiences to everyday life and have an understanding that science is all around them.	N/A	
Intent for this topic:	<p>Students we be able to learn about and explore different forces. They will have opportunities to carry out different investigations and record these results in a table and/or graphs and discuss their findings. Also, they will learn about magnets and which materials are magnetic.</p> <p>Students will ‘work scientifically’ to achieve these goals, learning the key features of scientific enquiry; observing over time, pattern seeking, identifying, classifying, investigating (fair tests) and researching.</p>		
Core vocabulary needed for this subject/topic:	<p><u>Subject:</u> Biology, Chemistry, Physics Observe, pattern, identifying, classifying, investigating, fair test, researching</p> <p><u>Topic:</u> Force, push, pull, gravity, friction, air resistance, water resistance, magnet, Newtons (N), measure</p>		

Vocabulary pupils will have accessed in other topics or subject areas:	Force, measure, push, pull, gravity			
Key vocabulary taught within this topic:	Push, pull, gravity, friction, air resistance, water resistance, magnet, Newtons (N)			
Prior knowledge: what pupils may already have studied				
Key stage	Subject	Topic title	Term/year taught	Content/What might pupils already know?
KS3	Science	Energy	Summer 1/Year 1	Pupils will have learnt about different types of energy including magnetic energy and gravitational energy.
KS3	Science	Space: Planets and stars	Summer 1/Year 2	Pupils will have knowledge of gravity as this is the force that keeps planets in their place when orbiting the sun.
KS3	Maths	Measure	Every school year	Pupils will have knowledge of measuring length and weight using standard and non-standard units of measure. They will also have compared different types of measure.
KS3	Maths	Time	Every school year	Pupils will have an understanding of time and have been introduced to seconds and minutes. Children may have been introduced to a stop watch to time how long things take.
Links to other subjects: Maths				

	<u>OU P Steps 5-6</u>	<u>OU P Steps 7-8</u>	<u>OU Step 1</u>	<u>OU Step 2</u>	<u>OU Step 3</u>
<u>Subject specific knowledge</u>	<p>Knows that forces are pushes and pulls.</p> <p>Can choose the correct symbol to identify the force that is being taught.</p> <p>Knows that friction can make objects do different things.</p>	<p>Knows that forces are pushes and pulls.</p> <p>Knows that forces act in pairs.</p> <p>Can identify the names of different forces.</p> <p>Knows that forces can also occur between 2 objects that aren't touching as well as</p>	<p>Knows that forces act in pairs.</p> <p>Knows that forces can also occur between 2 objects that aren't touching as well as objects that are touching.</p> <p>Knows the name different forces.</p>	<p>Knows that forces act in pairs.</p> <p>Knows that forces can also occur between 2 objects that aren't touching as well as objects that are touching.</p> <p>Knows the name different forces.</p>	<p>Knows that forces act in pairs.</p> <p>Knows that forces can also occur between 2 objects that aren't touching as well as objects that are touching.</p> <p>Knows the names of different forces and explain the difference.</p>

	<p>Knows that air and water resistance slow things down.</p> <p>Knows that something that is magnetic will stick to different things.</p>	<p>objects that are touching.</p> <p>Knows that friction can make objects do different things.</p> <p>Knows that friction is linked to movement.</p> <p>Knows that air and water resistance slow things down.</p> <p>Knows that a magnet is a metal that attracts or repels other materials.</p> <p>Knows that something that is magnetic will stick to different things.</p>	<p>Knows that friction can make objects:</p> <ul style="list-style-type: none"> - Speed up or start moving. - Slow down or stop moving - Change direction - Change shape - Turn <p>Knows that friction is a force that always acts in the opposite direction to movement.</p> <p>Knows that air and water resistance slow things down.</p> <p>Knows that a magnet is a metal that attracts or repels other materials.</p> <p>Knows that bar magnets are in the shape of a bar and one end of a bar magnet is called the North (N) pole and the other end is the South (S) pole.</p>	<p>Knows that friction can make objects:</p> <ul style="list-style-type: none"> - Speed up or start moving. - Slow down or stop moving - Change direction - Change shape - Turn <p>Knows that friction is a force that always acts in the opposite direction to movement.</p> <p>Knows that air and water resistance are frictional forces.</p> <p>Knows that air and water resistance push against objects which are moving through air or water.</p> <p>Knows that air and water resistance slow things down.</p> <p>Knows that a magnet is a metal that attracts or repels other materials.</p> <p>Knows that bar magnets are in the shape of a bar and one end of a bar magnet is called the North (N) pole and the</p>	<p>Can explain how friction can affect an object.</p> <p>Can explain how air and water resistance are frictional forces.</p> <p>Knows which forces slow things down.</p> <p>Knows that a magnet is a metal that attracts or repels other materials.</p> <p>Knows that bar magnets are in the shape of a bar and one end of a bar magnet is called the North (N) pole and the other end is the South (S) pole.</p> <p>Can explain why something is magnetic.</p>
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				other end is the South (S) pole.	
<u>Subject specific skills</u>	<p>Is able to measure distance using markers.</p> <p>Is able to tell someone to start and stop a stop watch using symbols or words to measure time.</p> <p>Is able to follow a set of demonstrations to carry out a simple investigation.</p>	<p>Is able to measure distance using non-standard units of measure (cubes, paper clips).</p> <p>Is able to use a stop watch to time how long it takes something to travel.</p> <p>Is able to make a prediction from a choice of 3 using symbols.</p> <p>Is able to follow a picture method to carry out a simple investigation.</p> <p>Is able to identify one thing that has changed when completing a fair test.</p> <p>Identifies the correct result in a table.</p>	<p>Is able to measure a force using Newtons (N)</p> <p>Is able to measure distance to the nearest centimetre.</p> <p>Is able to use a stop watch to time how long it takes something to travel.</p> <p>Is able to select an appropriate prediction from a given choice.</p> <p>Is able to follow a word and picture method to carry out a simple investigation.</p> <p>Is able to suggest what to change when completing a fair test.</p> <p>Is able to record results in a simple table.</p> <p>Analyses results in the form of tables, simple bar graphs and a brief descriptions using key words or sentence blanks.</p>	<p>Is able to measure a force using Newtons (N)</p> <p>Is able to measure distance in centimetres and metres.</p> <p>Is able to use a stop watch to time how long it takes something to travel.</p> <p>Is able to make a prediction linked to their investigation.</p> <p>Is able to follow a written set of instructions to carry out a simple investigation.</p> <p>Is able to explain why their investigation included a fair test.</p> <p>Is able to record results in a suitable table.</p> <p>Is able to record results in the form of a simple bar graph.</p>	<p>Is able to measure a force using Newtons (N)</p> <p>Is able to measure distance in centimetres and metres.</p> <p>Is able to use a stop watch to time how long it takes something to travel.</p> <p>Is able to make predictions.</p> <p>Is able to follow a written set of instructions to carry out a simple investigation.</p> <p>Is able to design an experiment to include a fair test.</p> <p>Is able to record results in a suitable table.</p> <p>Analyses results in the form of tables, simple bar graphs and a brief description.</p>

				Analyses results in the form of tables, simple bar graphs and a brief description.	Is able to draw conclusions from their results.
<u>Suggested Activities</u>	<ul style="list-style-type: none"> - Explore different objects and identify if it is a push or a pull that moves them. - Explore push and pull forces in school and everyday life. - Look at each of the different forces and complete investigations linked to each. (Suggestions listed below). Allow opportunities to make predictions, look at what makes a fair test and record results in tables and as a graph. - Draw force diagrams with arrows to represent the different forces. 				
<u>Possible Investigations</u>	<ul style="list-style-type: none"> - Push or Pull investigation - Allow children to measure forces using a newton meter. - Friction – surface investigation – change the surface of the ramp and measure the distance the car travels. - Air Resistance – paper helicopter investigation – add paper clips and time how long it takes for the paper helicopter to reach the ground. - Air Resistance – Make and compare parachutes - Air Resistance – design and make a parachute - Water Resistance – design and make a boat – time how long it takes to travel across a tray. - Magnets - Investigate which materials are magnetic and not magnetic. - Magnet – dancing paper clips 				
<u>Personal development</u>	<p><u>Problem solving</u> Investigations and matching exercises</p> <p><u>Communication skills</u> Working as pairs in investigations, asking and answering questions</p> <p><u>Self-belief</u> Learning new skills, practising them and demonstrating them.</p> <p><u>Self-management</u> Working with new equipment</p> <p><u>Teamwork</u> Working as groups to solve problems or find out new information</p>				
<u>Online resources</u>	<p>Twinkl</p> <p>CLEAPPS for risk assessments</p> <p>BBC bitesize for video resources</p> <p>Youtube</p> <p>Resource folder on the school server</p>				

Evidencing Work

All work / evidence sheets need to be printed off (where appropriate levelled in accordance with the rubric), students need to self-assess and work needs to be put in student folders.

RRS Articles:

This unit of work is linked to Articles of the UN Convention on the Rights of the Child.