

# Year 3 Forces and Magnets

Expected	Do not need to report GD at KS2 but these are some ideas for extending children's understanding.
<ul style="list-style-type: none"> <li>● knows that different surfaces can affect how far an object travels</li> <li>● describes how the majority of objects need to be pushed or pulled using physical contact, in order to move, stop or change direction</li> <li>● describes how a magnet can repel or attract without physical contact</li> <li>● defines the terms 'repel' and 'attract'</li> <li>● describes how two bar magnets can attract or repel each other</li> <li>● knows that magnetic materials are always metal and that materials that are not metal are not magnetic</li> <li>● recognises that not all metals are magnetic</li> <li>● defines the term 'magnetic'</li> <li>● correctly sorts a variety of materials into magnetic and non-magnetic by testing them</li> <li>● correctly predicts which materials will be magnetic from a range of everyday materials, e.g. glass, metal (steel), plastic, wood, rubber</li> <li>● correctly uses the word attract</li> <li>● knows that the ends of a bar magnet are called poles</li> <li>● knows that the poles are different</li> <li>● knows that there is a north and south pole on a bar magnet</li> <li>● knows that like poles repel</li> <li>● knows that different poles attract</li> <li>● explains their reasoning when predicting whether or not two magnets will attract or repel each other</li> </ul>	<ul style="list-style-type: none"> <li>● explains the differences in distance or speed that an object travels over different surfaces, using the term friction</li> <li>● gives examples of how magnetic forces acting at a distance are used in everyday life, e.g. <i>the fastener on a mobile phone case</i></li> <li>● explores how magnets, other than bar magnets, attract and repel each other</li> <li>● names a metal which is magnetic</li> <li>● names a metal which is not magnetic</li> <li>● describes why the poles of a magnet are called north and south</li> </ul>

Enquiry Opportunities	
<p>These are suggestions for enquiry activities. Please ensure that you are covering all types over the year. Focus on one scientific skill per enquiry.</p>	<p>Year 3 Working Scientifically Statements From Insights</p>

Children do not need to write up each stage of the investigation. Focus on just the skill being taught.			<ul style="list-style-type: none"> <li>• Makes systematic and careful observations over time.</li> <li>• Asks questions surrounding patterns found in data.</li> <li>• Gathers, records, classifies and presents data in a series of ways.</li> <li>• Sets up simple practical enquiries, comparative and fair tests.</li> <li>• Uses secondary sources with adult support to help clarify results seen.</li> </ul>		
Identifying and Classifying	Comparative Testing	Fair Testing	Pattern Seeking	Research	Observation Over Time
Which materials are magnetic? Identify how these properties make magnets useful. Investigate which materials are magnetic and sort between objects that are magnetic and those that are non-magnetic.	Which magnet is strongest? Which surface is best to stop you slipping? Investigate the amount of friction created by different surfaces. Use measures (such as length and time) to show how far or fast an object travels.	How does the mass of an object affect how much force is needed to make it move?	Does the size and shape of a magnet affect how strong it is? Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc. Looking for patterns in the way magnets behave in relation to each other and what might affect this, such as the size or which poles face each other.	How have our ideas about forces changed over time? How have our ideas about magnets changed over time? How does a compass work? Investigate how magnets are used in everyday life.	If we magnetise a pin, how long does it stay magnetised for?

Prior Knowledge	Previous Lesson Topics	
<ul style="list-style-type: none"> <li>• May have an awareness of how to make things stop and start.</li> <li>• The shape of some materials can be changed when they are stretched, twisted, bent and squashed.</li> </ul>	n/a	
	Year 3 National Curriculum Statements	Future Learning
	<ul style="list-style-type: none"> <li>• compare how things move on different surfaces</li> </ul>	In Year 5 pupils will be taught to:

	<ul style="list-style-type: none"> <li>● notice that some forces need contact between 2 objects, but magnetic forces can act at a distance</li> <li>● observe how magnets attract or repel each other and attract some materials and not others</li> <li>● 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</li> <li>● describe magnets as having 2 poles</li> <li>● predict whether 2 magnets will attract or repel each other, depending on which poles are facing</li> </ul>	<ul style="list-style-type: none"> <li>● Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.</li> <li>● Identify the effects of air resistance, water resistance and friction that act between moving surfaces.</li> <li>● Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.</li> </ul>
	<p>Year 3 Insight Statements</p>	
	<ul style="list-style-type: none"> <li>● compare how things move on different surfaces</li> <li>● compares and groups together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials</li> <li>● understands that some forces need contact between two objects, but</li> </ul>	

	<p>magnetic forces can act at a distance</p> <ul style="list-style-type: none"> <li>• predict whether two magnets will attract or repel each other, depending on which poles are facing</li> <li>• describes how magnets attract or repel each other and attract some materials and not others</li> <li>• describes magnets as having 2 poles</li> </ul>		
Common Misconceptions	Competitions	Scientists	Books
<p>Some children may think:</p> <ul style="list-style-type: none"> <li>• all metals are magnetic</li> <li>• the bigger the magnet the stronger it is</li> </ul>		<p>Required: William Gilbert – theories on magnetism</p> <p>Suggested: Andre Marie Ampere – founder of electro-magnetism Hans Christian Oersted - discovered electric currents create magnetic fields Henry Ford - cars Michael Faraday - electromagnets The Wright Brothers - airplanes</p>	<p>Traction Man (Mini Grey) Three Little Pigs (Lesley Sims) The Iron Man (Ted Hughes) Mrs Armitage: Queen of the Road (Quentin Blake) Mr Archimedes' Bath (Pamela Allen)</p>
Scientific Vocabulary		School Resources	Cross-curricular Links
<p>Year 3: force, push, pull, contact force, non contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, non magnetic material, poles, north pole, south pole</p>		<ul style="list-style-type: none"> <li>• Range of different magnet and metal types in the Science cupboard</li> </ul> <p>Outdoor Learning and Resources</p>	<ul style="list-style-type: none"> <li>• Create a range of charts and graphs using the data collected</li> <li>• Measure and record accurately</li> </ul>

	Test the friction of a variety of outside surfaces.	
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