







## Examples of Work

Naithan

Forces and magnets - Year 3

	Year	3	Topic	Forces and magnets
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> <li>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2)</li> </ul>			
	Description of activity			
	The children completed a carousel of activities where they explored a range of toys/games that involved forces to move them.			

EVIDENCE OF LEARNING			ASSESSMENT		
Oral evidence	Examples of work		Knowledge		
<ol style="list-style-type: none"> <li>“The fish stick to the magnet.”</li> <li>“It moved in lots of different ways.”</li> <li>“As you twist the knobs, it tilts and the ball moves.”</li> <li>“I made my name by rolling it into sausages and then bending them to make the letters.”</li> <li>“When one shape turns, it moves the others next to it.”</li> <li>“I could move the ball without touching it.”</li> </ol>	1	2	Naithan is aware that you can make things move or change their shape.		
				3	
	4	5		6	
					
	Teacher observations			Working scientifically	

	Year	3	Topic	Forces and magnets
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> <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> </ul>			
	Description of activity			
	The children were asked to complete a mind map to show what they already knew about forces and magnets and to generate some questions.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Teacher observations		The mind map shows limited knowledge about forces and magnets.
<p>Naithan uses the word ‘sticky’ rather than attract.</p> <p>Naithan does not name any magnetic materials or types of magnets.</p>		Working scientifically



Year

3

Topic

Forces and magnets

Focus of assessment (National Curriculum statements)

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

Description of activity

The teacher showed the children the activities they had carried out in the previous carousel activity and asked them how they made things move. The children started to use the words 'push' and 'pull'. The teacher demonstrated a push and a pull and asked children to think of things that they could move by pushing, pulling or both. She then asked them to record this in a way of their choosing.

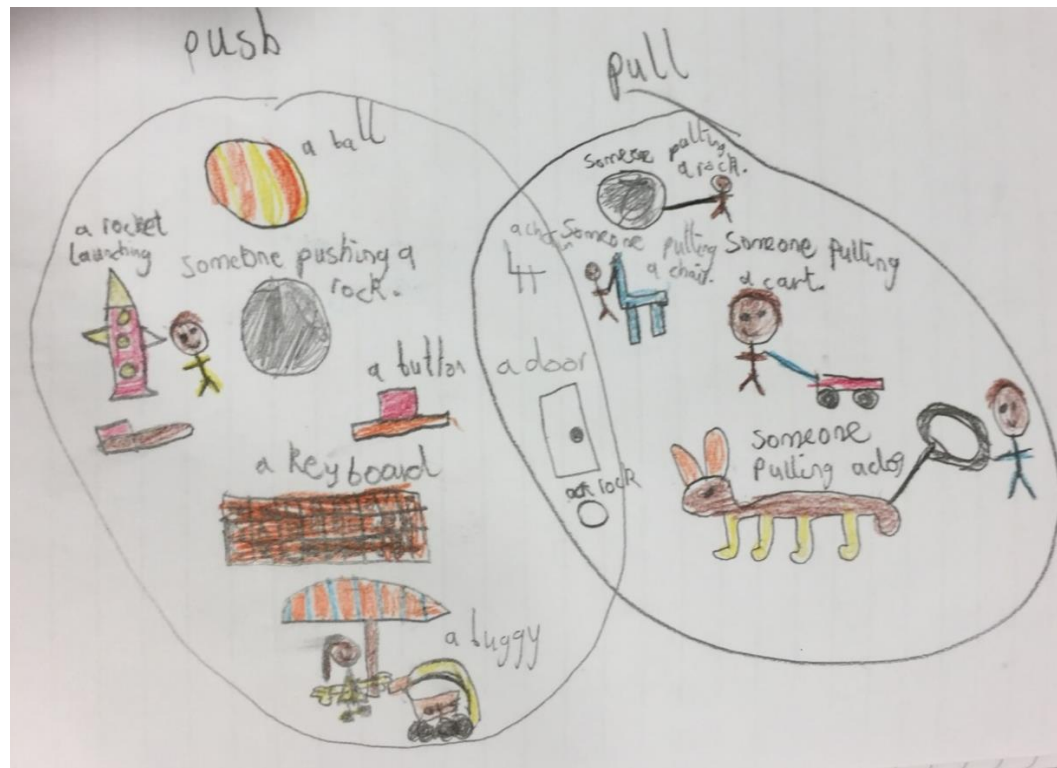
EVIDENCE OF LEARNING

ASSESSMENT

Oral evidence

Examples of work

Knowledge



Teacher observations

The children chose how to record their ideas. Naithan chose to use an intersecting Venn diagram. Other children used a table or simply labelled each individual object.

Working scientifically

Naithan records his ideas using an intersecting Venn diagram.



Year

3

Topic

Forces and magnets

Focus of assessment (National Curriculum statements)

- Compare how things move on different surfaces.

Description of activity

The children were given a ramp and four surfaces. A range of measuring equipment was left out for them to choose from. They were also given a table to record their results which prompted them to try each surface three times.

EVIDENCE OF LEARNING

ASSESSMENT

Oral evidence

Examples of work

Knowledge

"The car went best on A which was the wood."




When talking about his results, Naithan only considers the surface that was the best. He does not compare the surfaces.

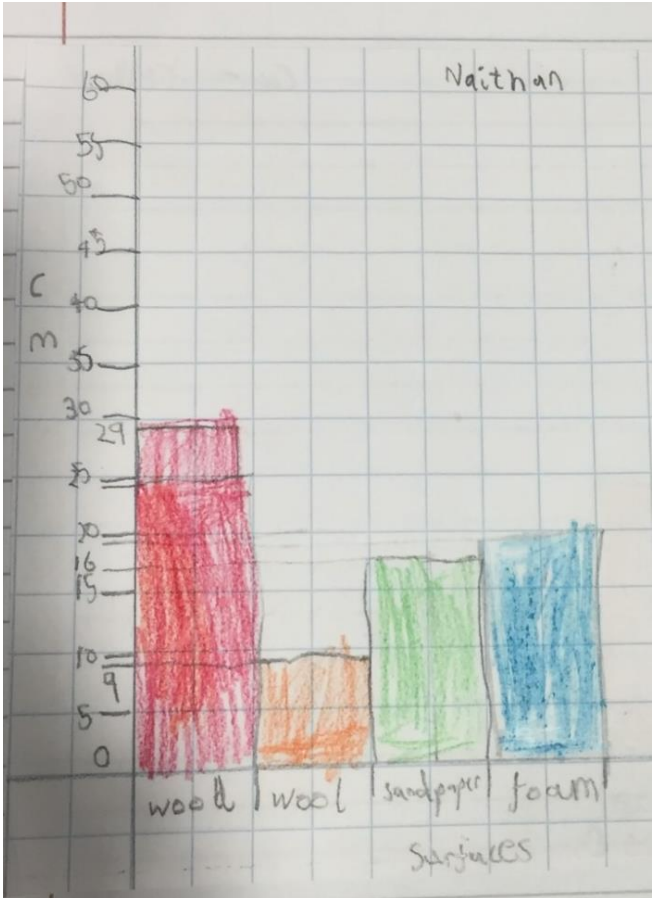
Teacher observations


Car	Type of surface			
Yellow	A wood	B wood	C carpet	D foam
Test 1	32cm	28cm	16cm	21cm
Test 2	28cm	9cm	19cm	16cm
Test 3	28cm	8cm	14cm	19cm
Average	29	9	16	19

Working scientifically


Naithan chose the tape measure for his group to use and took the measurements and recorded them correctly in the table, including the units used.

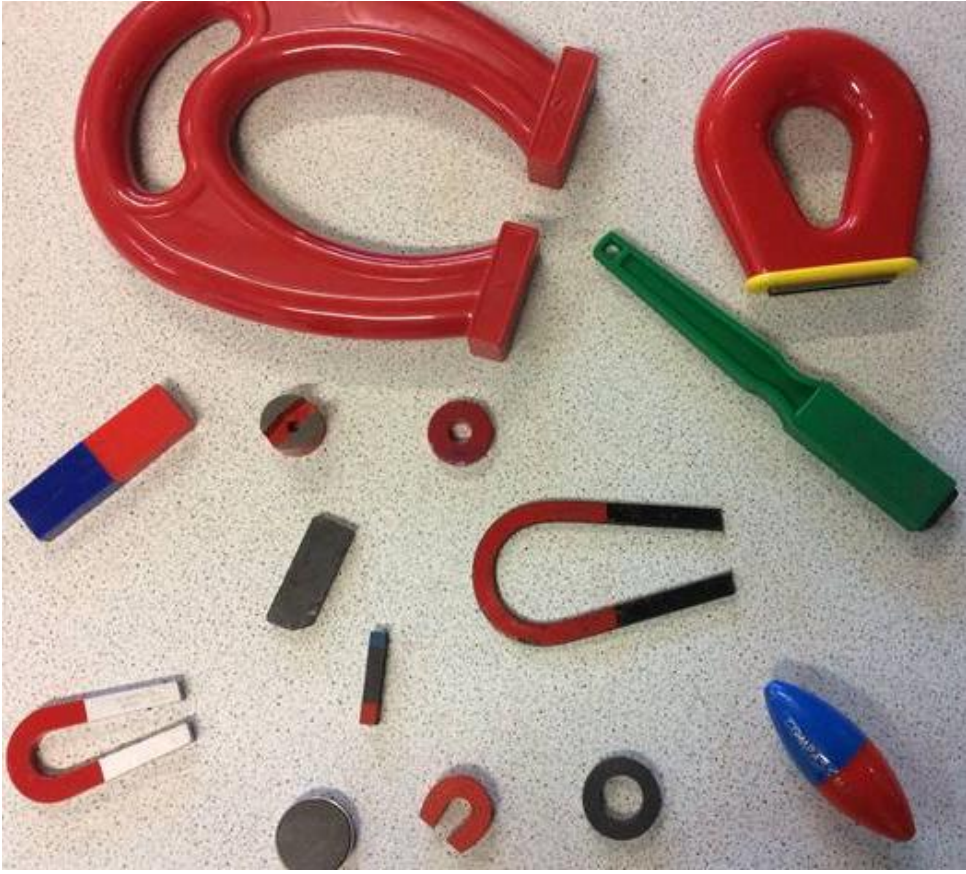
	Year	3	Topic	Forces and magnets
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> <li>Compare how things move on different surfaces.</li> </ul>			
	Description of activity			
The children then presented their results in a bar chart and the teacher asked them to talk to each other about their graph.				


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>Naithan: "The car went 29cm on the wood. This was the furthest. It only went 9cm on the wool. It actually went about the same distance on the sandpaper and foam."</p> <p>Teacher: "Why do you think it went different distances on the surfaces?"</p> <p>Naithan: "The wool was fluffy and slowed the car down. The wood was smooth and didn't slow it down. The sandpaper and foam feel quite similar."</p>		<p>Naithan is now showing an awareness that it is the texture of the surface that affects the movement.</p>
Teacher observations		Working scientifically
		<p>Naithan correctly draws the axes and the bars on his graph.</p>

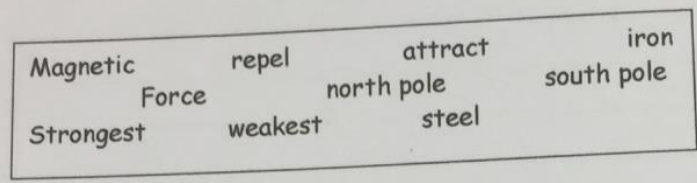

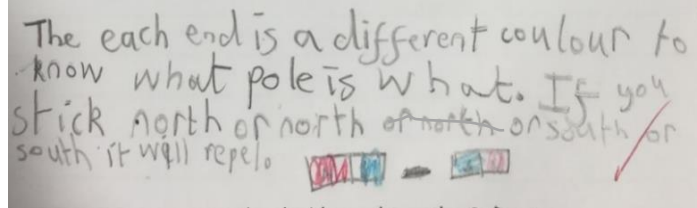
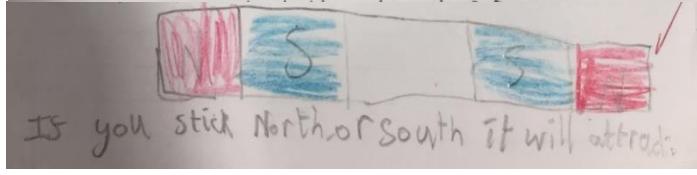
	Year	3	Topic	Forces and magnets
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> <li>Compare how things move on different surfaces.</li> </ul>			
	Description of activity			
	The children were given a spinning top and asked to see how it moved on different surfaces.			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>"It didn't spin on the doormat at all as the wings got caught. It span really well on the smooth table. I don't think it will spin for as long on the sugar paper as it is a bit rougher than the table."</p>		<p>Naithan uses his previous learning, that the texture of the surface affects the movement over it, to make predictions during this exploration.</p>
Teacher observations		<p>Working scientifically</p>
		<p>Naithan makes further predictions based on what he has observed.</p>

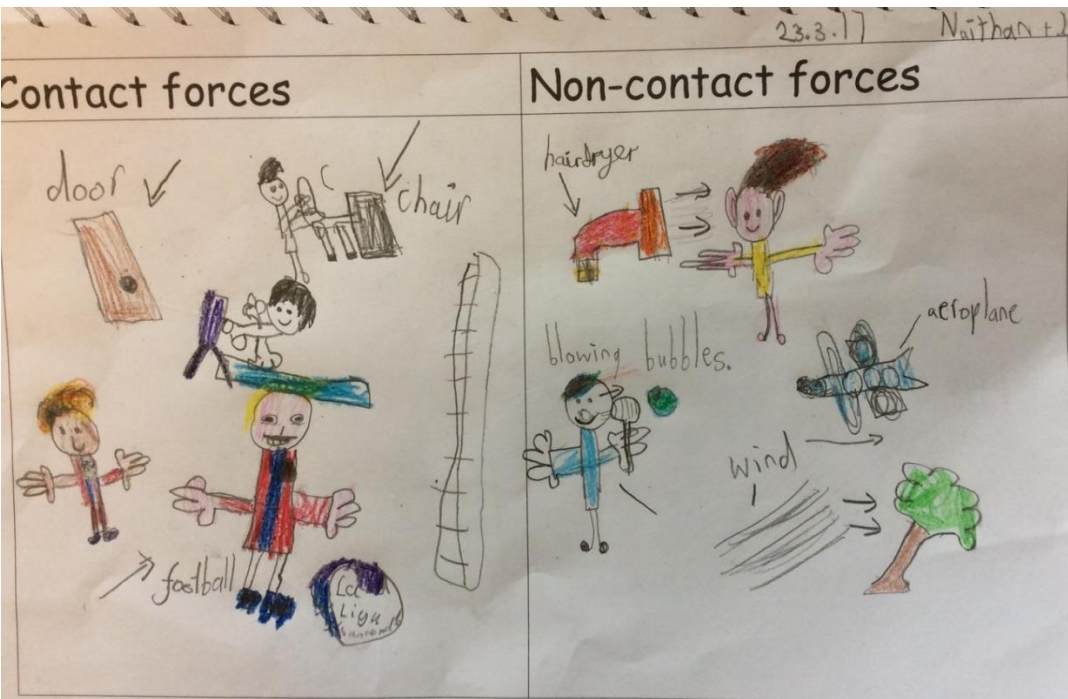
	Year	3	Topic	Forces and magnets
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> <li>• Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</li> <li>• Observe how magnets attract or repel each other and attract some materials and not others.</li> </ul>			
	Description of activity			
	The children were given some magnets and other resources in a box to explore.			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>"I can make the paperclip on the table move by using this magnet under the table. This one doesn't work though.</p> <p>"Sometimes two magnets push away and sometimes they stick together."</p>		<p>Through the exploration, Naithan discovers that the magnet does not need to be in contact with the paperclip to make it move. This needs reinforcing. He also notices the attraction and repulsion between magnets but does not use the correct scientific vocabulary or talk about the poles.</p>
Teacher observations		Working scientifically

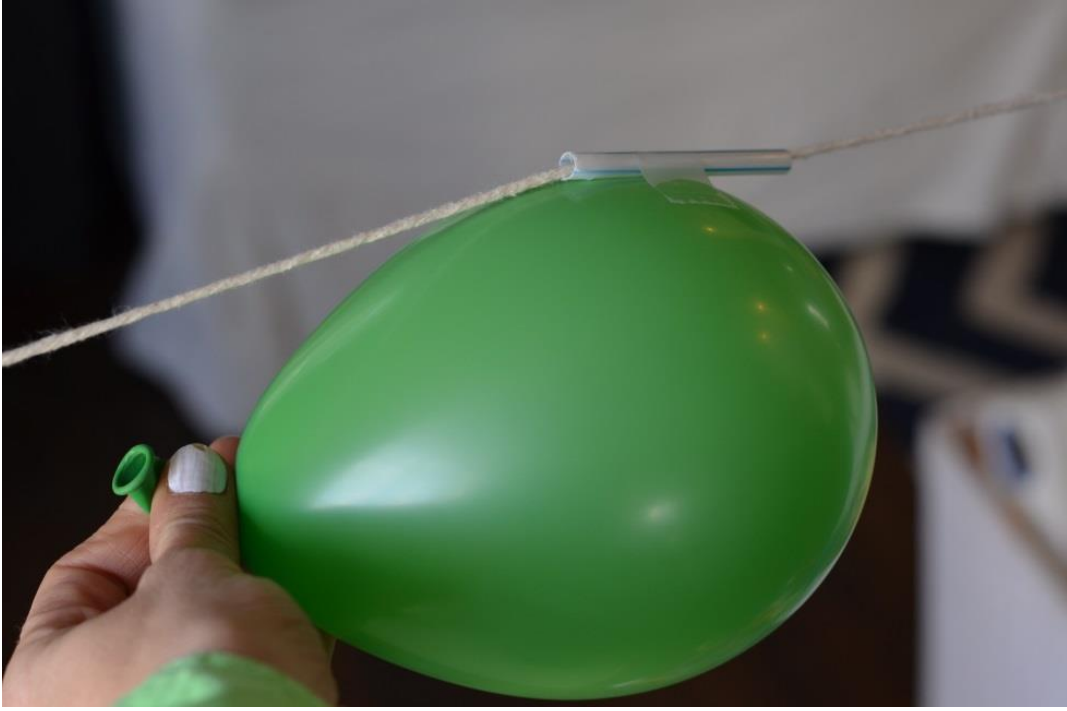
	Year	3	Topic	Forces and magnets
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> <li>Observe how magnets attract or repel each other and attract some materials and not others.</li> <li>Describe magnets as having two poles.</li> <li>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</li> </ul>			
	Description of activity			
	<p>The teacher showed an animation of the poles of two magnets attracting and repelling each other and highlighted this new key vocabulary. The children then practiced verbally explaining what they had learnt to a partner and then consolidated it in writing and drawings.</p>			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
	 	<p>Naithan identifies the poles of magnets and demonstrates that like poles repel and unlike poles attract.</p>
Teacher observations	  <p style="text-align: center;">Click <a href="#">here</a> to watch the video.</p>	Working scientifically
		<p>Naithan communicates his understanding orally and using drawing and writing.</p>

	Year	3	Topic	Forces and magnets
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> <li>Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</li> </ul>			
	Description of activity			
	The children were asked to think about a range of things that move and whether these were moved by contact or non-contact forces.			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Teacher observations		Naithan has not realised, at this stage, that things that are moved by air are still being moved by a contact force. (The air is in contact with the object.)
<p>The objects Naithan identifies as being moved by contact forces are all a direct push or pull by a person.</p> <p>The objects Naithan identifies as being moved by non-contact forces are mostly being moved by air.</p> <p>Understandably, Naithan cannot identify the force that makes an aeroplane move.</p>		Working scientifically

	Year	3	Topic	Forces and magnets
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> <li>Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</li> </ul>			
	Description of activity			
	<p>To address the misconception exposed in the previous activity, the children carried out a carousel of activities that involved making things move in different ways, which included directly pushing or pulling, using air and using magnets; moving a paperclip around a maze using a magnet, using a fan to blow a ping pong ball into a hole, playing mini snooker using a small ball and pencil as the cue, and exploring balloon rockets. The children were asked to think what was making each object move and to think about whether that involved contact between the two objects or not.</p>			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>“When we played snooker, the pencil was touching the ball, so they are in contact. The fan blows air at the ball which is touching the ball. Only the magnet can work without actually touching the paperclip.”</p>		<p>Naithan understands that most forces need contact whereas magnetic forces do not need contact and can act at a distance.</p>
Teacher observations		Working scientifically

	Year	3	Topic	Forces and magnets
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> <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> </ul>			
	Description of activity			
<p>As a starter activity, the teacher buried a range of small objects in a tray of sand. The children took turns to use a magnet to pull out an object. The children noticed that all the objects were made at least partly of metal and this 'stuck' to the magnet. The teacher reminded the children of the word 'attract'.</p>				


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>"There may still be some objects buried that are not made of metal, like a plastic bottle top. That wouldn't be attracted to the magnet."</p>		<p>Naithan is aware that some materials are magnetic and others, like plastic, are not. He is using the word 'attract' now. He is not showing awareness that not all metals are magnetic.</p>
Teacher observations		Working scientifically

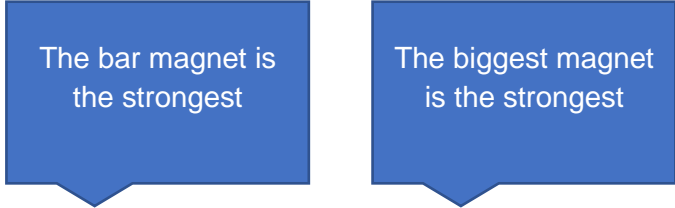
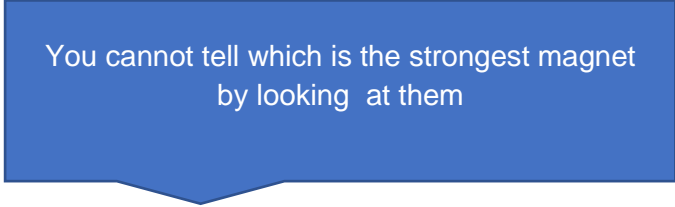
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	Description of activity			
<p>The children were given a selection of coins and asked to sort them in different ways. The children were then asked to sort them according to whether they thought they were magnetic or not. They were then given a magnet to test their ideas.</p>				


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>“I think all the coins will be magnetic as they are made of metal.</p> <p>“Not all the coins were magnetic even though they were made of metal. Some silver coins were magnetic and some were not. They must be made of different types of metal.”</p>		<p>Naithan is aware that some metals are magnetic and that others are not.</p>
<p style="background-color: #003366; color: white; padding: 2px;">Teacher observations</p> <p>Naithan suggested sorting by shape, colour, ridges on the edge, dirtiness.</p> <p>Naithan’s first comments shows he initially held the common misconception that all metals are magnetic.</p>		<p style="background-color: #FF0000; color: white; padding: 2px;">Working scientifically</p> <p>Naithan suggests different ways to sort the coins.</p>

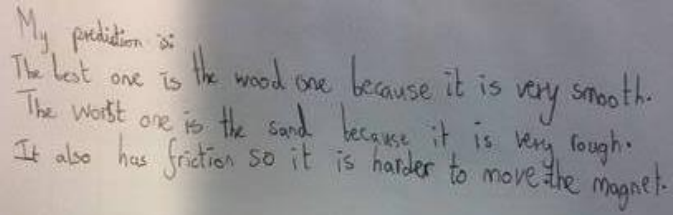
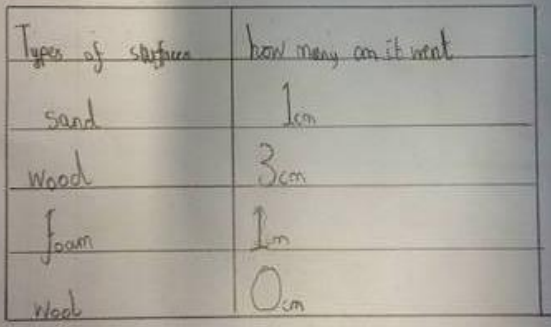

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	Description of activity			
	As an enrichment activity, while the teacher worked with another group of children to consolidate the key vocabulary, the children were asked to carry out a test into the strength of four magnets.			


EVIDENCE OF LEARNING		ASSESSMENT																													
Oral evidence	Examples of work	Knowledge																													
Teacher observations	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Magnet Investigation</p> <p>LO: To record findings using simple tables.      Which is the strongest magnet?</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 20px;"></td> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td> </tr> </table> <p>Put paperclip here      Move different types of magnets along slowly until paperclip is attracted; record number of centimetres away when attraction occurs.      ←</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 30%;">Type of magnet</th> <th>How many cm away when attracted the paperclip.</th> </tr> </thead> <tbody> <tr> <td>Bar magnet</td> <td>2cm</td> </tr> <tr> <td>Circular Magnet</td> <td>1cm</td> </tr> <tr> <td>Wand Magnet</td> <td>3cm</td> </tr> <tr> <td>Horseshoe Magnet</td> <td>0cm</td> </tr> </tbody> </table> <p>Which is the strongest magnet? Wand Magnet      How do you know? The Wand magnet got 3cm.</p> <p>Which is the weakest magnet? Horseshoe Magnet      How do you know? It only got 0cm.</p> </div>		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Type of magnet	How many cm away when attracted the paperclip.	Bar magnet	2cm	Circular Magnet	1cm	Wand Magnet	3cm	Horseshoe Magnet	0cm	Working scientifically
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Horseshoe Magnet	0cm																														
		Naithan followed the instructions to carry out the test, recorded his results in the table and correctly used his data to identify the strongest and weakest magnets.																													

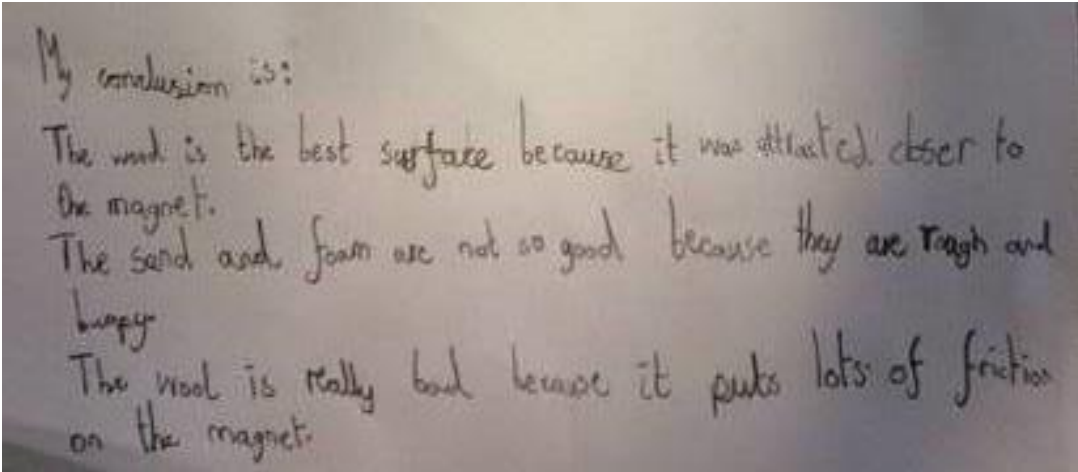
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	Description of activity			
	The children were asked to discuss the three statements presented in the style of a concept cartoon. After their discussion, the children were given a selection of magnets and asked to quickly test to find the strongest magnet.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>“Last week, my bar magnet was not as strong as the wand magnet. You can’t tell until you test them as sometimes a big magnet can be weak and a small one strong.”</p>		
Teacher observations		Working scientifically
<p>Naithan used the same method as in the previous activity but, as he did not have the paper scale, he used a ruler to measure the distance.</p>		<p>Naithan uses his evidence from the previous activity to refute the first statement about the bar magnet. He sets up a simple comparative test.</p>

	Year	3	Topic	Forces and magnets
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	<ul style="list-style-type: none"> <li>Compare how things move on different surfaces.</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> </ul>			
	Description of activity			
The children were asked to use their strongest magnet and test how the surface affected the distance the paperclip needed to be from the magnet in order to be attracted to it.				

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Naithan has consistently demonstrated that he understands that the texture of the surface affects how an object moves on it.
Teacher observations		
		
		Working scientifically
		Naithan makes a prediction based on previous observations.

	Year	3	Topic	Forces and magnets
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	Description of activity			
	The children were asked to write about what they had learnt from the exploration.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>Naithan was asked to look again at his evidence to check the first statement.</p> <p>“The paperclip was attracted from further from the magnet, not closer.”</p> <p>He was also asked to think about his final statement.</p> <p>“Oh, it is on the paperclip not the magnet, as it is the paperclip that moves.”</p>		<p>Naithan combines his knowledge of magnets and movement on different surfaces, showing he has a good understanding of both concepts.</p>
Teacher observations		Working scientifically
Naithan uses the word ‘attracted’ here unprompted.		



## Overall summary

Secure

Naithan has explored how objects move on different surfaces using cars, spinning tops and paperclips attracted by a magnet. He can make predictions about how well an object will move based on the texture of the surface. He has explored making objects move using contact forces and those that act at a distance (magnetic forces). He can talk about the poles of magnets and how these can attract or repel according to their orientation. He knows that some materials are magnetic and that others, such as plastic, are not. Through sorting coins, he learnt that not all metals are magnetic.