



**Topic Overview: Forces and Magnets**

Pupils should observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing). They should explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe).

**Objectives:**

- compare how things move on different surfaces
  - notice that some forces need contact between two objects, but magnetic forces can act at a distance
  - observe how magnets attract or repel each other and attract some materials and not others
  - 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
  - describe magnets as having two poles
  - predict whether two magnets will attract or repel each other, depending on which poles are facing
- Work scientifically by:*
- comparing how different things move and grouping them
  - raising questions and carrying out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions
  - exploring the strengths of different magnets and finding a fair way to compare them
  - sorting materials into those that are magnetic and those that are not
  - looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another
  - identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets

**Principles of Science:**

- We ask questions
- We explore and investigate
- We use scientific vocabulary
- We make links with other subjects
- We have fun!

**Focus scientists:**

Isaac Newton

**Writing opportunities:**

Explanation of forces

**Key vocabulary:**

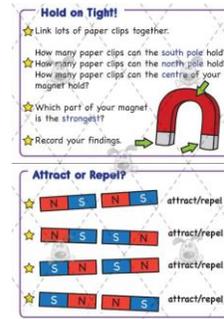
force surface magnet  
 magnetic force attract  
 repel magnetic material  
 poles bar magnet  
 horseshoe magnet  
 materials contact  
 non-contact north pole  
 south pole magnetic  
 field iron iron filings

**Learning Outcomes/ Assessment**

Emerging	Secure	Exceeding
<ul style="list-style-type: none"> <li>• <i>Observe object/living things/event and comment on it</i></li> <li>• <i>Notice similarities and differences in order to group and compare objects, living things and events</i></li> <li>• <i>Link cause and effect; recognise patterns and relationships</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Show understanding of a concept by using scientific vocabulary correctly</i></li> <li>• <i>Apply knowledge in familiar related contexts</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Create links to other curriculum areas</i></li> <li>• <i>Apply knowledge in unfamiliar context</i></li> </ul>

*\*Write names of chn in appropriate column.*

WALT	Key Vocabulary	Organisation	Notes for future planning
<b>Knowledge:</b> WALT investigate magnets WALT classify materials		Lab_13 investigation with Carole  Children to sort materials into magnetic and non magnetic. Children to test classification with magnet.  Main point for children to know: Not all metals are magnetic but only metal is magnetic.	<b>Chn not secure:</b>
<b>Success Criteria</b>			
WALT	Key Vocabulary	Organisation	Notes for future planning
<b>WALT understand different forces.</b>		TTYP: What forces do you know? (suggest that there are two forces a push and a pull)  Go through powerpoint linked to forces	<b>Chn not secure:</b>
<b>Success Criteria</b>		<ul style="list-style-type: none"> <li>• Magnetism</li> <li>• Friction</li> <li>• Gravity</li> <li>• Air Resistance</li> </ul>	
		Children to research the forces and suggest whether they are push or a pull force. Children to identify where these forces are and where we find them.	
WALT	Key Vocabulary	Organisation	Notes for future planning
<b>WALT understand that magnets attract and repel.</b>		Explain to children that magnets have different poles and that they are linked to the North and South pole. Explain that the Earth's core is like one giant magnet.  Explain the terms 'attract' and 'repel' DO NOT TELL THEM THAT OPPOSITES ATTRACT as this is what they are investigating.	<b>Chn not secure:</b>
<b>Success Criteria</b>		Investigation: Give children a magnet investigation to carry out. What do they notice?	
<b>Record all findings</b>		Go through their findings. Explain which poles attract and repel.	



WALT	Key Vocabulary	Organisation	Notes for future planning
WALT research a Scientist.		<p><b>Teacher input</b> (key questions)</p> <p>For homework children have been set a reading comprehension about Sir Isaac Newton.</p> <p>Discuss what they have found out about Newton. Put all their information on the board. Ensure that they have picked out:</p> <ul style="list-style-type: none"> <li>• 3 laws of motion</li> <li>• Gravity</li> </ul> <p>Children to use their homework books to put together a mind map containing the key points about Sir Isaac Newton.</p>	Chn not secure:
Success Criteria			
WALT	Key Vocabulary	Organisation	Notes for future planning
WALT investigate magnetic forces.		<p><b>Children to carry out 2 investigations in Lab_13 (with Angela not Carole)</b></p> <p>Investigation 1: Which magnet has the strongest force?</p> <p>Investigation 2: Do magnets work in different liquids?</p> <p>Before children carry out investigations all must make predictions about what they think will happen and give a reason as to why.</p> <p>At end of session discuss their findings. The strongest magnet is the smallest one and yes the magnets work in different liquids.</p>	Chn not secure:
Success Criteria			
WALT	Key Vocabulary	Organisation	Notes for future planning
WALT carry out a friction experiment.		<p><b>Discuss what children know about friction (children can look in their Science books for their research from earlier lesson)</b></p> <p>Get all children to rub their hands together so that they know that friction produces heat and slows objects down.</p> <p><b>Car investigation: Which surface will the car travel furthest on?</b></p> <p>Children given different materials to test their car going down a ramp. All children to predict which surface they think the car will travel furthest on and give reason for it.</p>	Chn not secure:
Linked to maths.			
Success Criteria			
Let car go			
Measure from back wheel			
Test 3 times and get average.			
WALT	Key Vocabulary	Organisation	Notes for future planning

WALT put data into a graph		<p><b>Discuss children's results from previous lesson. What did they notice?</b></p> <p>Go through how to create a bar graph using their data. They must calculate their average and put that into the graph.</p> <p>Model on board what to do.</p> <p><b>Results</b> Go through how to write up their results and whether their results supported their predictions.</p> <p>Extension: <b>If I did this investigation again I would....</b></p>	Chn not secure:
WALT understand our results			
Success Criteria			
Use average Make bars 2cm Label graph			
WALT	Key Vocabulary	Organisation	Notes for future planning
Assess our knowledge.		<p><b>Children to answer some push and pull statements and decide if they are true or false.</b></p> <p><b>Children to write down all they know about forces and magnets.</b></p> <p><b>Children to complete an end of unit test.</b></p>	Chn not secure:
Success Criteria			