YEAR 3 FORCES AND MAGNETS PLANNING

Class: **Term: Spring 1 and 2** **Subject: Science** **Unit: Forces and Magnets**

Differentiation and support (Detailed differentiation in weekly plans.) SEN: write up investigations on writing frames. Support from more able partners in mixed ability work. Additional adult support. GT: provide headings for experiment sections. Send off to experiment sooner than rest of group. Provide with equipment, but provide less scaffolding on how to conduct the experiment. Encourage conclusions that draw on scientific knowledge and enquiry skills.	English: writing up experiments in sequence using technical language Maths: measuring length and volume, drawing result tables and charts ICT: using simulations D&T: reasons for using different materials

W	Learning objective	Teaching activities	Resources	Assessment: Success Criteria	Lesson Evaluation
1	Self-assess knowledge of forces and magnets (15 mins) Describe the direction of forces between magnets or between a spring and someone compressing it Recognise that a force acts in a particular direction (30 mins)	Children complete a mind map on what they already know about forces and magnets Intro: Remind children of the difference between a push and a pull. Give them examples and ask them to say if it is a push or a pull e.g. tennis racket hitting a ball, child on a swing, person walking a dog. Give children magnets and springs to experiment with Think, pair, share what they find out. Take ideas as a class and give children scientific vocab to describe with. Explain how like poles repel and unlike poles attract, emphasising the vocabulary Independent work: Complete worksheet: • Label direction of force on the four possible combinations of magnets i.e. North – North, North – South, South – South and South – North. • Complete a sentence under each combination of magnets to say whether the magnets will attract or repel • Draw a diagram of a spring in a normal state, stretched state and compressed state and label the pushes and pulls Plenary: Go through correct answers to the worksheet on the IWB and address any misconceptions Revise vocabulary e.g. compress / stretch, push / pull etc	Mind maps Magnets Elastic bands / springs Worksheets	Formative assessment exercise MUST: experiment with magnets and springs SHOULD: label pushes / pulls and attraction / repulsion on diagrams COULD: use scientific ideas and language to express themselves	

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<td>2</td>
<td>Classify materials as magnetic or non-magnetic

Describe the difference between a magnet and a magnetic material

(1 hour)</td>
<td>Intro:
Watch the videos from
https://www.bbc.co.uk/bitesize/topics/zyttyrd/articles/zpvcrdm (if the link does not work, Google ‘BBC Bitesize What is a magnet’)
https://www.bbc.co.uk/bitesize/topics/zyttyrd/articles/zw889qt (if the link does not work, Google ‘BBC Bitesize Which materials are magnetic’)
Model how to use the real magnets and the BBC activity

Children complete table with:
<table><tr><th>Object</th><th>Material made from</th><th>Prediction (magnetic or non-magnetic)</th><th>Result (magnetic or non-magnetic)</th><th>Right (√) or wrong (x)</th></tr></table>
1/2 class: Test materials with a real magnet to see if they are magnetic or not and classify them under headings ‘magnetic’ or ‘non-magnetic’
1/2 class: Test materials through BBC activity at
https://www.bbc.co.uk/bitesize/topics/zyttyrd/articles/zw889qt (if the link does not work, Google ‘BBC Bitesize Which materials are magnetic’)
Groups swap over

Plenary:
Discuss what we found out and how not all metals are magnetic: only iron, steel, nickel and cobalt are magnetic.
Explain the difference between a magnet and a magnetic material</td>
<td>Magnets

Worksheet with tables

Laptops</td>
<td>MUST: know that not all materials are magnetic and be able to name some magnetic objects

SHOULD: know that only some metals are magnetic

COULD: explain the difference between a magnet and a magnetic material</td>
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<td>3</td>
<td>Investigation: How much weight different magnets can hold

Decide how to test an idea, explaining how to make a simple test fair

Identify patterns in results and use these to draw conclusions

Explain results in terms of their scientific knowledge and understanding

(2 hours)</td>
<td>Experiment: Children will be given different magnets and paper clips. They see how many paper clips each magnet can hold as a chain. The one that can hold the most is the strongest magnet.

Aim and prediction
Discuss what investigation we could carry out using this equipment and how we could do it.
Think, pair, share (explaining what we will be doing if children don’t suggest it in a timely way)
Think, pair, share what might affect the strength of the magnets and why? e.g. how new they are, what shape they are, what size they are etc

Method
Think, pair, share what we would need to do to make a ‘fair test’ Plan a fair test fair, with these conditions being the same.
• Force with which you attach the paper clips
• The paper clips you use
• How long you wait for the paper clips to fall
• Part of the magnet that you attach the paper clips to
Model how changing these things would be unfair and explain why this is the case.

Emphasise need to be careful not to get pricked by sharp bit of paper clips.</td>
<td>Paper clips

Magnets

Investigation frames

Graph frames</td>
<td>MUST: plan and carry out an experiment by using an investigation frame, with adult support

SHOULD: plan and carry out an experiment by using an investigation frame, without adult support

COULD: link predictions and conclusions to scientific knowledge and use scientific</td>
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		Children write aim, prediction and method, then carry out the investigation by attaching one paper clip at a time to a magnet, until it can't hold them 10 minute break **Results** Model how to draw a results table. What will it need to include? Model recording of investigation in a bar chart and explain how to use tick list on investigation frame **Conclusion** Think about: • Did our predictions match our results? Why / why not? • What scientific language could we use? • Evaluation – how could we have made a better 'fair test' / how could the investigation be improved? • Reliability – did other people get the same results as us? Why / why not?		language	