

SCHEMES OF WORK

Department Name	Cranbrook School Physics Department	Year Group	Y3/4
Title	Unit 3e Magnets and springs	Time period	6 Weeks (approx. 9 hours)

Timing	Topic	Learning Objectives	Teaching Strategies	Resources	Extension work	Teacher Note <i>Health and Safety</i>
Week 1	Review of forces		<ul style="list-style-type: none"> Review their current understanding of forces and movement by asking for examples of pushes and pulls 			
Week 1	Magnets	<ul style="list-style-type: none"> that there are forces between magnets and that magnets can attract (pull towards) and repel (push away from) each other to make and record careful observations of magnets to make generalisations about what happens when magnets are put together 	<ul style="list-style-type: none"> Ask about forces that do not involve touching objects Magnets will hopefully come up, if not prompt! Demo a toy that can be moved by a magnet (<i>push and pull</i>) Set up four (5 tables) of a variety of different magnets and samples of materials that can be used by the kids to develop some vocabulary about effects seen (<i>attract, repel, magnetic, non-magnetic!</i>) 	<ul style="list-style-type: none"> Suitable toy boat or car? (Thomas?) Various shaped and strength magnets from kits, some on floating dishes (moves more easily with weaker magnets) 	<ul style="list-style-type: none"> ICT for magnets in the home Some magnets stronger than others 	<ul style="list-style-type: none"> Paperclips always attract, magnets can repel
Week 2	Magnets	<ul style="list-style-type: none"> to make and test predictions about whether materials are magnetic or not to make careful observations that magnets attract some metals but not others and that other materials are not attracted to magnets to use results to draw conclusions, indicating whether they were right in their prediction about which materials were magnetic 	<ul style="list-style-type: none"> Predict which samples are <i>attracted</i> and therefore <i>magnetic</i> Use a fishing game idea, hover suspended magnet over various materials Differentiate between <i>magnetic</i> and <i>non magnetic</i> materials and record in a table Are their predictions correct? Award a tick if correct! 	<ul style="list-style-type: none"> Ten sets of a magnet hanging from "fishing rods" and Assorted different material samples, including non-metals Done in pairs hopefully 	<ul style="list-style-type: none"> Old copper coins non magnetic, new ones are magnetic (don't always believe what you see!) Check dates get them to find out the date when they changed, if you have enough 	<ul style="list-style-type: none"> Indicate that not all metals are magnetic Only magnets can push
Week 2	Magnets	<ul style="list-style-type: none"> that magnets have a variety of uses 	<ul style="list-style-type: none"> demo conveyer belt to sort different metals e.g. Al and Fe for recycling 	<ul style="list-style-type: none"> mixture of metals (Al and Fe) and some kind of system where the materials pass through magnetic field 	<ul style="list-style-type: none"> possibly use a powerful electromagnet can switch magnet off 	

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Week 3	Magnets	<ul style="list-style-type: none"> magnets can be very strong 	<ul style="list-style-type: none"> demo electromagnet to see how many it can hold.... 	<ul style="list-style-type: none"> Electromagnet, PSU to suit, ball bearings, tray to catch balls 	<ul style="list-style-type: none"> 	
Week 3	Magnets	<ul style="list-style-type: none"> to investigate the strength of a bar magnet to plan a fair test and decide what to measure and what equipment to use to make and record measurements to draw conclusions 	<ul style="list-style-type: none"> How many ball bearings can a magnet lift? devise fair test; discuss what will be varied and what will be kept constant measure no record data in table stronger magnets, hold more... 	<ul style="list-style-type: none"> lots of paper clips same magnets, clips etc., big, weaker magnets (old physics ones?) 	<ul style="list-style-type: none"> stronger magnets hold more bigger magnets are not necessarily stronger 	
Week 4	Springs	<ul style="list-style-type: none"> that springs are used in a variety of ways 	<ul style="list-style-type: none"> Demonstrate some common toys, do they have springs? 	<ul style="list-style-type: none"> Toys with springs and without Bungees, Newton meter 		
Week 4	Springs	<ul style="list-style-type: none"> that when a spring is stretched or compressed upward, it exerts a downward force on whatever is compressing or stretching it, and that when an elastic band is stretched downward, it exerts an upward force on whatever is stretching it that forces act in particular directions 	<ul style="list-style-type: none"> small groups (of 2 if possible) to investigate a variety of different types of spring and a variety of elastic bands to pull apart or <i>stretch</i> and to push or <i>compress</i> together observe and record the <i>direction</i> of the forces felt when spring or band is compressed and stretched (<i>up, down, left, right</i>) 	<ul style="list-style-type: none"> each group to be given; 4/5 different open and closed coil springs 4/5 different elastic bands 		
Week 5	Elastic bands	<ul style="list-style-type: none"> Students to carry out a whole investigation. In particular, predictions, comparisons and whether prediction was supported 	<ul style="list-style-type: none"> Demo catapult outside; what happens when stretched further? (goes further, more force) 	<ul style="list-style-type: none"> Catapult device, 2 nails in a piece of wood! 	<ul style="list-style-type: none"> Could double up elastic 	<ul style="list-style-type: none"> If rain, is there a hall?
Week 5	Elastic bands	<ul style="list-style-type: none"> to make predictions of the effect of stretching elastic bands by different amounts to make comparisons and identify patterns in results to draw conclusions and indicate whether the prediction was supported to explain the conclusions in terms of the size of the force 	<ul style="list-style-type: none"> groups have toy car and elastic band to test how far it will go outside (hopefully) as band is stretched different amounts Discuss what will happen as the launch elastic is stretched further (<i>pulling force is increased</i>). Will car go further by the same amount each time? Record in prepared table Question groups to explain data in their own words 	<ul style="list-style-type: none"> Toy car with big wheels, big bands, ruler to suit length of rubber bands Meter rulers or tape measures for range? 		<ul style="list-style-type: none">
Week 6	Topic assessment	<ul style="list-style-type: none"> Quizdom assessment on topic 	<ul style="list-style-type: none"> Brief review of topic (power point) followed by quiz 	<ul style="list-style-type: none"> Quizdom, check batteries, laptop 	<ul style="list-style-type: none"> Extra qs available 	<ul style="list-style-type: none"> Get class lists
