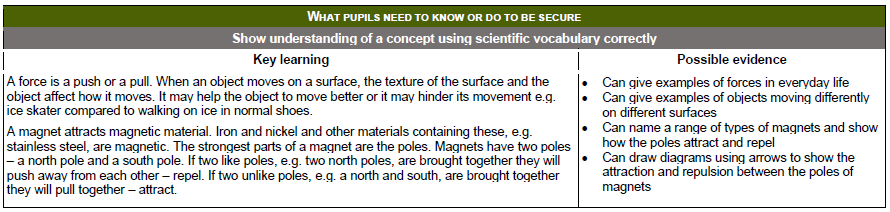
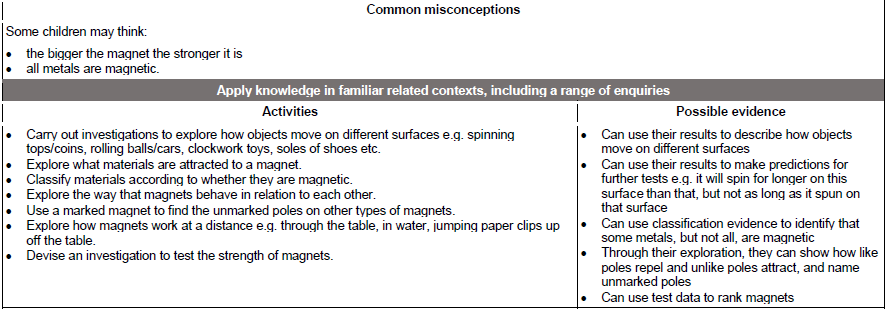
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| Year 3 - Forces and Magnets | | | | | |
| **National Curriculum Objectives:**  \* Compare how things move on different surfaces.  \* Notice that some forces ned contact between two objects, but magnetic force can act at a distance.  \* Observe how magnets attract and repel each other and attract some materials but 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. | | | | | |
| **Prior Learning:** | **Working Scientifically (NC) Links:** | **Opportunities for working Scientifically:** | **Story / Book Opportunities:** | **Maths Opportunities:** | **Vocabulary:** |
| **In Year 2: Materials:**  \* Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. | \* Compare how different things move and group them.  \* Raise questions and carry out different tests to find out how far things move on different surfaces; gather and record data to answer these questions.  \* Explore the strength of magnets and find a fair way to compare them.  \* Sort materials into those that are magnetic and those that are not.  \* Look for patterns in the way that magnets behave in relation to each other and what might affect this (e.g. its strength or which poles face each other).  \*Identify how these properties make magnets useful in everyday items and suggest creative uses for different magnets. | \* How do different surface affect how far a car travels?  \* How does the mass of an object affect how much force is needed to make it move?  \* Which magnet is strongest?  \* Do magnets need to touch for them to work?  \* Which ends of the magnet attract / repel?  \* Does the size and shape of a magnet affect how strong it is?  \* Are all materials magnetic?  \* Are magnets the same all the way through?  \* If we magnetise a pin, how long will it remain magnetised? | The Iron Man – Ted Hughes  Swim Little Wombat Swim – Charles Fuge  Mrs Armitage: Queen of the Road  (Quentin Blake)  Mr Archimedes’ Bath  (Pamela Allen) | Bar graphs  Displaying data in chart / table | force, push, pull twist, bar, ring, horseshoe, contact force, non-contact force, magnetic, magnetism, attract, repel, magnetic material, poles, metal, iron, steel, north pole, south pole |
| **Types of scientific Enquiry:**  Fair & Comparative testing  Research using secondary sources  Identifying, classifying & grouping  Pattern seeking  Observing over time | **Famous Scientists:**  **William Gilbert**  (Theories on Magnetism)  **Andre Marie Ampere**  (Founder of Electro-Magnetism) |
| **In Year 5:**  \* Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.  \* Identify the effects of air resistance, water resistance and friction, which act between moving surfaces.  \* Recognise that some mechanisms, including levers, pulling and gears, allow a smaller force to have a greater effect. | | | | | |







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| Year 5 - Forces | | | | | |
| **National Curriculum Objectives:**  \* Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.  \* Identify the effects of air resistance, water resistance and friction, which act between moving surfaces.  \* Recognise that some mechanisms, including levers, pulling and gears, allow a smaller force to have a greater effect. | | | | | |
| **Prior Learning:** | **Working Scientifically (NC) Links:** | **Opportunities for working Scientifically:** | **Story / Book Opportunities:** | **Maths Opportunities:** | **Vocabulary:** |
| In Year 3:  \* Compare how things move on different surfaces.  \* Notice that some forces need contact between two objects, but magnetic force can act at a distance.  \* Observe how magnets attract and repel each other and attract some materials but 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. | \* Explore falling paper cones or cup-cake cases.  \*Make parachutes and carry out fair to tests to determine which designs are the most effective.  \* Water resistance – make and explore different shaped boats.  \* Design and make products which use pulleys, levers, gears and / or springs and explore their effects. | \* How does the size of an object affect the rate that it falls?  \* What size wing makes the best sycamore paper helicopter?  \* What is the best material to make a parachute out of?  \* Does the length of a lever affect the size of a force produced? (Shaduf / trebuchet?)  \* How does the surface area of an object affect how long it takes to sink?  \* Where do you find gears in the real world?  \* Can you label all the forces acting on the object shown?  \* How do submarines sink if they are full of air? | **The Enormous Turnip**  (Katie Daynes)  **Leonardo's Dream**  (Hans de Beer)  **The Aerodynamics of Biscuits**  (Clare Helen Welsh)  **The Tin Snail**  (Cameron McCallister) | Drawing graphs / charts  Measuring distance, time, force | Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears, cog |
| **Types of scientific Enquiry:**  Fair & Comparative testing  Research using secondary sources  Identifying, classifying & grouping  Pattern seeking  Observing over time | **Famous Scientists:**  **Galileo Galilei** (Gravity and Acceleration)  **Isaac Newton**  (Gravitation)  **Archimedes of Syracuse**  (Levers) |
| **In KS3:**  \* Forces as pushes or pulls, arising from the interaction between 2 objects.  \* Using force arrows in diagrams, adding forces in one direction, balanced and unbalanced.  \* Movement as the turning effect of a force.  \* Forces associated with deforming objects; stretching and squashing – springs; with rubbing and friction between surfaces, with pushing things out of the way, resistance to motion of air and water.  \* Forces measured in Newtons, measurements of stretch or compression as force is changed. | | | | | |

