Year 3 – Forces and magnets

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| Prior Learning | Year 3 | Future Learning | Vocabulary |
| * Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 – Uses of everyday materials)
 | * Compare how things move on different surfaces. (Y3 – Forces and magnets)
* Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 – Forces and magnets)
* Observe how magnets attract or repel each other and attract some materials and not others. (Y3 – Forces and magnets)
* 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. (Y3 – Forces and magnets)
* Describe magnets as having two poles. (Y3 – Forces and magnets)
* Predict whether two magnets will attract or repel each other, depending on which poles are facing. (Y3 – Forces and magnets)
 | * Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. (Y5 – Forces)
* Identify the effects of air resistance, water resistance and friction that act between moving surfaces. (Y5 – Forces)
* Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. (Y5 – Forces)
* Magnetic fields by plotting with compass, representation by field lines. (KS3)
* Earth’s magnetism, compass and navigation. (KS3)
 | attract, friction, force, gravity, magnet, motion, opposite, pull, push, surface |

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| Key Learning | Possible Activities… |
| A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes.A magnet attracts magnetic material. Iron and nickel and other materials containing these e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles e.g. a north and south, are brought together they will pull together – attract.For some forces to act there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts. | * Carry out investigations to explore how objects move on different surfaces e.g. spinning tops/coins, rolling balls/cars, clockwork toys, soles of shoes etc.
* Explore what materials are attracted to a magnet
* Classify materials according to whether they are magnetic
* Explore the way that magnets behave in relation to each other
* Use a marked magnet to find the unmarked poles on other types of magnets
* Explore how magnets work at a distance e.g. through the table, in water, jumping paper clip up off the table
* Devise an investigation to test the strength of magnets
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| Working Scientifically |
| Pupils might 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 to 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. |
| Key Scientists | Common Misconceptions… |
| * **Galileo Galilei (1564-1642) -**  credited as ‘the Father of Modern Physics’
* **Isaac Newton** **(1642-1726)**  - largely influential in the recognition of gravitational force.
* **William Gilbert (1600s) –** first scientist to actually make a magnet.
* **The Wright Brothers –** airplanes
* **Henry Ford -** cars
 | Some children may think: • the bigger the magnet, the stronger it is• all metals are magnetic |