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|  **Creech St Michael Primary School** |
| **Science: Physics**  | **Forces and Magnets** | **Year 3 / 4**  |

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| **Background understanding (what I should already know)…** |
| * The shape of some materials can be changed when they are **stretched, twisted, bent** and **squashed**
* Know how different toys move.
* Know what a **force** is and be able to explain that a **push** and **pull** are types of forces.
* That when **forces** are applied to an object they allow them to move or stop moving
* The strength of the **force** determines how far and fast an object moves.
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|  **Key vocabulary** |
| **Attract** | If one object **attracts** another object, it causes the second object to move towards it  |
| **Bendy** | An object that bends easily into a curved shape |
| **Friction** | The **resistance** of **motion** when there is contact between two **surfaces** |
| **Force**  | The **pulling** or **pushing** effect that something has on something else  |
| **Gravity** | The **force** which causes things to drop to the ground  |
| **Magnet** | A piece of iron or other material which **attracts magnetic** materials towards it  |
| **Magnetic Field** | An area around a **magnet**, or something functioning as a **magnet**, in which the **magnet’s** power to **attract** things is felt  |
| **Metal** | A hard substance such as iron, steel, gold, or lead  |
| **Motion** | The activity of changing position or moving from one place to another  |
| **Non-Magnetic** | An object that is not **magnetic**  |
| **Opposite** | **Opposite** is used to describe things of the same kind which are completely different in a particular way. For example, north and south are **opposite** directions  |
| **Position**  | The **position** of someone or something is the place where they are in relation to other things  |
| **Pull** | When you **pull** something, you hold it firmly and use **force** in order to move it towards you or away from its previous **position**  |
| **Push** | When you **push** something, you use **force** to make it move away from you or away from its previous position  |
| **Repel**  | When a **magnetic** pole **repels** another **magnetic** pole, it gives out a **force** that pushes the other pole away  |
| **Resistance** | A **force** which slows down a moving object or vehicle  |
| **Squash** | Pressed or crushed with such **force** that something loses its shape  |
| **Stretchy** | Slightly elastic  |
| **Surface**  | The flat top part of something or the outside of it  |
| **Twist** | Turn something to make a spiral shape  |

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| **What I will know by the end of the unit…** |
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| What are **forces**?  |

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| * **Forces** are **pushes and pulls**.
* These forces change the **motion** of an object.
* They will make it start to move or speed up, slow it down or even make it stop.
* For example, when a cyclist **pushes** down on the pedals of a bike, it begins to move. The harder the cyclist pedals, the faster the bike moves.
* When the cyclist **pulls** the brakes, the bike slows down and eventually stops.
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| How do different **surfaces** affect the **motion** of an object? | * Forces act in **opposite** directions to each other.
* When an object moves across a surface, **friction** acts as an **opposite force.**
* **Friction** is a **force** that holds back the motion of an object.
* Some surfaces create more friction than others which means that objects move across them slower.

* On a ramp, the force that causes the object to move downwards is gravity.
* Objects move differently depending on the surface of the object itself and the surface of the ramp.
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| How do **magnets** work? | * Magnets produce an area of force around them called a magnetic field.
* When objects enter this magnetic field, they will be attracted to or repelled from the magnet if they are magnetic.
* When magnets repel, the push each other away
* When magnets attract, they pull together.
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| Which materials are **magnetic**? |

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| * Objects that are magnetic, are attracted to magnets.
* Iron and steel are magnetic.
* Aluminium and copper are non-magnetic.
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| How do **magnetic poles** work? | * The ends of a magnet are called poles.
* One end is called the north pole and the other end is called the south pole.
* Opposite poles attract, similar poles repel.
* If you place two magnets so the south pole of one faces the north pole of the other, the magnets will move towards each other. This is called attraction.

If you place the magnets so that two of the same poles face each other, the magnets will move away from each other. They are repelling each other. |

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| **Working Scientifically: Possible Investigations** |
| * Investigate the amount of friction created by different surfaces.
* Use measures (such as length and time) to show how far or fast and object travels.
* Compare and group how different objects move.
* Observe how a magnetic field attracts iron filings using a bar magnet.
* Investigate how magnets are used in everyday life
* Investigate which materials are magnetic and sort objects that are magnetic and non-magnetic.
* Investigate if the size of a magnet affects how strong it is (using chains of paper clips of varying lengths)
* Investigate if all metals are magnetic.
* Observe what happens when magnets with similar poles are placed next to each. Repeat this for when the poles are different.
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**Scientific skills and enquiry (Year 3 and 4)**

* Ask relevant questions and use different types of scientific enquiries to answer them.
* Set up simple practical enquiries, comparative and fair tests.
* Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.
* Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.
* Gather, record, classify and present data in a variety of ways to help in answering questions.
* Identify differences, similarities or changes related to simple scientific ideas and processes.
* Report on findings from enquiries including oral and written explanations, displays or presentations of results and conclusions.
* Use straightforward scientific evidence to answer questions or to support their findings.
* Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

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| **Who: (famous people)** |
| **Sir Isaac Newton (1642–1727)** | * Considered by many to be one of the most important scientists in history. He was one of the greatest mathematicians and most influential scientists (physicist) of all time.
* One of his achievements was developing the theory of gravity.
* It is widely considered that he developed the theory of gravity when he saw an apple fall from a tree.
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