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|  **Creech St Michael Primary School** |
| **Science: Physics**  | **Forces**  | **Year 5 / 6**  |

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| **Background understanding (what I should already know)…** |
| * 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.
* Friction is the resistance of motion when there is contact between two surfaces
* The force that causes objects to move downwards towards the ground is gravity.
* That magnets have poles, and that opposite poles attract, while similar poles repel
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|  **Key vocabulary** |
| **Air Resistance** | **Air resistance** is a type of **friction** between **air** and another material. |
| **Attract** | If one object **attracts** another object, it causes the second object to move towards it |
| **Friction**  | The **resistance** of **motion** when one object rubs against another |
| **Force**  | The **pulling** or **pushing** effect that something has on something else  |
| **Gear** | A part of a machine that causes another part to move because of teeth which connect the two moving parts  |
| **Gravity**  | The **force** which causes things to drop to the ground  |
| **Lever**  | A basic tool used to lift or pry things open  |
| **Motion** | The activity of changing position or moving from one place to another  |
| **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  |
| **Pulley** | A simple machine that makes lifting something easier. A **pulley** has a wheel or set of wheels with grooves that a rope or chain can be pulled over  |
| **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  |
| **Spring**  | A spiral of wire which returns to its original shape after it is pressed or pulled  |
| **Streamlined** | A **streamlined** vehicle, animal, or object has a shape that allows it to move quickly or efficiently through air or water  |
| **Surface**  | The flat top part of something or the outside of it  |
| **Scientific skills and enquiry (Year 5 and 6)**• Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.• Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. • Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.• Identify scientific evidence that has been used to support or refute ideas or arguments. • Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.• Use test results to make predictions to set up further comparative and fair tests.  |

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| **What I will know by the end of the unit…** |
| What are **forces**? | **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.
* **Friction** is a **force** - it is the **resistance** of **motion** when one object rubs against another.

* Other **forces** that create **resistance** of **motion** include **water resistance** and **air resistance.**
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| What is **gravity** and **air resistance**? | * **Gravity is** the **force** that pulls objects to the centre of the Earth.
* Air **resistance** pushes up on the parachute, **opposing** the force of **gravity.** This makes the parachute land more slowly.

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| What is **water resistance?** |

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| * Water **resistance** is the **friction** that is created between water and an object that is moving through it.
* Some objects can move through water with less **resistance** if they are **streamlined.**
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| What are examples of **mechanisms**? |

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| * **Levers** allow us to do heavy work with less effort. For example, trying to pick up a large heavy box is difficult, however if a **lever** is used it becomes much easier to move it.
* **Pulleys** also allow us to do heavy work - objects are attached to ropes and **pulley** wheels, and so instead of lifting heavy object upwards, we can pull on the **pulley** rope downwards.
* **Gears** are toothed wheels. Their ‘teeth’ can fit into each other so that when the first wheel turns, so does the next one. This allows **force**s to move across a **surface.**
* **Springs** can be stretched by pulling them or squashed by pushing them. The greater the **force** pulling or pushing the **spring,** the greater the force the **spring** uses to move back to its normal shape.
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| **Working Scientifically: Possible Investigations** |
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| * 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.
* Draw diagrams to show how objects move down ramps, through the air and through water, using arrows to show the direction of the forces.
* Explore the effects of friction on motion and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel
* Provide examples of when friction is useful.
* Investigate how surface area affects air resistance and explain the relationship between them.
* Make parachutes to investigate how air resistance works. Ensure that only one variable is changed while other variables stay the same. Variables may include the objects attached to the parachute, shape of parachute, size of parachute, length of string attached to the object, height of drop, material of parachute. Explain why this is necessary in an experiment.
* Explore resistance in water by making and testing boats of different shapes
* Design and make products that use levers, pulleys, gears and/or springs and explore their effects
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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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| **Archimedis (287 - 212 BC)****C:\Users\Fiona.Mellenchip\AppData\Local\Microsoft\Windows\INetCache\Content.MSO\8DEDBA93.tmp** | * Considered the most famous mathematician and inventor in ancient Greece.
* Known for discoveries in the sciences of mechanics and hydrostatics. He discovered the laws of **levers and pulleys**, which allow us to move heavy objects using small forces.
* One of his most famous inventions is the **Archimedes**' screw: a device that could lift water to higher levels. One of its first uses was to pump water out from leaking ships, but is still used today to move liquid from one place to another.
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