Science Knowledge Organiser – Forces
How do forces act on objects around us?
Year 5 - Term 3

**Nursteed Community Primary School**

| Prior knowledge | Key knowledge | Subsequent knowledge |
|---|---|---|
| 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) | 1. To explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.<br><br>2. To identify the effects of air resistance, water resistance and friction that act between moving surfaces.<br><br>3. To recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. | Forces as pushes or pulls, arising from the interaction between two objects. (KS3). Using force arrows in diagrams, adding forces in one dimension, balanced and unbalanced forces. (KS3) Moment as the turning effect of a force. (KS3) 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. (KS3) Forces measured in Newtons, measurements of stretch or compression as force is changed. (KS3) |

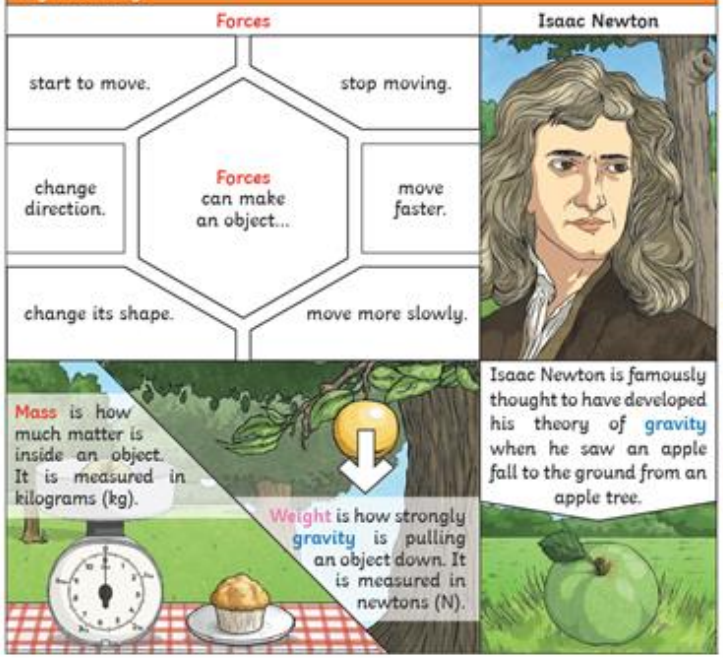
**Working Scientifically Skills – Year 5 & 6**

At least one LI per block should focus on a WS skill.

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting 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
- Identifying scientific evidence that has been used to support or refute ideas or arguments.

| Vocabulary | Meaning |
|---|---|
| Forces | Pushes or pulls. |
| Gravity | A pulling force exerted by the Earth (or anything else which has mass). |
| Weight | The measure of the force of gravity on an object. |
| Mass | A measure of how much matter (or 'stuff') is inside an object. |
| Friction | A force that acts between two surfaces or objects that are moving, or trying to move, across each other. |
| Air resistance | A type of friction caused by air pushing against any moving object. |
| Water resistance | A type of friction caused by water pushing against any moving object. |
| Mechanism | Mechanisms are simple machines with moving parts that change input forces and movement into a set of useful output forces. Examples of mechanisms are pulleys, gears and levers. |
| Up thrust | A force that pushes objects up, usually in water. |

**Key Knowledge**




**Isaac Newton**



Isaac Newton is famously thought to have developed his theory of gravity when he saw an apple fall to the ground from an apple tree.

**Pulleys**

Pulleys can be used to make a small force lift a heavier load. The more wheels in a pulley, the less force is needed to lift a weight.

**Gears/Cogs**

Gears or cogs can be used to change the speed, force or direction of a motion. When two gears are connected, they always turn in the opposite direction to each other.

**Key Knowledge**

Examples of forces in action:


Water resistance and air resistance are forms of friction. Friction is sometimes helpful and sometimes unhelpful. For example, air resistance is helpful as it stops the skydiver hitting the ground at high speed. Friction on a bike chain can make the bike harder to pedal so it is unhelpful.

**Levers**

Levers can be used to make a small force lift a heavier load. A lever always rests on a pivot.