

## Why don't we fall off the Earth?

Sir Isaac Newton once said, 'If I have seen further than others, it is by standing upon the shoulders of giants.' We want the children to follow in Newton's footsteps and investigate and experiment for themselves what is a force and how does this affect us being on Earth. Forces, gravity, friction and magnets will be covered by different experiments physical activities.

### In this unit children will:

- In this unit of work, the children will learn how most forces include pull or pushing.
- This will then link to gravity and the children will learn how the Earth works and how gravity was founded!
- Sir Isaac Newton will be introduced and his life as one of the world's most famous scientist looked at.
- They will also investigate how magnets work and can differ in shape and size and some of the different uses for them.
- The children will get to explore how the south and north pole differ on a magnet and investigate what repel and attract means.
- The children will get to set up their own experiment to find out about friction by using toy cars and different surfaces for them to travel on.

### Prior Learning

**Year 1** Materials – metals.

**Year 2** Materials – magnetic materials.

### Cross Curricular Links

**Geography** Map work and looking at how the Earth works.

### Key Vocabulary

**Still** - no movement.

**Force** - A push or pull on an object which can cause it to move, change speed, direction or shape. Measured in Newtons (N).

**Acceleration** - getting faster.

**Deceleration** - getting slower.

**Magnet** - A material or object that produces a magnetic field. It attracts or repels magnetic objects, including iron.

**Speed** - how far something travels in a set amount of time (mph).

**Velocity** - describes speed and direction (a cyclist going 3mps in a northerly direction).

**Thrust** - increases velocity.

**Drag** - decreases velocity.

**Nuclear** - relating to the nucleus of an atom.

**Attract** - To pull towards. Opposite of repel.

**Repel** - To push away. Opposite of attract.

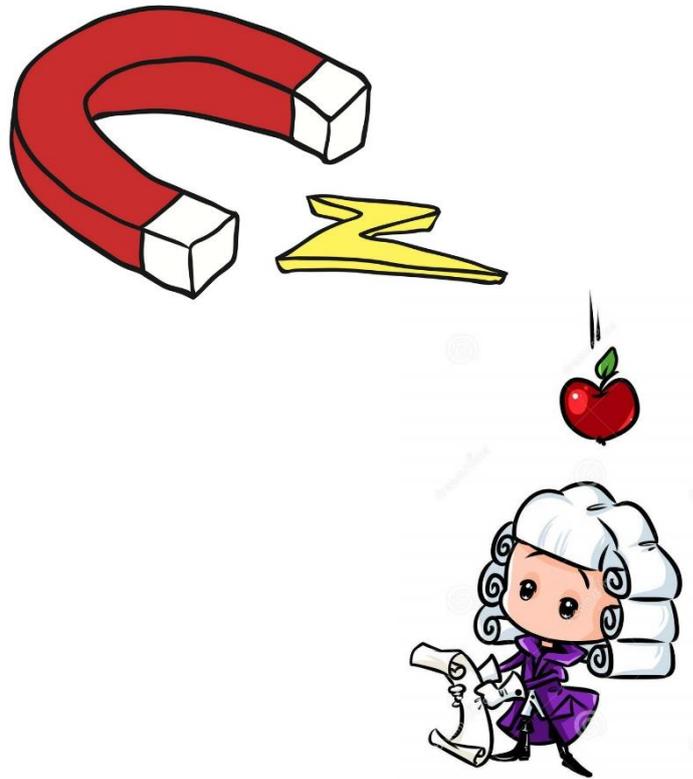
**Friction** - The resistance of motion when one object rubs against another. Friction causes objects to slow down and the energy becomes heat.

**Gravity** - The area around a large object when a weight can be felt. The sun's gravity keeps the planets orbiting around it.

**Mass** - The amount of matter contained in an object. Measured in units such as g, kg.

## Key Knowledge

- All **forces** can be thought of as a **push** or a **pull** OR all forces can be thought of as **attracting** or **repelling**.
- **Forces** act on objects.
- **Forces** can cause movement and change of shape. They can also act on objects without causing movement or change of shape. **Forces** do not always have an obvious effect.
- Weight is a **force**, **mass** is the amount of matter. On the moon, your mass is the same, but your weight will be different because the amount of **gravity** acting on you is different. Less **gravity** means less weight, but it will not affect your **mass**.
- **Magnets** are objects that produce an area of magnetic force called a **magnetic field**.
- **Magnetic fields** by themselves are invisible to the human eye.
- Forces can be measured in **Newtons** (N).
- Force meters contain springs that stretch in proportion to the force being measured.
- The **Earth** is a giant **magnet**. Its magnetic field is like a bar magnet at its centre.
- Neodymium **magnets** are some of the world's strongest magnets.



- Every magnet has a north and a south **pole**, just like Earth.
- One end of a magnet **attracts** and one **repels**.
- Most **metals** are not attracted to **magnets**. These include copper, silver, gold, magnesium, platinum, aluminium and more.

## Key Questions

- What affects the strength of a magnet?
- What everyday objects use magnets?
- How does a compass work?
- Why isn't plastic magnetic?
- How many different types of magnet is there?