



## Year 3 Science Knowledge Organiser: (Forces and Magnets)



### Subject Specific Skills

- I can compare how things move on different surfaces
- I can notice that some forces need contact between two objects, but magnetic forces can act at a distance
- I can observe how magnets attract or repel each other and attract some materials and not others
- I can 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
- I can describe magnets as having two poles
- I can predict whether two magnets will attract or repel each other, depending on which poles are facing.

### Prior Learning

- Children should recognise the term 'magnet' and may identify a 'fridge magnet'
- Children should understand the terms 'push' and 'pull' although may not identify them as forces

### Key Knowledge:

- Pupils should observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing). They should explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe).
- Forces are only balanced when an object is moving at a steady speed or not moving at all. This is Newton's first law of motion. Acceleration and deceleration occur when the forces acting on an object are unbalanced.
- A force is a push or a pull or a combination of these, such as a twist. A force can cause an object to speed up, slow down or change shape. Forces cannot be seen, but the effects of forces can be.

### Key Vocabulary

**Matter:** is the amount of material or "matter" in an object, measured in kilograms (kg)

**Mass:** Mass is measured in grams and kilograms.

**Weight** is the force acting on an object due to gravity. Earth's gravity causes objects to accelerate towards its centre with a force of approximately 10 N for every kilogram

**Newton:** A unit of force. The weight of an object is measured in newtons (N). An apple resting on your hand weighs around 1 N.

### Key Individual: Isaac Newton



### Key Knowledge:

- Some forces, such as friction and air resistance, act when objects or fluids are physically touching each other. Other forces act at a distance, such as magnetism and gravity. The planets and the Sun do not touch, yet the planets stay in orbit around the Sun due to the force of gravity.
- Friction is very useful. We need friction to create a good grip between the soles of our shoes and the ground, or between our car tyres and the road. Air resistance is a type of friction.
- At other times, friction can be something we want to reduce. Oil or lubricants are added to door hinges or the gears of our bicycles to reduce friction and make them move more easily.
- Magnets have two poles: a north pole and a south pole. If you hold two magnets close together with opposite poles pointing towards each other, they will attract and stick together.
- This magnetic repulsion force can be useful. For example, Maglev (magnetic levitation) trains use magnetic repulsion to float a few centimetres above the track. Electromagnetic generators inside the track then alternate their polarity, attracting then repelling the magnets on the train. This pushes and pulls the train forward.

#### Balanced and Unbalanced Forces

