



Year 5 Science Knowledge Organiser: (Forces)



Subject Specific Skills

- I can explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- I can identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- I can recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Prior Learning

- 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.

Key Knowledge:

- Pupils should explore falling objects and raise questions about the effects of air resistance. They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. They should experience forces that make things begin to move, get faster or slow down. Pupils should explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. Pupils should explore the effects of levers, pulleys and simple machines on movement. Pupils might find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.
- 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.

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

Gravity: The force that pulls objects together and makes objects fall to the ground. Every object is affected by gravity. The greater the mass of an object, the greater its gravitational pull.

Key Individual: Galileo Galilei



Key Knowledge:

- The invention of levers, wheels, gears and pulleys transformed the way our ancestors lived. These simple mechanisms enabled people to build bigger and more complex places to live and work; to irrigate fields and grind flour; to transport heavy goods, travel to distant places, and much, much more.
- There are lots of real-world examples of levers, pulleys and gears that the children might already know about. These include cranes, wheelbarrows and bicycles.
- Newton's first law of motion states that an object will continue at a constant speed and in the same direction unless a force acts upon it. This means that even if an object is travelling at high speed, it will continue at that speed unless another force acts on it. A force is only required for acceleration, deceleration or a change of direction. If you were to throw a rock in space it could keep moving forever. It would keep travelling in a straight line, only stopping or changing direction if it hit another object or got caught in the gravitational pull of a star or planet. This doesn't happen if we throw a rock on Earth. The rock will always eventually come to a stop because of forces including friction, gravity and air resistance. These forces act on moving objects and eventually bring them to a stop.
- 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.