



Knowledge Organiser

Subject: Science

Topic: Forces in Action

Year: 5

Key Knowledge

Force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall. Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object. A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.

Common misconceptions

- The heavier the object the faster it falls, because it has more gravity acting on it.
- Forces always act in pairs which are equal and opposite.
- Smooth surfaces have no friction.
- Objects always travel better on smooth surfaces.
- A moving object has a force which is pushing it forwards and it stops when the pushing force wears out.
- A non-moving object has no forces acting on it.
- Heavy objects sink and light objects float.

Key Learning

- To demonstrate the effect of gravity acting on an unsupported object.
- To give examples of friction, water resistance and air resistance.
- To give examples of when it is beneficial to have high or low friction, water resistance and air resistance.
- To demonstrate how pulleys, levers and gears work.

Disciplinary Skills

- **Investigating** – Carrying out experiments and tests to observe how forces affect objects and motion.
- **Exploring** – Observing and experimenting with mechanisms, such as pulleys and levers, to understand how they work.
- **Researching** – Using books, videos, and online sources to gather information about forces, gravity, and the movement of planets.

Key Concepts

Forces Affect Motion

A force can cause an object to start moving, stop moving, speed up, slow down, or change direction.

Gravity is a non-contact force that pulls objects towards the Earth, causing unsupported objects to fall.

Air resistance, water resistance, and friction are contact forces that act between moving surfaces, affecting motion.

Mechanisms and Simple Machines

Mechanisms such as pulleys, levers, and gears help make tasks easier by increasing force.

A small force applied over a long distance can produce a larger force over a short distance, as seen in tools like bottle openers.

Simple machines reduce the effort needed to move or lift objects.

Movement in Space and the Solar System

The Earth and other planets move in orbit around the Sun.

The Moon orbits the Earth, and together with the Earth's rotation, this creates cycles such as day and night.

The Sun, Earth, and Moon are spherical, and the apparent movement of the Sun across the sky is due to the Earth's rotation.

The Big Question

What forces are active around us?

Key Vocabulary	
Force	A force is a push or pull that can cause an object to start or stop moving or change its speed, direction or shape.
Gravity	Gravity is a pulling force exerted by the Earth (or any object with mass).
Newton	The newton (N) is a unit of measurement used to measure force, named after Sir Isaac Newton.
Friction	Friction is a contact force that occurs between two touching surfaces that are either trying to move or are already moving across each other.
Air Resistance	Air resistance is a form of friction that occurs between air and an object moving through it. It can also be referred to as 'drag'.

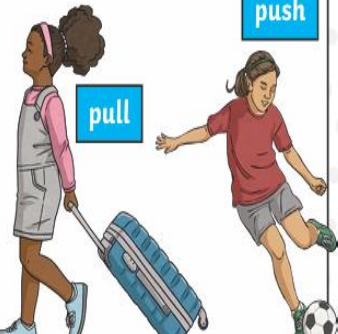
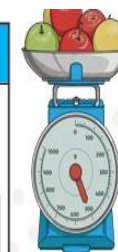
Ibn al-Haytham



Al-Haytham described **gravity** as the attraction between two masses and explored how the **force of gravity** causes objects to accelerate.

Forces

Forces can be categorised as pushes or pulls.

Mass is the measure of the amount of matter within an object and is typically measured in grams (g) or kilograms (kg).

Weight is the measure of the gravitational **force** acting on an object and is measured in **newtons (N)**.



Linking Thinking Across Our Learning Journey						
Early Years	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
			Forces and Magnets Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others.		Forces in Action	