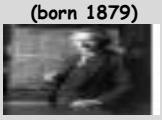
Coley Primary School – Knowledge Organiser

SUBJECT FOCUS: Physics strand	Science: Forces	YEAR 5	TERM 5

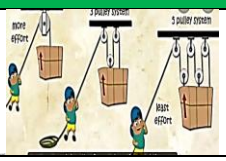
WHAT? – Key Knowledge

- Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object
- Identify the effects of air resistance, water resistance and friction, that act between moving surfaces
- Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect
- Explore falling objects and raise questions about the effects of air resistance.
- Explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall.
- Experience forces that make things begin to move, get faster or slow down.
- 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.
- Explore the effects of levers, pulleys and simple machines on movement.
- Find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation.
- Use scientific language: say, read and spell scientific vocabulary.

Famous Scientists

Galileo (born 1564) 	**Galileo** (born 1564) became famous for discovering celestial bodies using telescopes. His work on different weights descending at the same time strengthened the Copernicus' theory that the Earth and other planet's revolve (orbit) the Sun. Unfortunately, this got Galileo into lots of trouble and he was imprisoned for this work as it went against many religious beliefs held at the time. He died in 1642.
Sir Isaac Newton (born 1642) 	**Sir Isaac Newton** (born 1642) is one the important scientists in history. One of his achievements was developing the theory of gravity. It is thought he developed the theory when he saw an apple fall from a tree. He died in 1727.
Albert Einstein (born 1879) 	**Albert Einstein** (born 1879) published his theories of gravity being the product of the curvature of space and time acting on the universe. He supported Newton's theory of gravity but claimed there was more to this force and it affected more than just Earth. This was ground breaking science at the time (1905). He died in 1955.

TYPES OF MECHANISMS



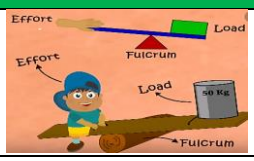
Pulleys

Pulley are used to reduce the amount of force needed to lift a load. The more wheels in a pulley the less force is needed to lift the weight.



Gears / Cogs

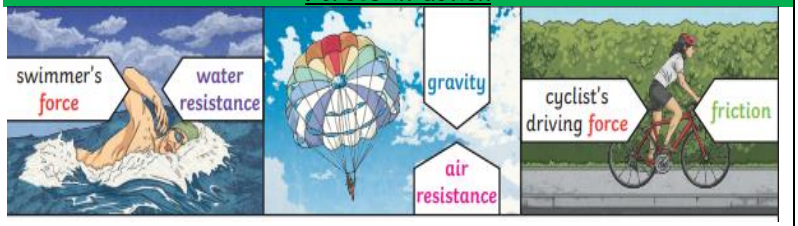
Gears/ cogs are used to change speed, direction or force of a motion. When 2 gears are connected they always turn in the opposite direction to one another.



Levers

A way to lift heavy weights using the least amount of effort. The longer the lever, the easier it is to lift. A lever always rests on a pivot or fulcrum.

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.

Forces can make an object:

- **Start to move, stop moving, change direction, move faster,**
- **Change its shape, move more slowly.**

WHAT? – Key vocabulary

forces	Pushes or pull.
gravity	A pulling force exerted by the Earth (or anything else which has mass).
Earth's gravitational pull	The pull that Earth exert on the object, pulling it towards Earth's centre. It is Earth's gravitational pull which keeps us on the ground.
force meter	It is marked in Newtons and measures the weight of an object.
mass	A measure of how much matter (or 'stuff') is inside an object. It is measured in kilograms (kg).
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 objects.
water resistance	A type of friction caused by water pushing against any objects.
buoyancy	This is an upward force that a liquid applies to objects.
streamlined	When object is shaped to minimise the effect of air and water resistance.
mechanism	Parts which work together in a a machine. Example of mechanism are pulleys, gears and levers.
force meter, balance force, upthrust, accelerate, decelerate, surface, effect, brake, stop, move	

Diagrams and symbols

This shark is **streamlined**.



It does not create much water resistance, so it can move through the water quickly.

It has a pointed nose to cut through the water, and a smooth, low curved back to allow the water to flow over and around it.

I wonder… Can I …

- describe and explain how motion is affected by forces? (including gravitational attractions, magnetic attraction and friction)
- design very effective parachutes?
- work out how water can cause resistance to floating objects?

Working Scientifically Challenge:

Let's think like scientists…

Can they…

- explain what gravity is and its impact on our lives?
- explain why a wheeled object that is initially pushed will slow down and stop?
- explain the impact of friction on a moving object?
- explain the effect of drag force on moving objects?
- explain how force and motion can be transferred through gears, pulleys, levers and springs?

Possible experiences: *Curious minds…*

- **Falling Objects** – explore the effect of air resistance, by observing how different objects (like sycamore seeds) fall.
- **Forces** *(Foxton Primary Science)*, by Nichola Tyrrell