



Subject: Science

Year group: 5

Term: Spring

Unit name: Forces

Prior Knowledge - Compare how things move on different surfaces. (Y3 - Forces and magnets)

Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets)

Observe how magnets attract or repel each other and attract some materials and not others. (Y3 - Forces and magnets)

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. (Y3 - Forces and magnets)

Describe magnets as having two poles. (Y3 - Forces and magnets) Predict whether two magnets will attract or repel each other, depending on which poles are facing. (Y3 - Forces and magnets)

Scientific enquiry

Classifying	Gear trains
Observing over time	Not relevant
Pattern seeking	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. Levers and fulcrums Relationship between weight in grams and Newtons
Comparative/fair testing	Falling objects – making parachutes Resistance in water – making boats
Researching	Using a force meter

National curriculum:

- 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.






Assessment for learning

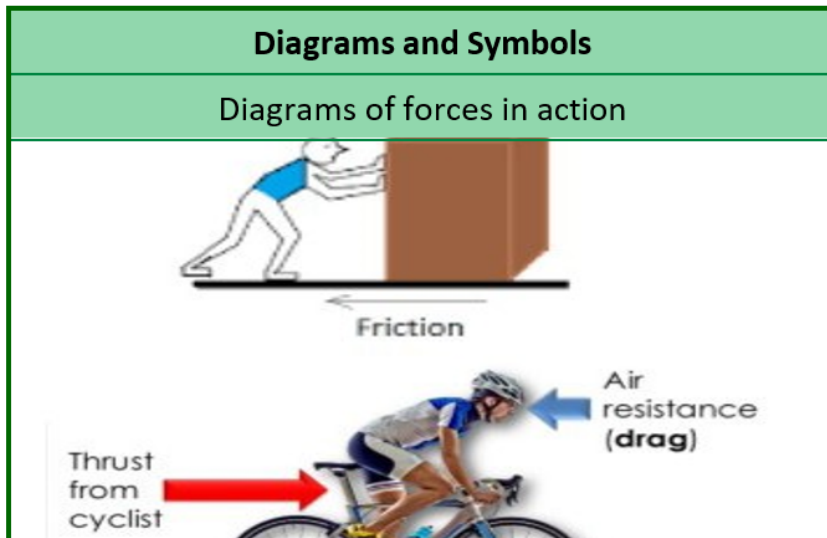
Recapping prior knowledge- beginning of unit- what do children already know?

Beginning of each lesson- focus on recall of previous learning (quick quizzes)

Topic: Forces	Year Five	Strand: Physics
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What? (Key Vocabulary)	
Spelling	Definition/Sentence
Streamlined	A shape that presents least resistance to air or water
Surface	The top layer of something
Grip	To have a good connection with a surface
Drag	To cause to slow down
Centre	The middle

What? (Key Knowledge)	
Forces	
What is a force?	A force is either: push or a pull
Forces can make things...	Speed up, slow down, change shape and change direction
A force that speeds something up	The child is pushing the car to speed it up 
A force that slows something down	The girls is pulling the dog to slow it down 
A force that changes the shape of something	The can is being squeezed so that it changes shape and becomes smaller 
A force that changes the direction of something	When the ball is hit with the racket, it will change direction 
Types of force	
Magnetism	Attract: 



Water Resistance

Thrust

Gravity pulls us towards the centre of the Earth.

Recommended Experiments

A minimum of two experiments should take place outlining the scientific enquiry skills and approaches used.

	Identify the effects of air resistance by designing and testing a parachute which would slow a car down a ramp
	Testing water resistance when swimming (during Year 5 swimming lessons)
	Recognising the impact of mechanisms on forces when using pulleys, levers and gears during technology lessons
	Choosing a feature of a spinner to investigate, for example, size of wings, height dropped or number of paper clips

Magnets attract or repel each other or other objects	Repel: North and South attract. But North and North or South and South will repel.
Air Resistance	<ul style="list-style-type: none"> Air resistance slows down moving objects, because air slows you down as you move through it To travel faster through the air, things need to be streamlined
Water Resistance	<ul style="list-style-type: none"> Water resistance slows down moving objects, because water slows you down as you move through it To travel faster through the water, things need to be streamlined
Friction	<ul style="list-style-type: none"> Friction happens when two surfaces touch each other Friction gives us grip Friction produces heat Rougher surfaces slow things down a lot Smoother surfaces don't slow things down as much
Gravity (another force)	
What is gravity?	Gravity is the forces that pulls objects down towards the <u>centre</u> of the Earth. Gravity stops things from floating away into space.



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space.
When things go into the air (like a football) gravity pulls them back down.

Builds on: learning in Year 3 - Summer - Unit: Sound and Electricity

Learning links

Leads to: learning in Year 5 - Summer 2 - Unit: Earth and Space

Lesson Sequence



1. Explore gravity and the life and work of Isaac Newton



2. Examine the connection between air resistance and parachutes



3. Explore factors which affect an object's ability to resist water



4. Investigate the effects of friction on different surfaces



5. Investigate mechanism – levers and pulleys



6. Investigate mechanisms - gears

Forces in Action

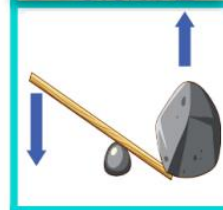


Mechanisms



Pulleys

A pulley is a wheel over which a belt, rope, or chain is pulled to lift or lower a heavy object.



Levers

Levers are a bar that rotates around a point. They make it easier to lift a heavy load.



Gears/Cogs

Gears are toothed wheels that mesh together, they rotate in opposite directions.

Mass and Weight

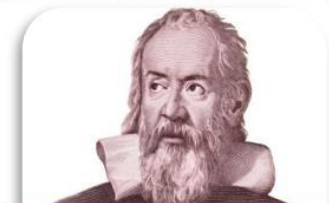


The mass of an item can be measured in **Grams/ Kilograms.**

Weight is how much force is needed to pull an object and is measured in **Newtons.**



Sir Isaac Newton developed his theory of gravity.



Galileo conducted experiments to test mass.