

# Scheme of Learning: Forces

## Topic Sequence:

1	2	3	4	5	6	7	8	9	10
Lab Skills	Particles and Separation Techniques	Forces	Cells and Organisation	Elements and the Periodic Table	Energy	Health and Human Body	Chemical Reactions	Electricity and Magnetism	Reproduction

## Topic Overview:

The Forces topic aims for pupils to develop their understanding of why objects behave in the world around them; from why they stay on the surface of the Earth, to why their car will speed up and slow down. This topic aims to link the importance of understanding forces with its impact on sport. We use the context of Olympic track cycling to gain an understanding of how forces underpin the design of a bike, as well as how changing body position and clothing can affect speed and increase the chance of winning an Olympic medal.

This topic builds on the KS2 idea that forces are pushes and pulls and begins to identify some basic forces. We build the foundations which will later be developed in the 'motion and pressure' topic in year 8 and 'Forces and interactions' and 'Forces and motion' in KS4 (GCSE).

## Lesson Sequence:

Pupils will start by being able to list the different types of forces, and the direction that they act. They will need to understand if the forces are contact or non contact and how they interact with an object. Students will then develop this knowledge by describing if forces in opposite directions are balanced or unbalanced and to calculate a resultant force. Once they can identify resultant forces they will then be able to apply this knowledge to explain how resultant forces affect the object. We start by looking at how it affects the motion of an object (speed and direction). We then focus on two specific resistive forces, drag and friction, and the ways we can reduce them. We then move on to looking how resultant forces cause a change of shape. Finally the pupils look at the relationship between weight and mass. Pupils will be assessed by being asked to explain why changing the body position, tyre thickness or shape of a helmet can change a cyclist's speed.

## Sequence of Lessons:

1	Intro to forces (contact and non-contact)
2	Representing forces
3	Resultant forces
4	Drag
5	Friction
6	Changing shape
7	Weight and Gravity
8	Forces assessment

## Resources:

1	Newton meters (Range high and low resolution) Objects of different weights. Work sheet 1: <a href="#">Forces definition match</a> Work Sheet 2: <a href="#">Table of results</a>
2	Large Squared (graph) Paper. Worksheet 1: Free body diagram practice.
3	Worksheet 1: Resultant force practice 1 Worksheet 2: Resultant force practice 2
4	Equipment. Hair dryer x 4 Meter ruler x 8 Small dynamics trolley x 8 Plasticine. 100g x 8
5	Equipment: Friction Block and Newton Meter X 8 Table of results
6	Equipment: 1 x spring 1x strawberry lace, 1 x clamp stand, a meter ruler, 2 x clamps and 2 x bosses. Table of results and graph to annotate.
7	Graph paper or print slide 10 to allow them to plot the graph.
8	Print off assessment sheet.

## Supportive Reading:

Comprehension activity	TBC
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## Assessment:

Knowledge:	20 question multiple choice quiz
Application of Knowledge:	Explain why changing the body position, tyre thickness or shape of the helmet can change a cyclist's speed.