

Forces

Big Idea 3: Changing the movement of an object requires a net force to be acting on it.

Big Idea 4: The total amount of energy in the Universe is always the same but can be transferred from one energy store to another during an event.

Our Inspirational Scientists: Sir Isaac Newton

In this unit, we will build on our knowledge of magnetism from Year 3 and will look at gravity and how Newton's theory suggests that gravity pulls objects towards Earth and so unsupported objects will fall. We will also deepen our understanding of friction from Year 3 by exploring how air resistance, water resistance and friction are contact forces that act between moving surfaces. We will link our learning to D&T where we can see that pulleys, gears and levers allow a small force to become a bigger force.



These are the key skills and knowledge you will gain through this unit:

Scientific 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.
Working Scientifically	• plan, set up and carry out comparative and fair tests to answer questions, including recognising and controlling variables where necessary; • take measurements using a range of scientific equipment with increasing accuracy and precision; • Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas; • Talk about how scientific ideas have developed over time.

Force,
Gravity,
Earth,
Air resistance,

Key Vocabulary
Water resistance,
Friction,
Mechanisms,
Simple Machines,

Levers,
Pulleys,
Gears

Developing scientific thinking

This unit supports the following elements in particular:

- Taking measurements, using a range of scientific equipment, with increasing accuracy.
- Recording data and results using tables and line graphs.
- Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanation of and degree of trust in results.

Investigations and Experiments in this unit:

Comparative / fair testing - What factors affect how long it takes a spinner to reach the ground?

Research - When was gravity first observed?

Observation - How does gravity act on different objects?

Pattern seeking - Is there a link between the shape of an object and whether it floats?

Identifying, grouping and classifying - Which materials float and which materials don't?

Problem solving - What is the best design for a fast vehicle?

Reading Links

Retrieve information from research.

Writing Links

Write a summary of Newton's theory of gravity. Is this the only theory?

Maths Links

Measurements

Other Curriculum Links

History - Significant people and changes in theory.

D&T - Pulleys, levers and gears

