

Forces- Year 5- Kapow unit- Forces and space: Unbalanced forces

Previous learning

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
 Compare and group together a variety of materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
 Describe magnets as having two poles.
 Predict whether two magnets will attract or repel each other depending on which poles are facing.

Key Vocabulary for Year 5

Air resistance	
Water resistance	
Friction	
Gravity	
Newton	
Gears	
Pulleys	

Previous vocabulary

Magnetic, force, contact, attract, repel, friction, poles, push, pull

Useful links

- <https://www.stem.org.uk/resources/community/collecion/12696/year-5-forces>
- <https://www.hamilton-trust.org.uk/science/year-5-science/forces-may-forces-be-you/>
- <https://www.bbc.co.uk/bitesize/articles/z22t7yc>

Key scientists you could look at...

Isaac Newton

Scientific skills

Working scientifically	Questioning and enquiry	Observing and measuring	Investigating	Recording	Grouping and classifying
Use practical scientific methods, processes and skills, covered in a variety of ways throughout the year	Begin to plan different types of scientific enquiries to answer questions, including recognising and controlling variables when necessary.	Begin to take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings where appropriate. Begin to identify patterns that might be found in the natural environment. Begin to make own decisions about what observations, measurements, and equipment to use. Begin to interpret data. Begin to make accurate and precise measurements.	Begin to test results to make predictions to set up further comparative and fair tests. Begin to recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. Begin to suggest improvements to the method and give reasons.	Begin to record data and results of increasing complexity using scientific diagrams and tables, classification keys, tables and bar and line graphs. Begin to report and present findings from enquiries. Begin to decide how to record data from a choice of familiar approaches. Begin to choose how best to present data	Begin to use and develop keys and other information to record, identify, classify and describe living things and materials.

Experiment and activity ideas

Parachutes- creating air resistance	Make a balloon powered car	Investigate levers, pulleys and gears, making a moving object	Investigate and create levers	Investigate and create pulleys
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Knowledge- objectives

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

Resources in school

Magnets- range of different types, range of different materials, variety of different metals, friction ramp, pulleys, gears, newton meters

Forces

Forces can make an object...

Isaac Newton

Isaac Newton is famously thought to have developed his theory of gravity when he saw an apple fall to the ground from an apple tree.

Mass is how much matter is inside an object. It is measured in kilograms (kg).

Weight is how strongly gravity is pulling an object down. It is measured in newtons (N).

The Moon has a smaller **mass** than Earth so the **gravitational pull** on the Moon is smaller than it is on Earth.

Jupiter has a greater **mass** than Earth so the **gravitational pull** on Jupiter is stronger than on Earth.

Examples of forces in action:

swimmer's **force**

water **resistance**

gravity

air **resistance**

cyclist's **driving force**

friction

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.

Pulleys	Gears/Cogs	Levers
<p>Pulleys can be used to make a small force lift a heavier load. The more wheels in a pulley, the less force is needed to lift a weight.</p>	<p>Gears or cogs can be used to change the speed, force or direction of a motion. When two gears are connected, they always turn in the opposite direction to each other.</p>	<p>Levers can be used to make a small force lift a heavier load. A lever always rests on a pivot.</p>

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.

This shark is streamlined.

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