Hartshill Academy
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Year 8

End of Year Assessments

Wednesday 3rd June to Wednesday 17th June

Heart - Ambition - Respect - Tenacity

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Year 8

English

Heart - Ambition - Respect - Tenacity

Year 8: Knowledge Organiser

Your end of year assessment will be skills-based, meaning it is designed to test how well you can apply the key techniques and methods you have learned throughout Year 8.

Rather than focusing on specific texts, the test will assess your ability to analyse, interpret, and communicate effectively using the skills you have developed across the year.

You do not need to revise the individual texts you have studied, as these will not be directly tested. Instead, focus on practising how to use your skills confidently in new and unfamiliar contexts.

The aim is to show your understanding of how to approach different tasks, not simply what you know about a particular text.

8.01: *Dracula*

Subject-Specific Vocabulary

1	Gothic fiction	(n) a genre of literature that is characterised by themes of mystery, terror, gloom and romance
2	epistolary	(adj) written as a series of letters
3	connotation	(n) an idea or feeling created by a word that adds to its literal meaning
4	antagonist	(n) the character who opposes the protagonist
5	dramatic irony	(np) when the audience is aware of the importance of a character's words or actions, but the character is not
6	**conjunctive adverbial**	adverbs of one or more words that act as conjunctions, linking sentences or clauses
7	semantic field	(n) a group of words or phrases that are connected by topic or meaning
8	**participle phrase**	a modifying phrase that uses the participle form of a verb (-ing or -ed) to describe a noun
9	**simile**	(n) a literary method in which a writer describes a person or thing as being similar to someone or something else
10	metaphor	(n) a comparison in which a person, object or action is used to represent or symbolise another person, object or action
11	extended metaphor	(n) a metaphor that unfolds across multiple lines or even paragraphs of a text
12	foreshadowing	(n) when the writer gives advance hints of what is to come later in the story
13	cliffhanger	(n) a moment of suspense when characters are left in a difficult situation without offering any resolution
14	allusion	(n) an expression that refers to another person or thing
15	juxtaposition	(n) two things placed closely together for a contrasting effect
16	**symbolism**	(n) when a writer takes an action, object, place, person, animal or word and gives it a much more metaphorical meaning

Character and Tone Vocabulary

17	ominous	(adj) giving a sense that something bad is going to happen
18	grotesque	(adj) repulsively ugly or distorted, especially in a comical or frightening way
19	macabre	(adj) disturbing because of an association with death or causing a fear of death
20	foreboding	(n) a feeling that something bad will happen
21	**insidious**	(adj) something dangerous or unpleasant that gradually and secretly causes harm
22	malignant	(adj) evil in nature
23	possessed	(adj) completely controlled by something (such as an evil spirit)
24	redemption	(n) the act of being saved from sin or evil
25	prodigious	(adj) unnatural or extreme in extent or size

Thematic Vocabulary

26	**supernatural**	(adj) beyond scientific explanation or human logic
27	**The 'New Woman'**	a feminist ideal that became popular in the late 19th century and influenced feminism in the 20th century
28	**gender**	(n) socially constructed perceptions of how men and women are expected to behave
29	**patriarchal**	(adj) a society, family or system in which men have all or most of the power and importance

Academic Vocabulary

30	archetype	(n) a perfect or typical example of a particular kind of person or thing that has all of their, or its, most important characteristics

8.06: *Pygmalion*

Subject-Specific Vocabulary

1	**Standard English**	(n) the most widely understood and accepted form of English; the form of English used when writing and when speaking formally
2	accent	(n) the way in which the people of a particular area, country or group pronounce the words of their language
3	**dialect**	(n) the way in which the people of a particular area or group use specific words and grammar
4	**Received Pronunciation**	(n) an accent of English that is associated with people from the upper and upper-middle classes; the 'Queen's English' or 'BBC English'
5	**foil**	(n) a character who contrasts with the protagonist to highlight their qualities
6	**satire**	(n) a literary genre that uses humour to expose, ridicule and criticise human flaws and social problems
7	**dramatic irony**	(n) when the audience is aware of the importance of a character's words or actions, but the character is not
8	register	(n) the level of formality in language
9	**sociolect**	(n) the words and grammar spoken by a specific social group
10	code-switching	(n) shifting between two or more styles of speech to fit the social situation
11	anti-climax	(n) a disappointing end to an exciting or impressive series of events

Character and Tone Vocabulary

12	inferior	(adj) lower in rank, status or quality
13	**metamorphosis**	(n) a complete change in form or nature; a transformation

Thematic Vocabulary

14	**social class**	(n) a system of ordering society whereby people are divided into sets based on their perceived social or economic status
15	**social hierarchy**	(n) the order in which society categorises its people into rankings of socio-economic tiers based on factors like wealth, income, race, class, education and power
16	injustice	(n) an event or situation which is unfair and undeserved
17	**exploitation**	(n) the action or fact of treating someone unfairly to benefit from their work
18	**hypocrisy**	(n) the practice of engaging in the same behaviour or activity for which one criticises or condemns another
19	**patriarchal**	(adj) a society, family or system in which men have all or most of the power and importance
20	**gender equality**	(n) the idea that everyone should be treated fairly and have the same chances, regardless of gender
21	sexism	(n) the unfair treatment of someone because of their sex
22	misogyny	(n) the hatred of, or strong prejudice against, women
23	objectification	(n) the act of treating a person as an object or thing, rather than as a person with feelings

Academic Vocabulary

24	**stereotype**	(n) a fixed and oversimplified belief about a group of people that ignores individual differences and can lead to unfair treatment or assumptions
25	**subvert**	(v) to overturn or undermine something that is established

8.04: Social Justice: Poetry

Subject-Specific Vocabulary

1	refrain	(n) a word, line or phrase that is repeated within lines or stanzas of a poem
2	**imagery**	(n) a literary method used to create a particular image to convey the key ideas, messages or themes in a text
3	**personification**	(n) giving human feelings or actions to an inanimate object
4	connotation	(n) an idea or feeling created by a word that adds to its literal meaning
5	**speaker**	(n) in poetry, the narrative voice or the person speaking in the poem
6	**metaphor**	(n) a comparison in which a person, object or action is used to represent or symbolise another person, object or action
7	**extended metaphor**	(np) a metaphor that unfolds across multiple lines or even paragraphs of a text
8	**plosive**	(n) a hard speech sound made by the letter t, k, p, d, g, or b
9	**caesura**	(n) a pause that occurs within a line of poetry, usually marked by some form of punctuation
10	**emotive** language	(np) words or phrases used to stir emotions in the audience
11	**symbolism**	(n) when a writer takes an action, object, place, person, animal or word and gives it a more metaphorical meaning
12	**juxtaposition**	(n) two things placed close together for a contrasting effect
13	enjambment	(n) the continuation of a sentence across a line break in poetry
14	**simile**	(n) a literary method in which a writer describes a person or thing as being similar to someone or something else

Thematic Vocabulary

15	**social justice**	(np) the fair and equal treatment of all people in society
16	**injustice**	(n) an event or situation which is unfair and undeserved
17	**abuse of power**	(np) when a person or group in a position of authority uses their power to oppress people
18	**collective responsibility**	(np) everyone being responsible for each other
19	**activist**	(n) a person who takes action or campaigns to bring about political or social change
20	**glass ceiling**	(np) a metaphor used to describe the difficulties faced by women when trying to move to higher roles in a patriarchal society
21	**exploitation**	(n) the action or fact of treating someone unfairly to benefit from their work
22	prejudice	(n) holding an unfair opinion about a person or group without reason or experience, often based on sex, religion, ethnicity or other characteristics
23	**civil rights**	(np) the right that every person has to political and social freedom and equality
24	**oppression**	(n) continued, unfair, cruel and unjust treatment which prevents people having their rights and freedoms

Academic Vocabulary

25	**tone**	(n) the attitude or feelings that a speaker or writer expresses through their words
26	**polemic**	(n) a strongly critical verbal or written attack on someone or something

8.03: Social Justice: Non-Fiction Rhetoric

Subject-Specific Vocabulary

1	rhetoric	(n) the art of effective persuasion, especially in speaking
2	ethos	(n) the appeal to credibility
3	logos	(n) the appeal to logic and reasoning
4	pathos	(n) the appeal to emotion
5	rhetorical device	(np) a technique used in writing or speech to achieve a persuasive effect
6	anecdote	(n) a short, interesting story about a real incident or person
7	personal pronoun	(np) a short word used as a substitute for the proper name of a person
8	subordinating conjunction	(np) a word that joins a dependent clause to a main clause
9	emotive language	(np) words or phrases used to stir emotions in the audience
10	anaphora	(n) the repetition of the same words at the start of successive sentences or clauses
11	rhetorical question	(np) a question that is used to make a point, rather than get an answer
12	allusion	(n) an expression that refers to another person or thing
13	parallelism	(n) two or more phrases or clauses in a sentence that have the same grammatical structure
14	analogy	(n) a comparison between one thing and another, typically for the purpose of explanation or clarification

Thematic Vocabulary

15	social justice	(np) the fair and equal treatment of all people in society
16	advocate	(n) a person who publicly supports a cause (v) publicly recommend or support
17	gender equality	(np) the idea that everyone should be treated fairly and have the same chances, regardless of gender
18	suffrage	(n) the right to vote in elections
19	activist	(n) a person who takes action or campaigns to bring about political or social change
20	age discrimination	(np) when a person is treated differently because of their age
21	representation	(n) including different types of people in literature, films, politics, sport, etc. so that all different groups are represented
22	moral integrity	(np) having the courage to do what we believe is right
23	civil rights	(np) the right that every person has to political and social freedom and equality

Academic Vocabulary

24	tone	(n) the attitude or feelings that a speaker or writer expresses through their words
25	perspective	(n) an attitude towards something; an opinion
26	counter-argument	(n) an argument or set of reasons put forward to oppose another argument
27	fact	(n) a thing that is known or proved to be true
28	statistic	(n) a numerical fact; a piece of data obtained from a study
29	thesis	(n) a statement, opinion or a theory that is put forward to be proved in an essay

Creative Writing

When we create a piece of narrative or descriptive writing, we use the panoramic approach. Imagine your writing like a panoramic picture captured by your camera – you want to grab every detail!

The panoramic approach helps you structure descriptive or narrative writing clearly.

- Start wide by setting the **time, place, and mood**.
- **Zoom in** to add closer detail.
- Use a **single striking sentence** to highlight an important image.
- Shift focus to different details or actions (**focus shifts**).
- **Zoom out** again to show the bigger picture.
- Finish with a **changed ending**, showing how the scene or mood has developed.

This method helps your writing feel detailed, organised, and engaging.

Critical Writing

Critical writing helps you clearly explain your ideas about a text; we follow the **What? How? Why**? Structure.

WHAT (Topic sentence) — Identify the big idea using a critical verb. Make a clear point related directly to the question.

HOW (Evidence) — Zoom in on a key word, using a critical verb. Support your point with evidence across the text.

WHY (Intentions) — Link back to the big idea. Explain why the writer chose to present this idea in this way.

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Year 8

Maths

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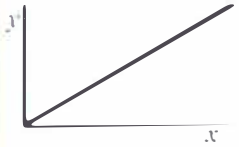
KPI 8.08 Direct Proportion

1) Proportion

A relationship between two quantities.

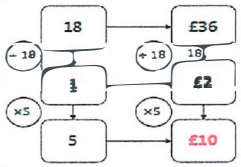
2) Direct proportion

A relationship between two variables where, as one increases, the other also increases.
The graphical representation of this relationship is a straight line through the origin.



3) Unitary method

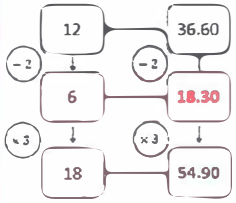
To find the value of one unit first.



5) Best buy

Better value for money means that the cost is cheaper when buying an identical item or amount. Equal quantities must be compared.

4) Multiple intersections



6) Recipes

Option 1: Find the amount of ingredients needed for a specific number of people.
Option 2: Find how much of the recipe can be made with the quantities available in the question.

KPI 8.09 Fractions, Decimals and Percentages

1) Common conversions

Fraction	Decimal	Percentage
$\frac{1}{10}$	0.1	10%
$\frac{1}{8}$	0.125	12.5%
$\frac{1}{5}$	0.2	20%
$\frac{1}{4}$	0.25	25%
$\frac{1}{3}$	0.33333....	33.3% (1dp)
$\frac{1}{2}$	0.5	50%
$\frac{3}{4}$	0.75	75%
$\frac{1}{1}$	1	100%

2) Fraction to decimal

Divide the numerator by the denominator.

$\frac{1}{5} \rightarrow 1 \div 5 \rightarrow 5\overline{)1.0}$ (0.2)

3) Decimal to percentage

Multiply by 100 and add the percentage symbol.

$0.09 \rightarrow 0.09 \times 100 = 9\%$

4) Percentage to fraction

Write the percentage as the numerator and make 100 the denominator. Simplify if possible.

$30\% \rightarrow \frac{30}{100} = \frac{3}{10}$

4) Percentage change

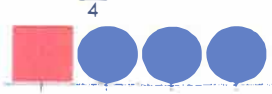
Percentage Increase or Decrease =

$\frac{\text{Change}}{\text{Original}} \times 100$

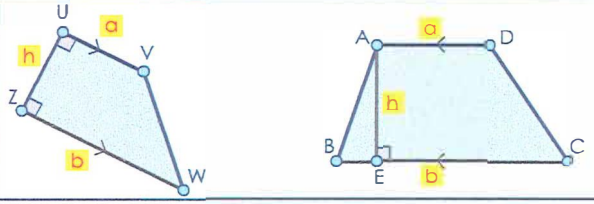
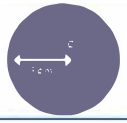
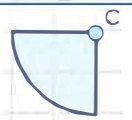
KPI 8.10 Percentages Calculations

1) Multiplier	A percentage written as a decimal is the percentage multiplier.	**2) Percentage of an amount with a calculator**	The percentage multiplier multiplied by the amount.
3) Percentage change	$\frac{\text{difference}}{\text{original}} \times 100$	**4) Reverse percentages**	$\text{original} = \frac{\text{new amount}}{\text{multiplier}}$

KPI 8.11 Ratio 1

1) Ratio	A part-to-part comparison. The ratio of a to b is written a:b	**2) Ratio as a fraction**	Fraction of shapes which are squares: $\frac{1}{4}$  Fraction of shapes which are circles: $\frac{3}{4}$
3) Equivalent ratios	Found by multiplying or dividing all parts of the ratio by the same number.		
4) Simplifying ratios	Ratios can be simplified by dividing each part of the ratio by the same number. ÷5 ↻ 25 : 15 ↺ ÷5 5 : 3	**5) Sharing into a given ratio**	Add the parts together. Divide the total by this. Multiply this by each part of the ratio. Share £18 in the ratio of 5:4 Add the part → 4 + 5 = 9 parts £18 ÷ 9 = £2 → 1 part = £2 5 parts: 5 x £2 = £10 4 parts: 4 x £2 = £8 £10: £8
6) Unitary Ratio	Write the ratio 5:3 in the form 1:n ÷5 ↻ 5 : 3 ↺ ÷5 1: $\frac{3}{5}$		

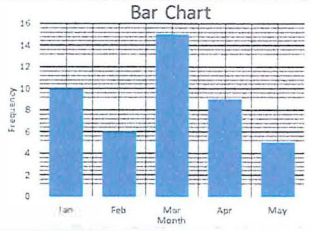
KPI 8.12 Area of Circles

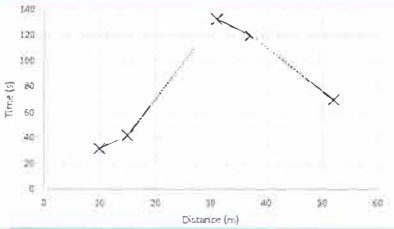
1) Trapezium	Quadrilateral with one pair of parallel sides.	**2) Isosceles trapezium**	Quadrilateral with one pair of parallel side and two right angles.
3) Area of trapezium	Sum of the parallel sides. Divide by 2. Multiply by the vertical height.	$A = \left(\frac{a+b}{2}\right) \times h$	
4) Area of a circle	$A = \pi r^2$ $A = \pi \times 9^2$ $A = 81\pi \text{ cm}^2$ 	**5) Area of a semi-circle**	$A = \frac{\pi r^2}{2}$ 
6) Area of a quarter-circle	$A = \frac{\pi r^2}{4}$ 	**7) Area of a three-quarter circle**	$A = \frac{3\pi r^2}{4}$ 

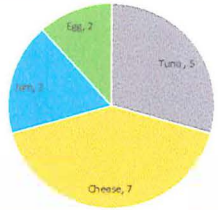
KPI 8.13 Statistics 1

1) Frequency table	A table showing how often (frequent) something occurs. Can include tally charts.	**2) Bar chart**	A way of displaying data, using horizontal or vertical bars which are the same width and have gaps between them. Data can also be presented in dual and composite bar charts in which case a key word would be used.
3) Line graph	Uses lines to join points on a graph to represent a data set.	**4) Pie chart**	Method of displaying proportional information by dividing a circle up into different-sized sectors.

Score	Tally	Frequency (*f*)
1	IIII	4
2	𝍸 IIII	9
3	𝍸 I	6
4	𝍸 III	8
5	III	3
6	I	1







5) Stem and Leaf diagrams

Presents data in a table where the place value columns are split.
For example, the tens and the ones columns may be split where the tens become the "stem" and the ones become the "leaf". Stem and lead diagrams come with a key and must always be written in order.

12	5
34	31
27	22
19	6
39	40

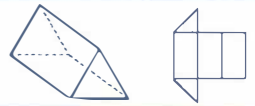
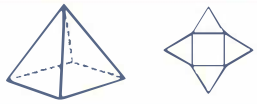
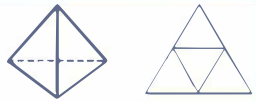
0	5 6
1	2 9
2	2 7
3	1 4 9
4	0

Key
2 \| 9 = 29

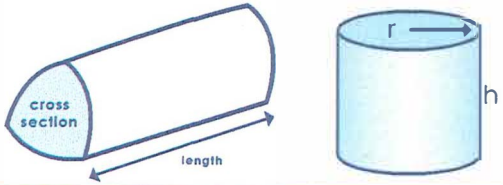
KPI 8.14 Averages and spread

1) Average	The central or typical value in a data set. There are three types of averages: mode, median and mean.	**2) Mode**	The most common/frequent value from a set of data. Mode of 3, 3, 6, **7, 7, 7**, 8, 9, 10 = 7
3) Median	The middle value when the data is in order. Median of 9, 5, 15, 6, 8 → 5, 6, **8**, 9, 15 = 8	**4) Mean**	Add up all the numbers and divide the total by how many numbers there are. Mean of 7, 8, 9: $\frac{7+8+9}{3} = \frac{24}{3} = 8$
5) Range	A measure of the spread of the data, = *Largest Value − Smallest Value*.		
6) Reversing the mean	If we have the mean but one of the data points is missing, we can find the missing value by: 1) Multiplying the 'mean' by the number of data points to get the total of the values; 2) Subtracting the sum of the known values from the total of all values.	E.g. The mean of three numbers is 5. Two of the numbers are 3 and 10. Find the third value. Total of the values: 5 x 3 = 15 15 – (3 + 10) = 2 The third value is 2	

KPI 8.15 3D Visualisation

1) Face	A face is a single flat surface.	**2) Edge**	An edge is a line segment between faces.	**3) Vertex**	A vertex is a corner.
4) Cube	6 faces 12 edges 8 vertices 	**5) Cuboid**	6 faces 12 edges 8 vertices 	**6) Triangular prism**	5 faces 9 edges 6 vertices 
7) Pentagonal prism	7 faces 15 edges 10 vertices 	**8) Square-based pyramid**	5 faces 8 edges 5 vertices 	**9) Triangular -based pyramid**	4 faces 6 edges 4 vertices 
10) Cylinder	3 faces 2 edges 0 vertices 	**11) Cone**	2 faces 1 edge 1 vertex 	**12) Sphere**	1 face 0 edges 0 vertices 

KPI 8.16 Volume

1) Volume	The volume of a solid body is the amount of 'space' it occupies. It is measured in cubic units e.g. cubic centimetres (cm^3).		
2) Volume of a prism	Volume of a prism = area of cross section × length Volume of cylinder = $\pi r^2 h$ 	**3) Units of capacity**	1 L = 1000 ml; 1 L = 1000 cm^3

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Year 8

Science

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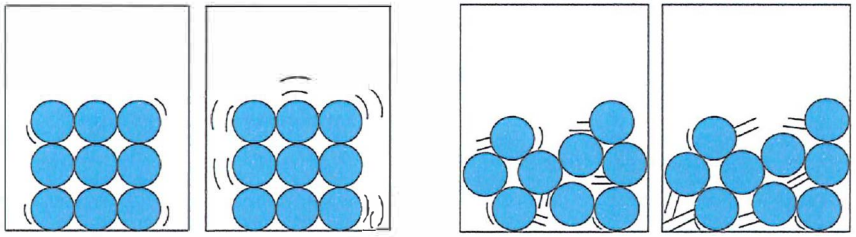
8.01: Heating and Cooling

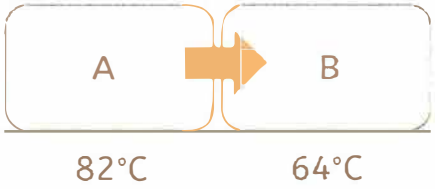
Temperature



- a physical quantity which is a measure of the **average energy** of particles due to their **motion**

Changing Temperature

- Heating and cooling affect an object's **thermal store** of energy.



- Net flow of energy is **always** from hotter to colder objects' thermal store.

- A thermal store can be changed by **any energy pathway** depending on the mechanism causing it.

'Mixing' Objects

same masses

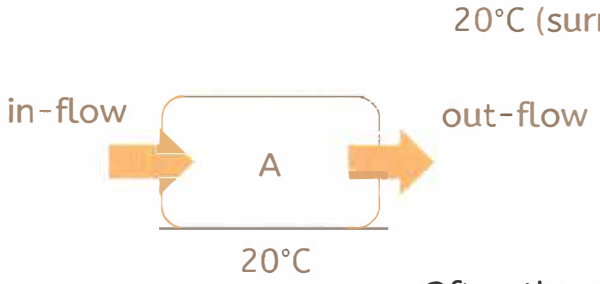
Resulting temperature: halfway between initial temperatures.

different masses

Resulting temperature: between initial temperatures and closer to that of larger mass.

Thermal Equilibrium

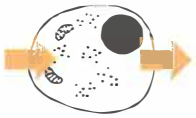
- when two objects reach the **same temperature**
- with no net flow of energy between thermal stores



- Often the result of energy **dissipating** to the cooler surroundings.

8.01: Heating and Cooling

Unchanging Temperature



But not thermal equilibrium (i.e. two objects **not** the same temperature).

higher than surroundings

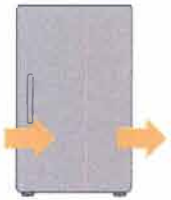
rate of supply → rate dissipated to surroundings

lower than surroundings

rate of removal

rate supplied by surroundings

air at 22°C



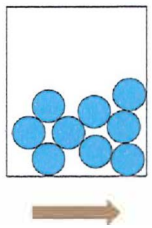
set at 5°C

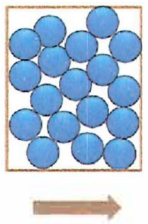
Changing Temperature

For the **same energy** supplied:

- Greater mass/volume,

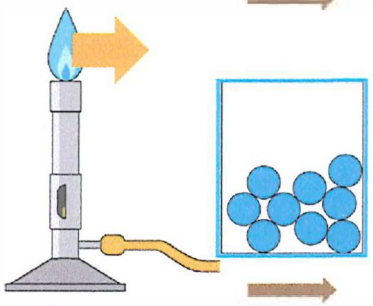
→ smaller temperature change.



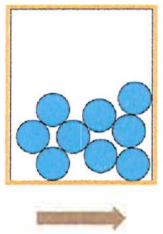


- Different starting temperature,

→ same temperature change.



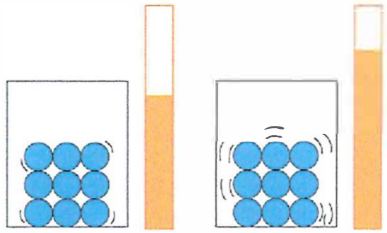
constant supply



Energy in Thermal Stores

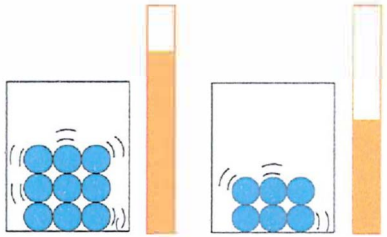
Hotter objects have more energy in their thermal store.

- Particles moving more.
- Each particle has more energy.
- Total energy of all particles: more.



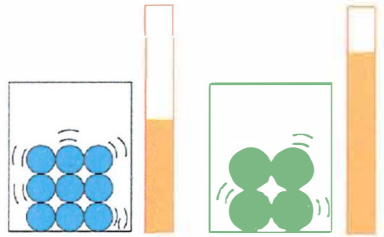
Larger masses have more energy in their thermal store.

- Greater mass: more particles.
- At same temperature, each particle has same energy.
- Total energy of all particles: more.



Some materials have more energy in their thermal store.

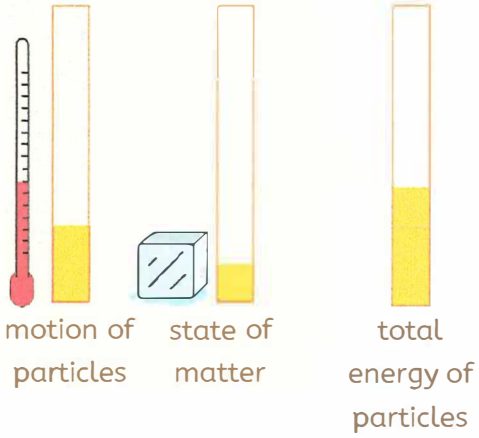
- Some materials have particles that require more energy to vibrate.
- At same temperature, each particle is vibrating the same, but they required more energy to do so.
- Total energy of all particles: more.

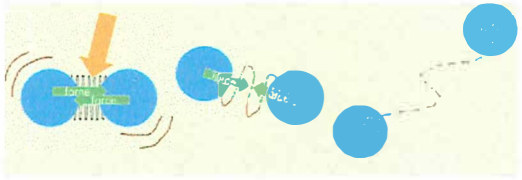


8.01: Heating and Cooling

Internal Energy

- total energy within an object due to the motion and position of its particles

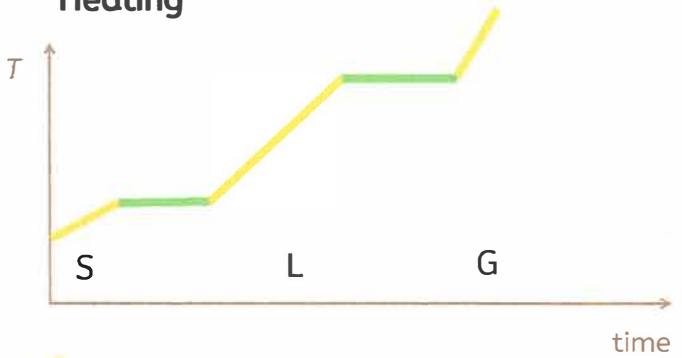




- *Force* reaches limit for motion.
- More energy in, *Force increases,* ↑.
- Separation increases, ↑ (then stays

- *Energy* stored by material.

Heating



Temp changing (no change of state)

Change of state (no change in *Temp*)

Thermal Transfer

Energy transfers from or to a thermal store.

- Temperature difference.
- In contact.

- All objects 'light up' a space with IR radiation.

thermal transfer

by particles

by waves

convection

thermal conduction

thermal radiation

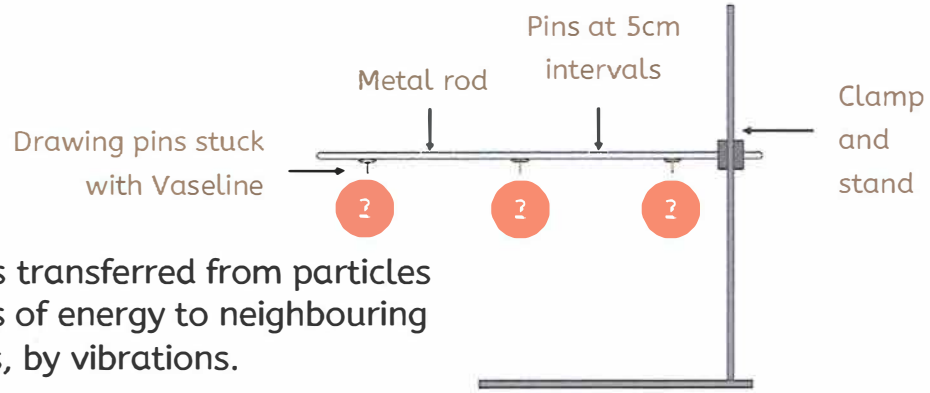
movement of material (fluids)

no movement of material (solids)

8.01: Heating and Cooling

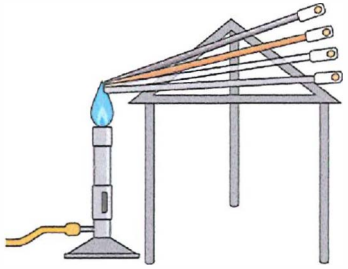
Thermal Conduction

- spontaneous process of energy transfer between a hotter and a cooler object in contact, without the movement of the material



Energy is transferred from particles with lots of energy to neighbouring particles, by vibrations.

Thermal conductivity



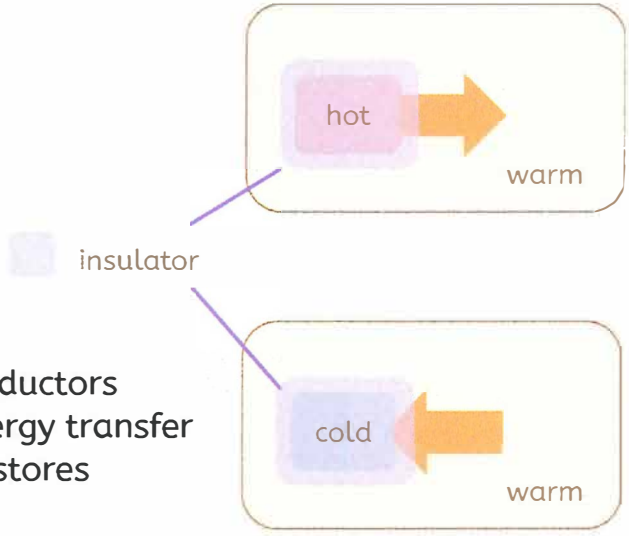
Good conductors have a higher thermal conductivity: energy transmitted easily through them.

Metals are the best thermal conductors.

Rate of thermal conduction

temperature difference	greater
material	higher thermal conductivity
thickness	less thick
surface area	greater

→ higher rate



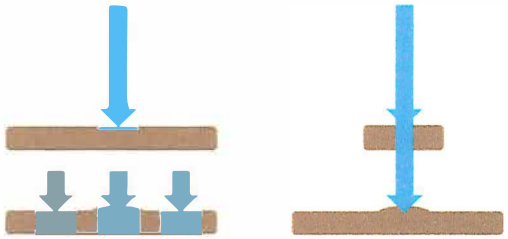
Insulators

- poor thermal conductors that minimise energy transfer to/from thermal stores

8.01: Heating and Cooling

Pressure

- quantity resulting from a force acting on a surface



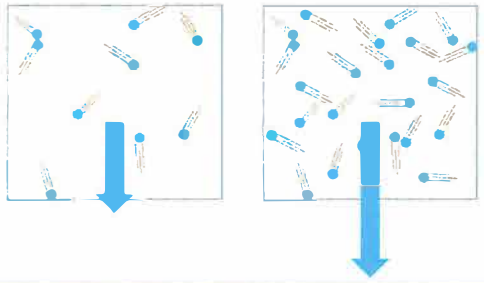
low pressure | high pressure

Pressure on objects

Pressure is **higher** when:

- a force acts over a **smaller surface area**
- a **large force** acts.

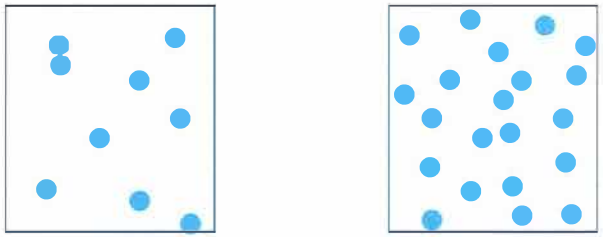
Pressure by a fluid



Forces between particles, and between particles and the inside walls of the container cause pressure on the gas.

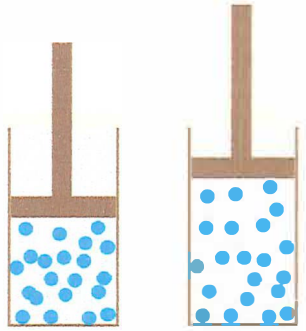
If more particles are causing a higher pressure – greater weight – higher pressure on surface.

Density



low density | high density

Greater mass in the same volume → higher density.

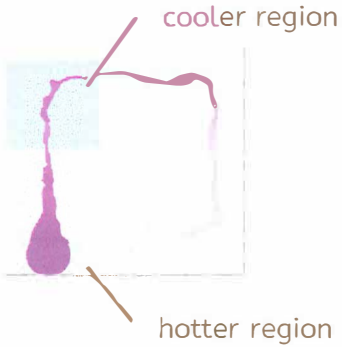


Greater volume of the same mass → lower density.

$$\text{density } (g/cm^3) = \frac{\text{mass (g)}}{\text{volume } (cm^3)}$$

8.01: Heating and Cooling

Convection



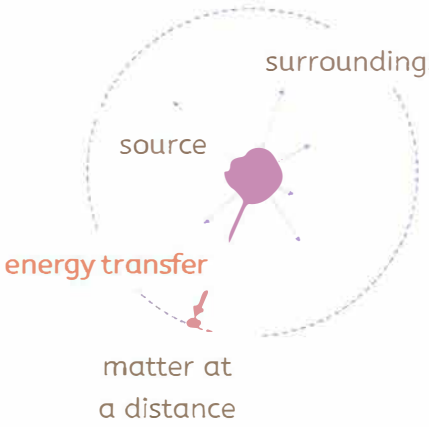
- movement of a hotter fluid to a colder region

- The less dense region rises.
- The rest of the fluid is more dense.
- The less dense matter 'floats' on more dense matter.

- A region of fluid that is colder sinks to replace the hotter fluid.

- A region of the fluid gets hotter.
- Particles move more.
- The separation between particles increases.
- Fluid expands.
- Its density decreases.

Temperature difference in a fluid causes **convection currents**.



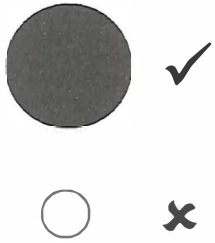
Thermal Radiation

- energy transfer to or from a thermal store by absorption or emission of light
- **no contact** necessary: can be transmitted through a vacuum

- **All** objects emit and absorb infra-red radiation.
- **Hotter** objects emit more energy by IR radiation (more intense).

Surfaces that absorb and emit energy from IR radiation best:

- dark
- matt/rough/dull
- large surface area.



8.01: Heating and Cooling

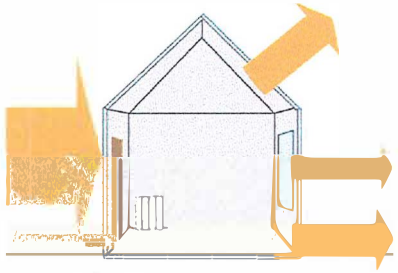
Real-world Contexts

Building Design

To maintain steady temperature independent of surroundings.

The greater the energy supplied, the greater the fuel use and costs.

To reduce fuel use:



loft insulation

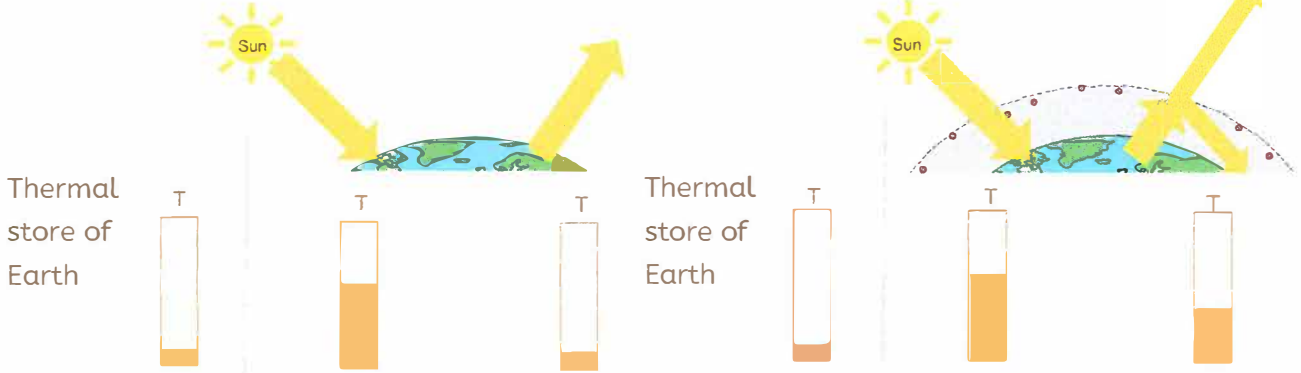
double glazing

cavity wall insulation

draught excluders

Greenhouse Effect

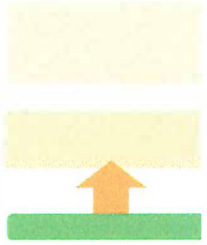
Causes a medium, steady average global temperature.



Weather Systems

Driven by temperature differences of different surfaces of the Earth.

- Low density air exerts less force on Earth's surface: low-pressure.
- Air rises in low-pressure systems.



Energy in thermal store of air increases.

Air expands.

Density decreases.

Air rises.

8.01: Heating and cooling

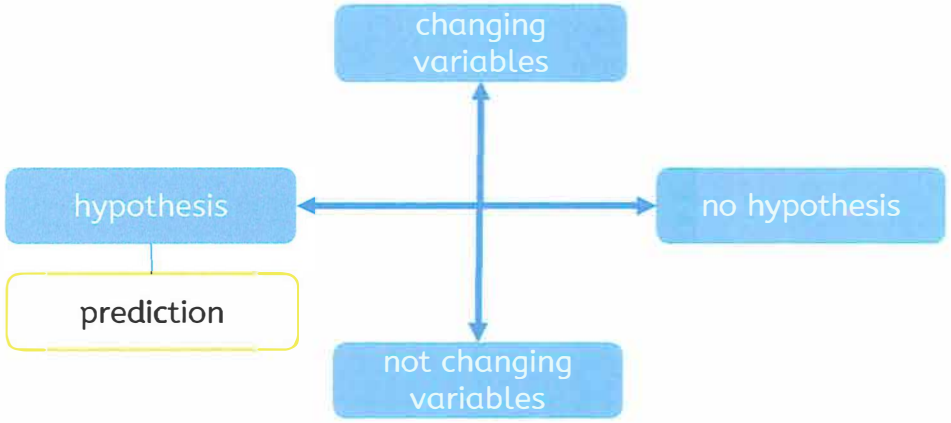
Measurement Error

- the difference between the measured value and the true value of the quantity being measured

Always some uncertainty in measurement

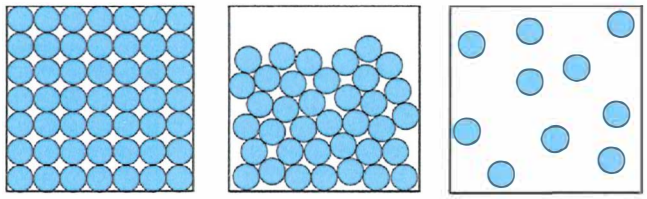
no control over	some control over
random error	systematic error
environmental	method, apparatus, skill
• repeat • mean • measure over time	• control/monitor environment • control procedure/apparatus • measurement technique

Scientific Methods

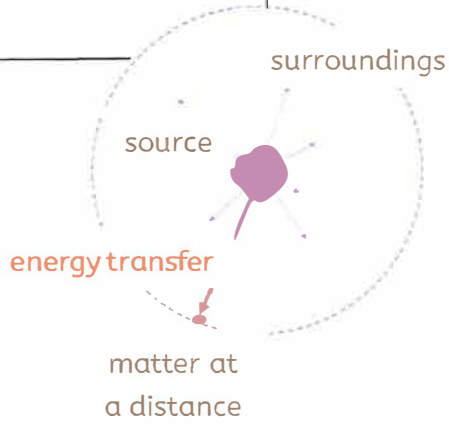


There is not a single way of doing research or a single scientific method.

Using Models



Particle Model



Radiation Model

During events, energy transfers from energy stores by an energy pathway.

Energy Stores and Pathways

8.01: Heating and cooling

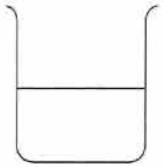
Developing a Method

Line of enquiry → Plan data collection → Type of scientific method → Apparatus / techniques → High-quality data

Plan data collection:
- to answer question
- systematic

Apparatus / techniques:
- resolution
- measurement error
  - impact random error
  - likelihood systematic error

Equipment

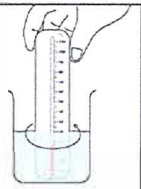
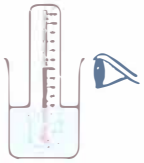


beaker

- Select the appropriate size.
- Place on a flat stable surface.
- Graduated markings: approximate volume.
- Pour in/out liquid carefully.
- After heating, move with tongs or wait to cool.
- If stirring, use a stirrer.

Skilful Techniques

To use a liquid thermometer

				
scale	stir	immersed	stopped	eye level

Safe Practicals

Hazards
All apparatus and techniques

Risks
- harm
- damage

- Follow normal laboratory rules
- Plan and risk assessment

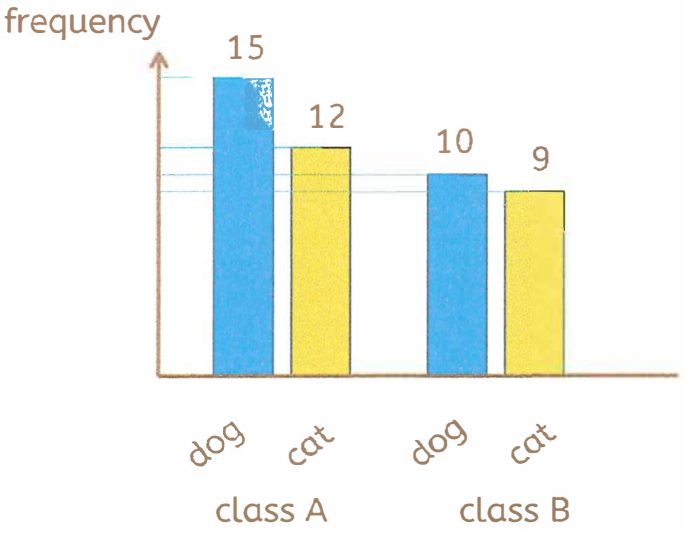
Reduced likelihood
- harm
- damage

Identify hazards → Judge risk → Plan control measures

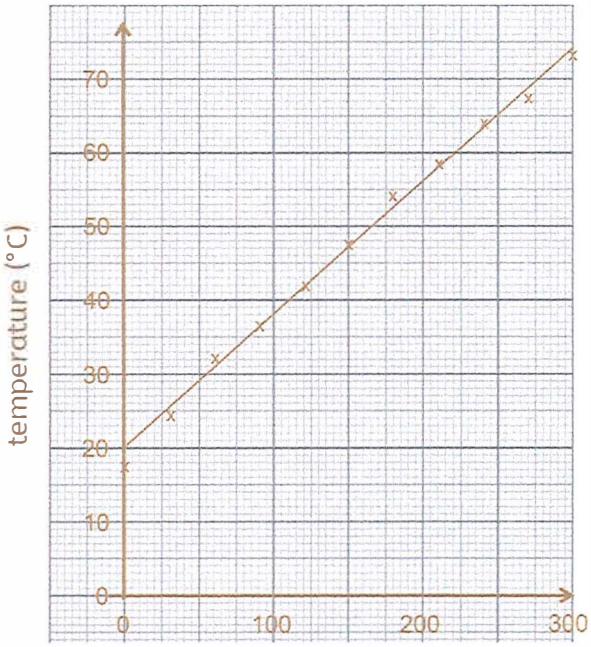
8.01: Heating and cooling

Interpreting Data

Identifying the most appropriate chart or graph depends on the type of data and the line of enquiry:

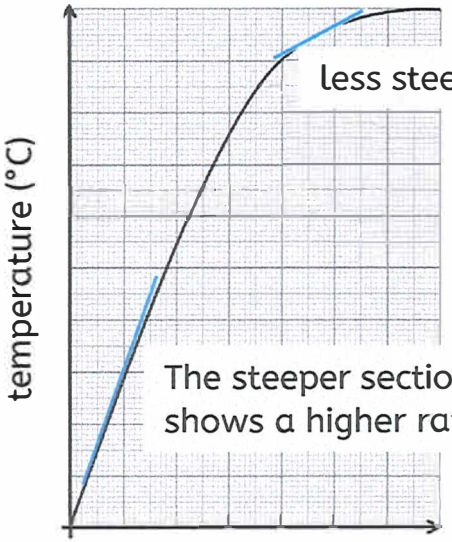


Compound bar charts are useful to compare a variable across different categories.



Values are read off from the best-fit line.

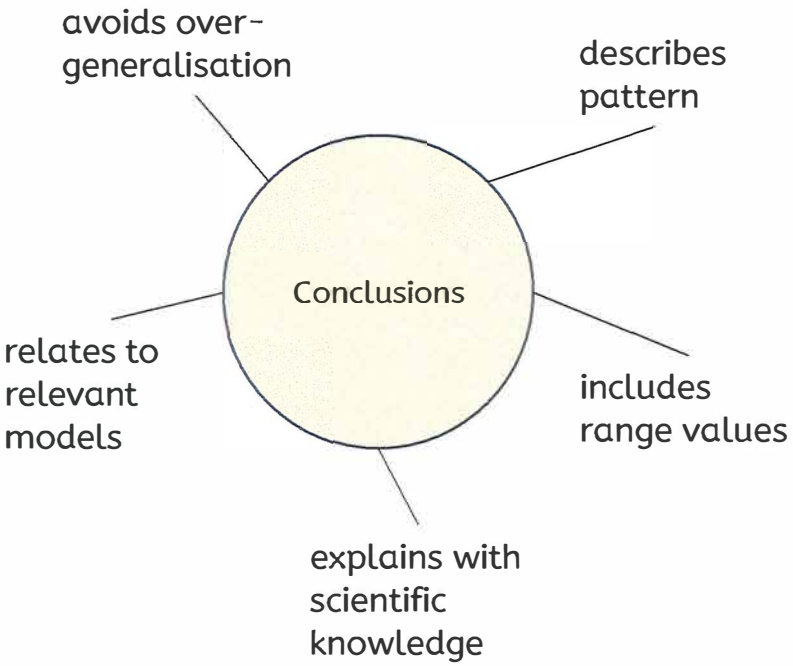
Patterns/trends are found by noticing what happens to one variable when the other is changed.



The steeper section of the graph shows a higher rate of change.

8.01: Heating and cooling

Making Conclusions



Evaluating Quality of Research

methods

- control of variables
- apparatus
- techniques
- skill

data to answer EQ

measurement error low

data

- range
- systematic intervals
- high resolution
- low in anomalies
- repeatable
- reproducible

differences can be observed

matches multiple datasets

conclusions

- values and patterns logically follow from the data
- conclusions are only based on the collected data
- researcher suggests further research needed

★★★

peer review

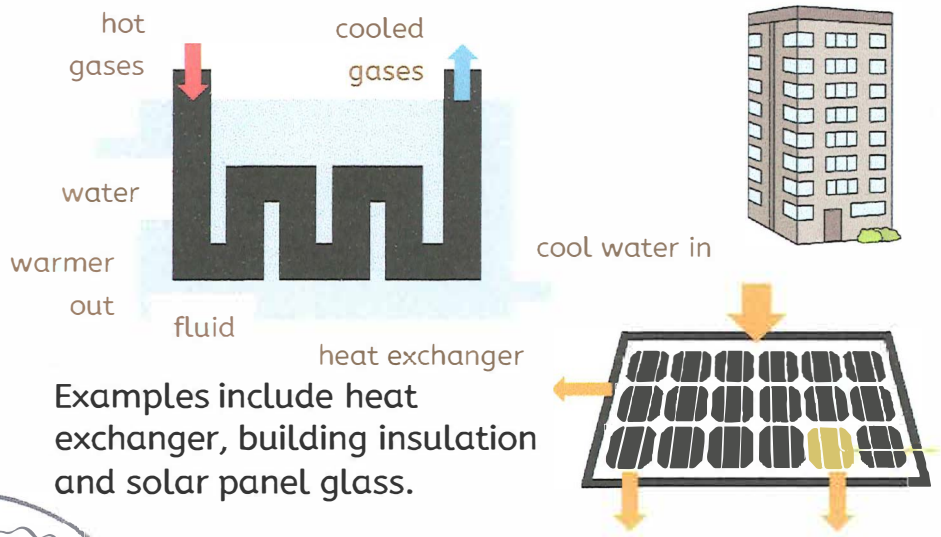
Scientific research is highly valued because of the efforts to produce high-quality data and have it tested by peers.

8.01: Heating and cooling

Applications to Industry

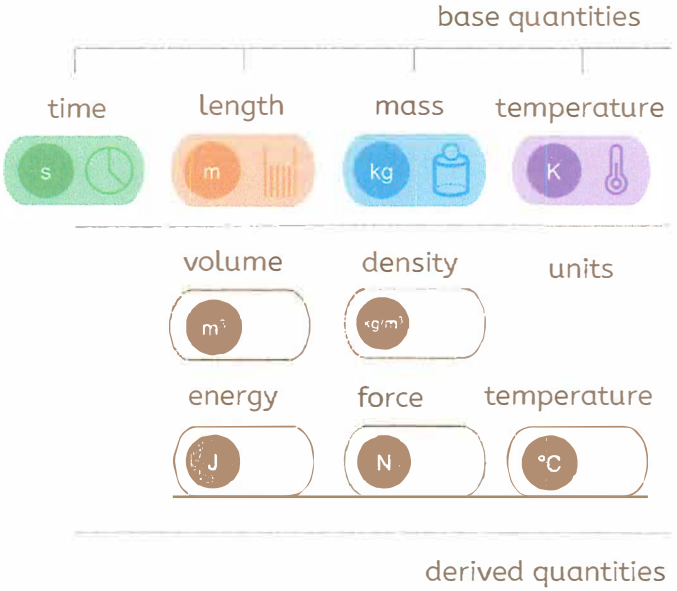
STEM workers

- Design problem needs solving ← Funded by various sources
- Use scientific knowledge to draft designs
- Test designs using modelling
- Select optimal design ← Costs considered



Examples include heat exchanger, building insulation and solar panel glass.

Measurement Values



Quantities and their units:

Base quantities: length, mass, time, temperature (K).

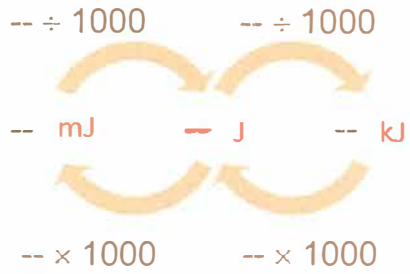
Derived quantities include energy, volume and density and the commonly used temperature unit, °C.

Unit Prefixes:

Range of unit prefixes which differ by the factor of 1000.

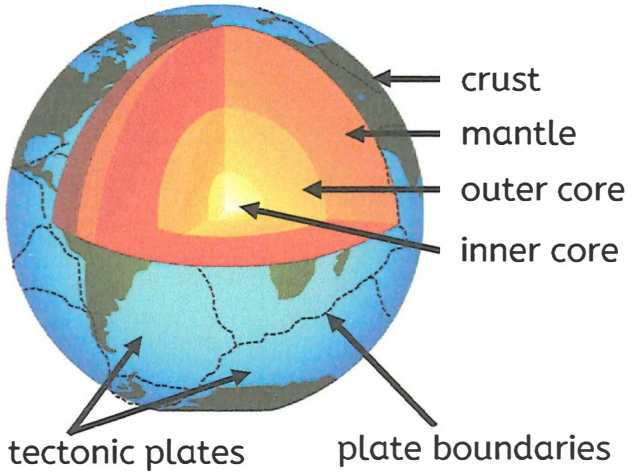
Prefixes change numbers to a more human scale.

Easier to compare values that have the same unit prefix.



8.02: Earth and the Atmosphere

Composition and structure of the Earth

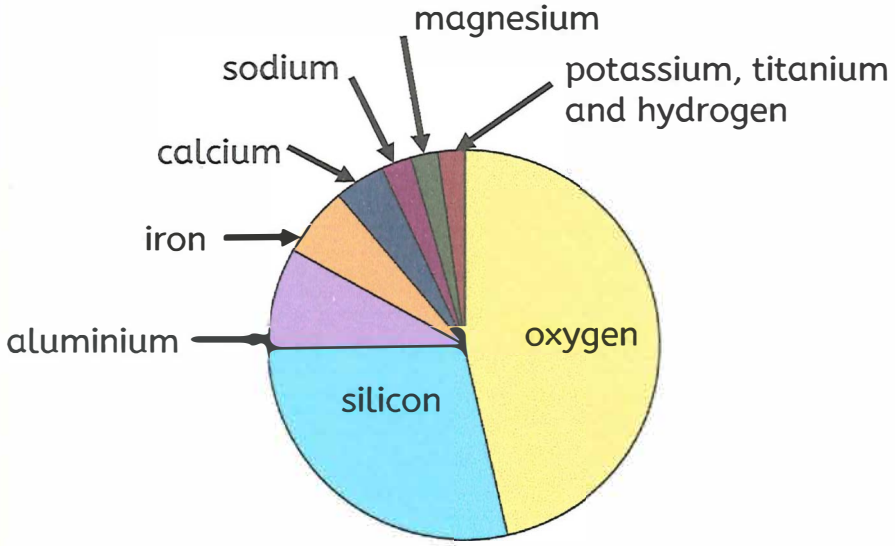


Layer	State	Composition	Thickness (km)	Temperature (°C)
crust	solid	rocks and minerals	5 to 70	0 to 30
mantle	solid	rocks and minerals	2900	1400 to 3000
outer core	liquid	molten iron and nickel	2200	4400
inner core	solid	solid iron and nickel	1200	5430

The two types of crust are continental crust, which is found beneath landmasses, and oceanic crust, which is found below the oceans.

Continental crust is the thickest.

Earth's crust is broken up into tectonic plates that meet at plate boundaries.



The most common elements that make up the minerals of Earth's crust.

Scientists can't explore deep inside Earth, so they use models to show what it's like. These models have limitations and can change when new evidence is found.

An apple

A layer cake

+
- has a thin outer layer
- has a thick middle layer
- has a core

−
- not spherical
- the outer layer is the same thickness all around
- the inner and outer cores are not clear

+
- has a thin outer layer
- has thicker middle layers
- has four layers

−
- not spherical
- doesn't show the difference in layer thickness
- the core is not hot

8.02: Earth and the Atmosphere

Scientific theory: continental drift

After data collection, scientific thinkers propose a scientific theory; it is based on a body of facts and is repeatedly confirmed by observation (and experiment).

The theory of continental drift is the theory that the continents were once connected in a land mass (Pangaea) but have broken apart and drifted away over time.

Three pieces of evidence that support the theory are:

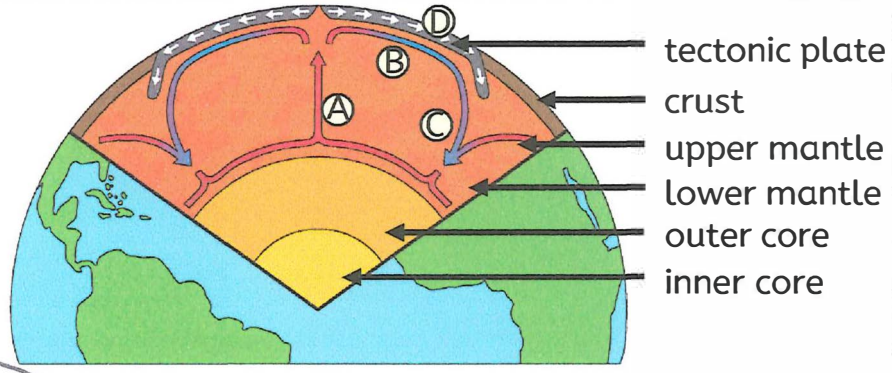
- The coastlines of many continents appear to fit together like a jigsaw puzzle.
- There were similar types of rocks across continents that are now far apart.
- There were identical plant and animal fossils found on different continents that are now far apart.

Peer review

Scientific thinkers present evidence to their peers in order to support an opinion and explain their reasoning.

Peer review is when researchers submit work for peer feedback. Peer review is important because it helps to make sure that the research is trustworthy and of high quality.

Convection currents cause continent movement



A. Hot, less dense rock rises towards the upper mantle.

B. In the upper mantle, the hot rock spreads and moves sideways.

C. As it cools, it becomes more dense and sinks back down, creating convection currents.

D. These convection currents cause the tectonic plates above to shift. As a result, the continents slowly change position over millions of years.

8.02: Earth and the Atmosphere

Rocks and the rock cycle

Igneous rock

- Igneous rocks are formed when molten rock crystallises.
- Molten rock above the Earth's surface is called **lava** and forms **extrusive** igneous rock when it cools and crystallises.
- Molten rock below the Earth's surface is called **magma** and forms **intrusive** igneous rock when it cools and crystallises.
- If molten rock cools **slowly**, it will form rock with **large** crystals.
- If molten rock cools **quickly**, it will form rock with **small** crystals.

Metamorphic rock

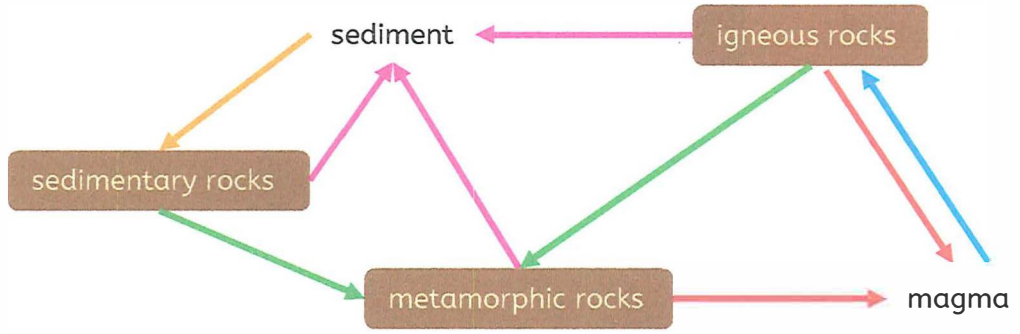
- Metamorphic rocks form from existing rocks, deep within the Earth's crust due to high temperature and pressure, causing chemical changes in minerals.
- Over millions of years, sedimentary and igneous rocks transform into metamorphic rocks, often near tectonic plate boundaries.

Sedimentary rock

Sedimentary rocks are formed through:
weathering → transportation → deposition → sedimentation → compaction → cementation
Layers, called **strata**, can be seen in sedimentary rock.

Weathering is the slow breakdown of rocks while they are in place. It can be **biological** (by living organisms), **chemical** (by chemical reactions) or **physical** (by forces e.g. freeze-thaw).
Erosion is the movement and carrying away of rock fragments.

The rock cycle involves the recycling of rocks, during which rocks can change into different types.



Fossils

Fossils are the preserved remains or traces of a dead organism that was alive millions of years ago. Fossils can be **trace fossils** (preserved imprints or evidence), **body fossils** (actual remains) or **mineralised fossils** (when hard parts are replaced by minerals).

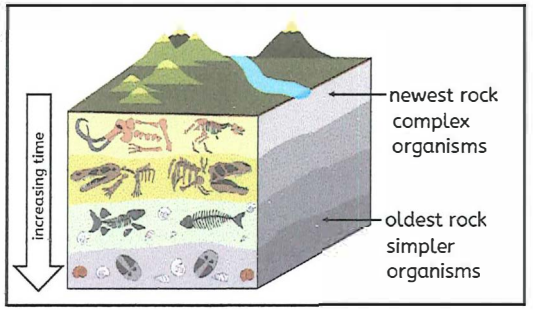
Fossils are found in sedimentary rocks. High temperatures and pressures destroy fossils, so they are not found in metamorphic or igneous rocks.

8.02: Earth and the Atmosphere

Fossils continued

Fossilisation process:
Organism dies → buried in sediment → soft parts rot, hard parts stay → pressure compacts layers → minerals replace hard parts → fossil forms → uplift exposes fossil

The fossil record is a collection of fossils documenting the history of life on Earth. It shows how organisms and environments have changed over time.

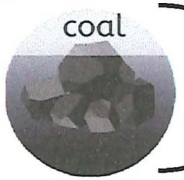


More complex fossil organisms are found at the top in newer rocks. Simpler fossils are deeper in older rocks.

Fossil fuels

Fossil fuels are natural resources formed over millions of years from the remains of dead organisms, such as plants and animals. Fossil fuels are **non-renewable** energy resources because they take a very long time to replenish.

Fossil fuel extraction provides energy, products, and jobs, but causes pollution, habitat loss, resource depletion, and global social inequality.



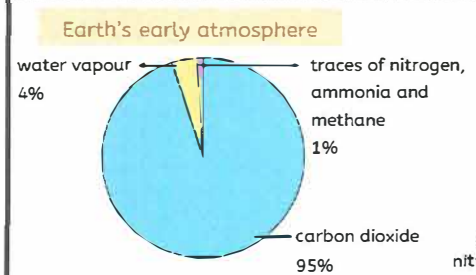
Swamp plants die → buried in mud and sediment → form peat → more burial → heat & pressure → peat turns to coal

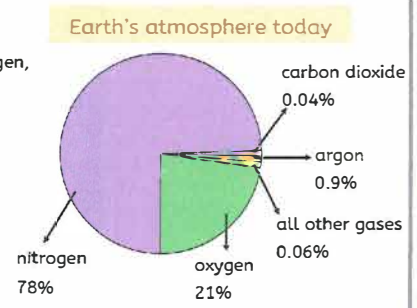
Coal is extracted through surface and underground mining.	Uses: heating, generating electricity, steel production.

Plankton die → sink → buried in sediment → pressure and heat → oil and gas form → trapped under impermeable rock

Crude oil and natural gas are extracted by drilling wells through impermeable rock.	Uses of crude oil: refined to make petrol, diesel, plastics. Uses of natural gas: cooking, generating electricity, industry.

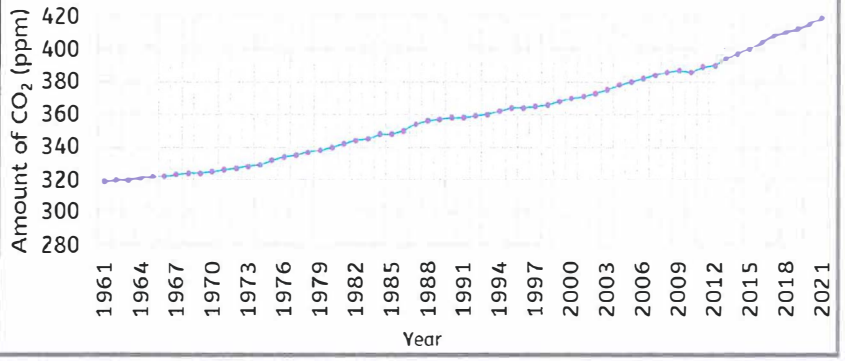
Earth's atmosphere





Human activities, such as the combustion of fossil fuels, which release large amounts of CO_2 into the atmosphere, result in an increase in atmospheric CO_2 concentration.

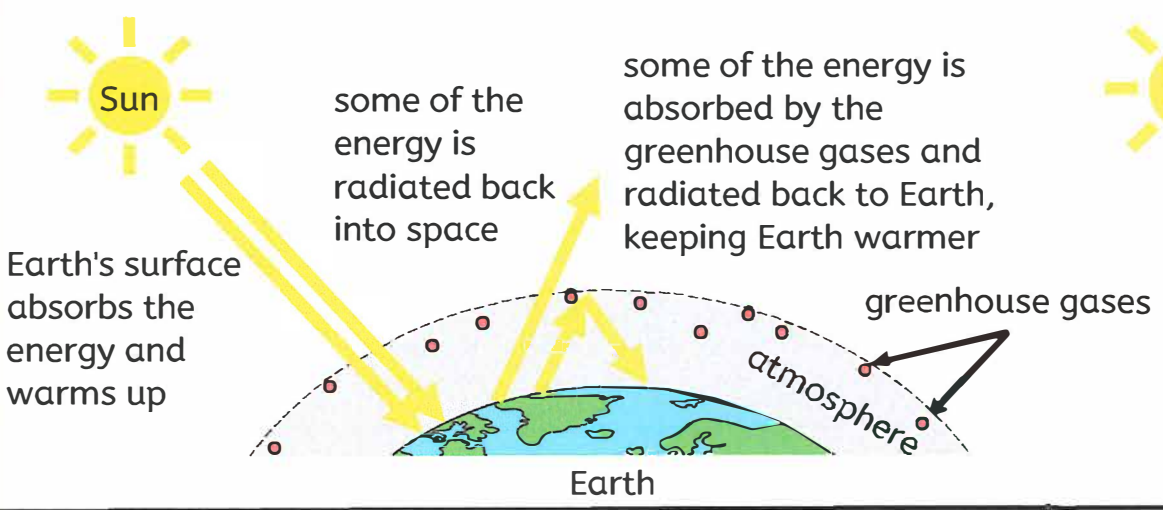
Carbon dioxide in the atmosphere between 1960 and 2021

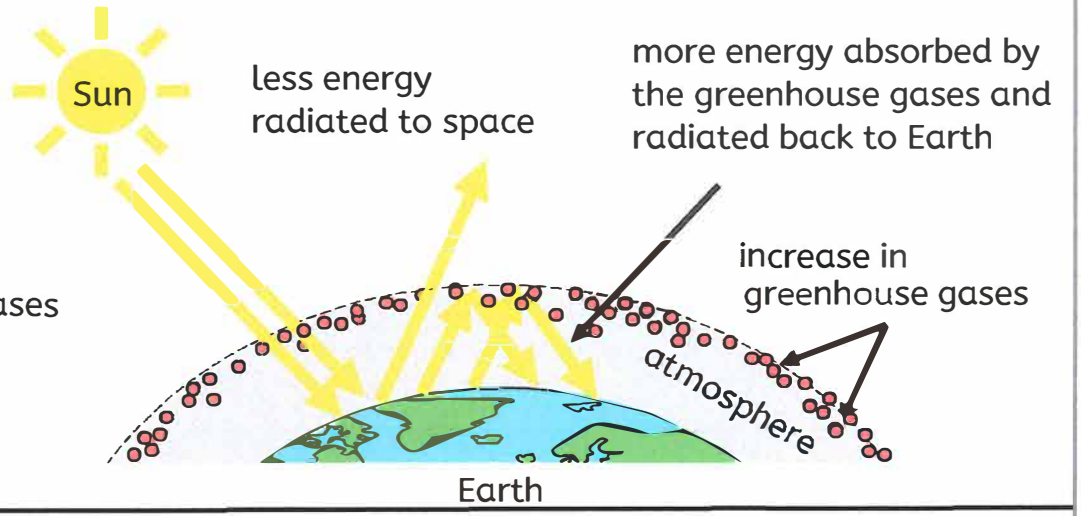


8.02: Earth and the Atmosphere

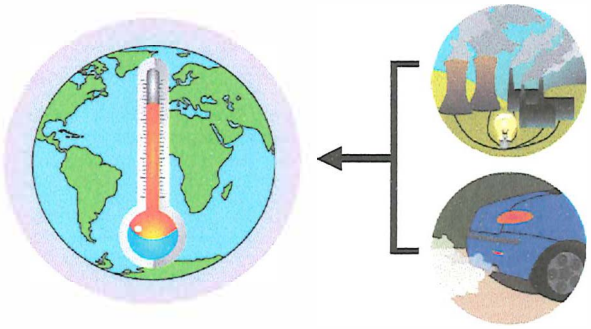
The greenhouse effect, global warming and climate change

Earth's atmosphere contains greenhouse gases (carbon dioxidemethane water vapour), which keep Earth warmer than it would be without them. The greenhouse effect is the natural warming of the planet to habitable temperatures, caused by greenhouse gases. The enhanced greenhouse effect is the unnatural warming of the Earth due to increased greenhouse gases in the atmosphere.



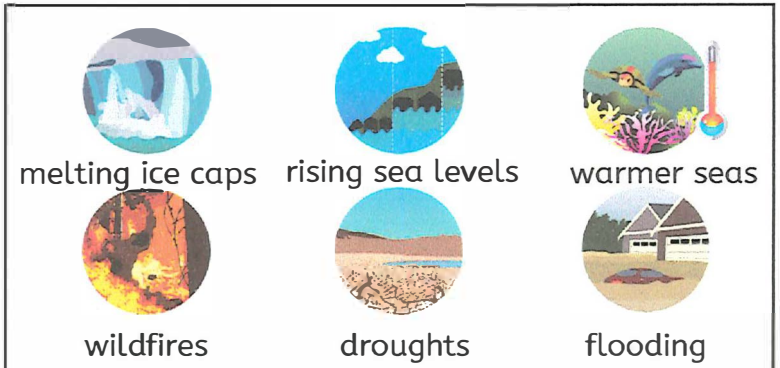


Global warming is the increase in Earth's average temperature, caused by the enhanced greenhouse effect.



Climate change is the change in the Earth's long-term weather patterns, including precipitation, wind and temperature. It leads to social, economic and environmental impacts.

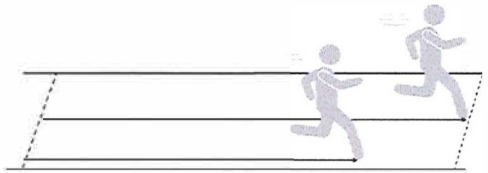
Environmental impacts cause habitat loss, food shortages, wildlife threats, farming issues, water problems, and human displacement.



8.03: Forces and Motion

Speed

- the rate of change of distance



uniform speed = unchanging speed

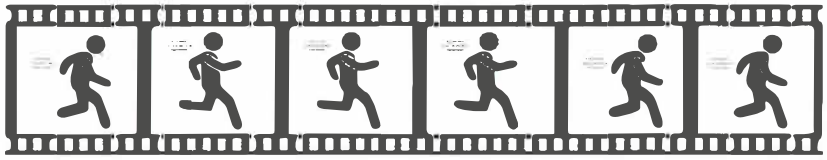
Higher speed:

- greater distance in same time interval
- same distance, shorter time interval

$$\text{average speed} = \frac{\text{distance travelled}}{\text{time taken}}$$

Instantaneous Speed

Speed at a particular moment in time.

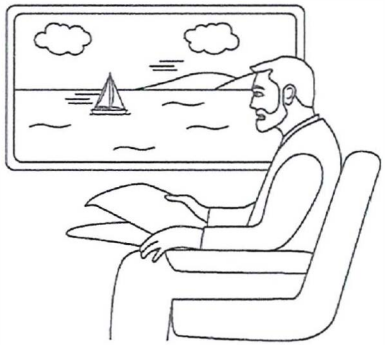


Average Speed

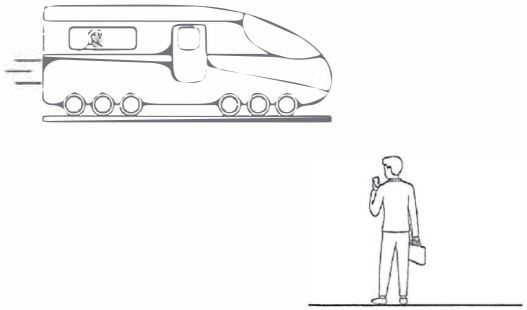
Speed for distance travelled, measured over a longer time interval.

Relative Motion

- movement of one moving object relative to another object
- depends on the frame of reference

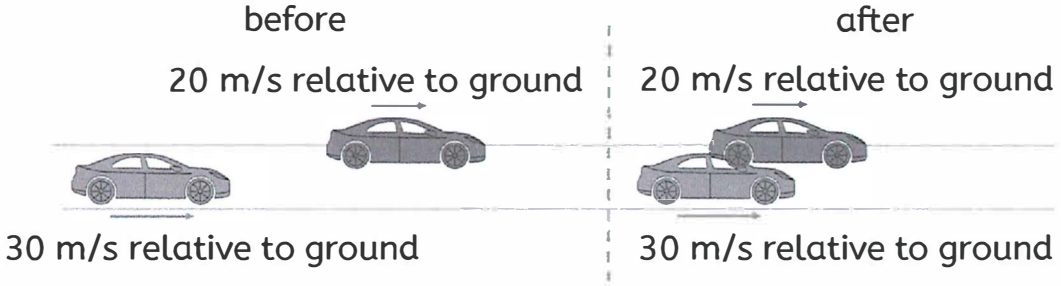


frame of reference: train



frame of reference: ground

Two moving objects relative to the ground

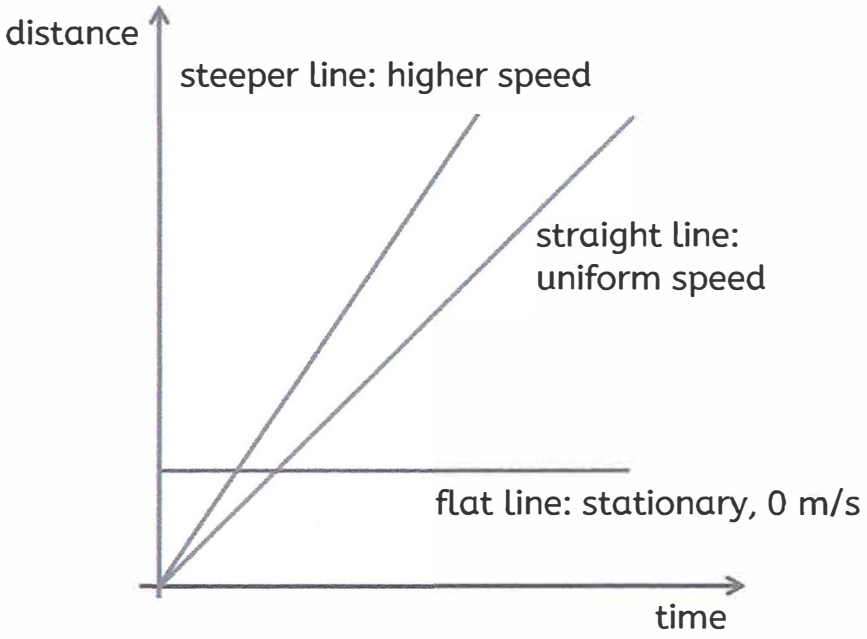


Every second: relative distance changes by 10 m.

Relative speed = 10 m/s

8.03: Forces and Motion

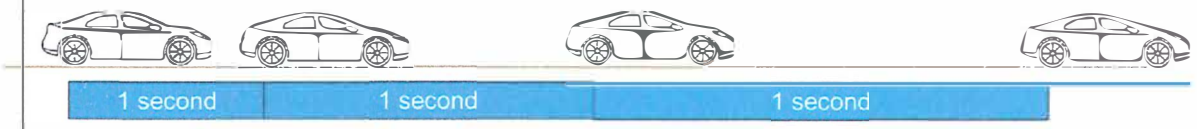
Distance-time Graphs



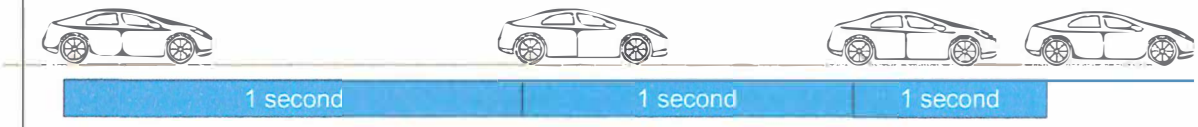
- Measurement results are plotted on a d-t graph.
- Lines-of-best-fit average out an object's position over time.
- Lines indicate general trends of motion.
- Values read off from the line to interpret specific parts of motion.

Acceleration

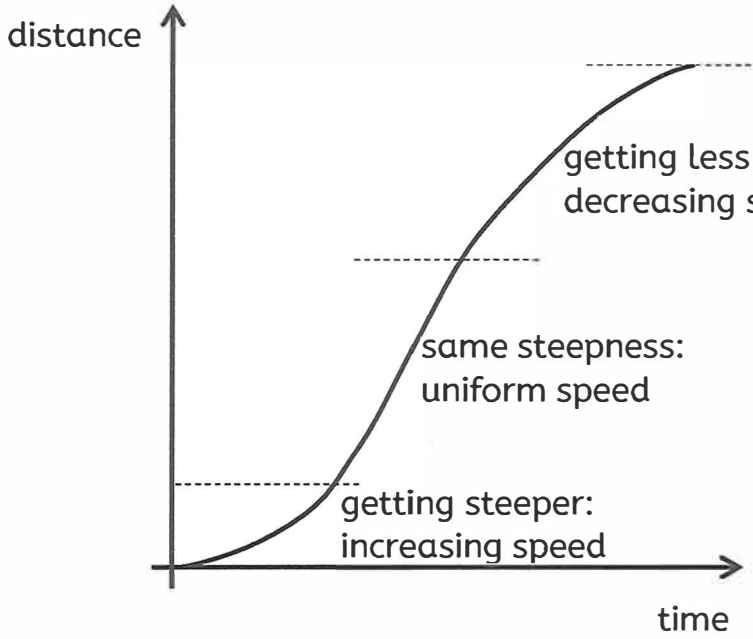
- the change of speed (or direction) over a time interval



increasing speed



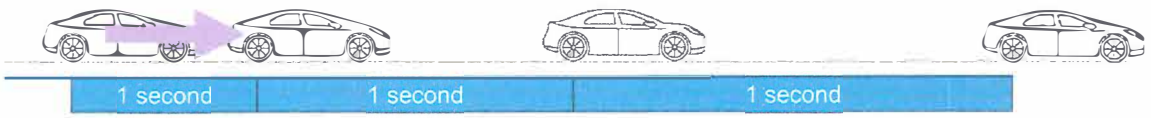
decreasing speed (decelerating)



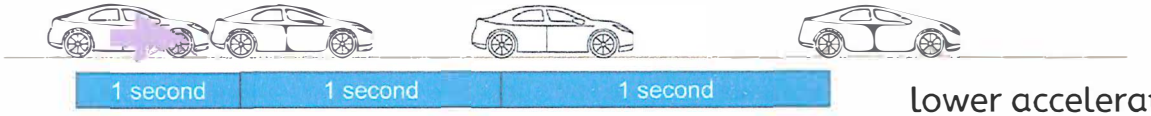
8.03: Forces and Motion

Affects on Acceleration

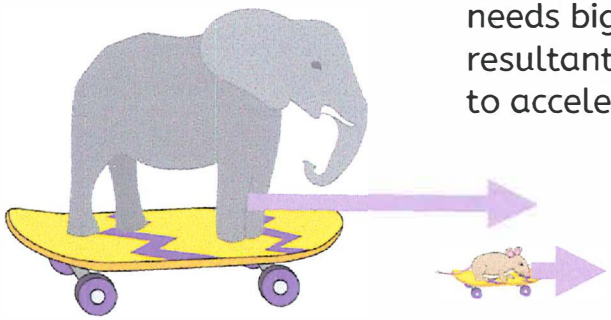
Greater resultant force causes higher acceleration.



higher acceleration

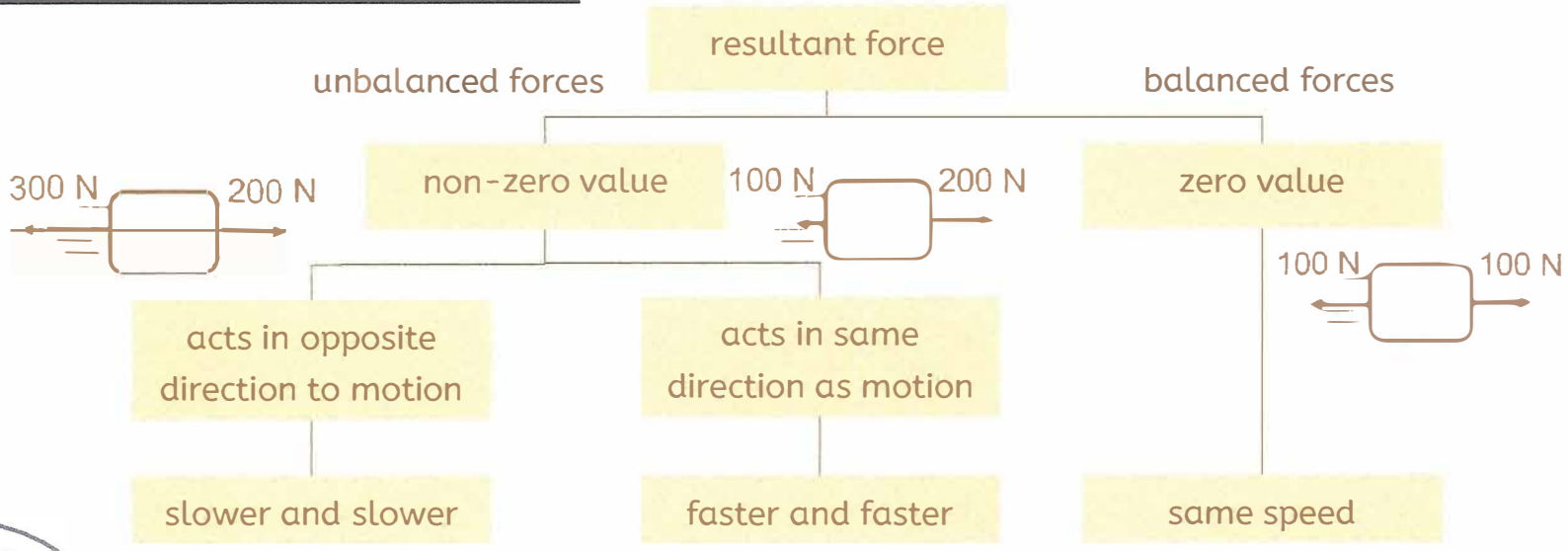


lower acceleration



Greater mass needs bigger resultant force to accelerate.

Resultant Force and Acceleration

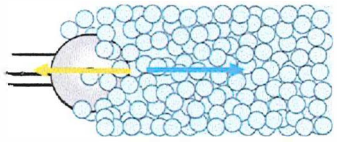


8.03: Forces and Motion

Motion in Fluids

Frictional forces act to **resist motion**

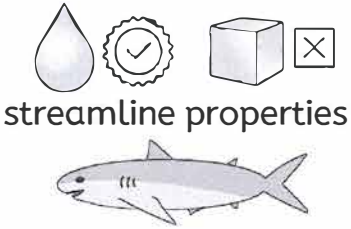
- friction force
- **drag** forces
  - air resistance
  - water resistance



- Relative motion between fluid and object.
- Object pushes forwards on particles of fluid.
- Particles push backwards on object = drag force.

Drag force depends on:

- Material of fluid
- Speed of relative motion
- Shape of object
- Size of front surface
- Smoothness of surface



Propelled: has driving force

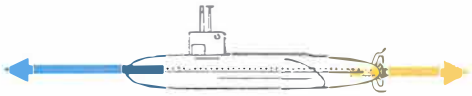
Moving: has drag force

Propelled or Not

moving slowly

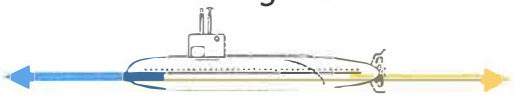
- Resultant force is 0 N: uniform speed, no change to forces

increases thrust



Resultant force ← increasing speed, drag will increase

moving fast



- Resultant force is 0 N: uniform speed, no change to forces

remove propulsion

Resultant force → decreasing speed, drag will decrease

Accelerates until drag equals size of weight.

Parachute released, increases drag, resultant force acts upwards, decreases speed, drag decreases etc.

8.03: Forces and Motion

High-Quality Data

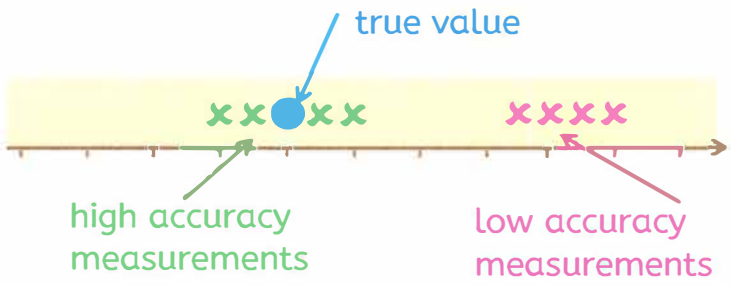
valid data

- with low measurement error
- that is accurate
- that is repeatable
- that is reproducible

- represents the real situation and is trustworthy

accurate data

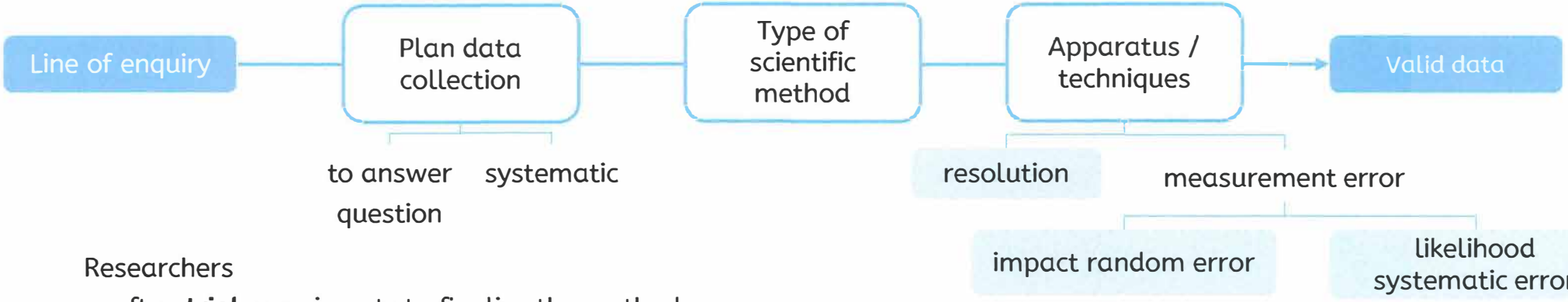
- closeness of a measurement to the true or agreed value.



Developing a Method

Researchers

- select apparatus and techniques known to give accurate data,
- measure over appropriate range, with systematic intervals.



Researchers

- often **trial** experiments to finalise the method.

Safe Practicals

Researchers

- may redesign experiments to reduce risk to acceptable levels.

Hazard	Risk	Control Measure
Falling	• Damage to bones on impact with floor or other fixed objects	• Do not stand on tables, stools etc. • Reduce maximum height to one students can reach.

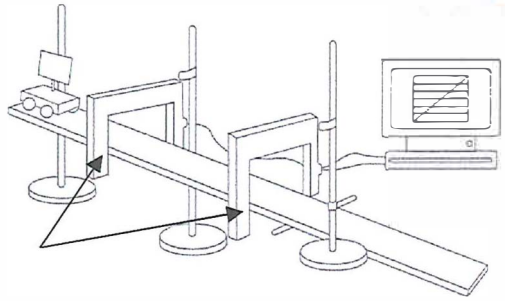
8.03: Forces and Motion

Selecting Apparatus and Techniques

Datalogging

- a process where sensors measure the physical properties of a system

Researcher sets up the constraints on the computer to record data, e.g. time intervals and the logging period.



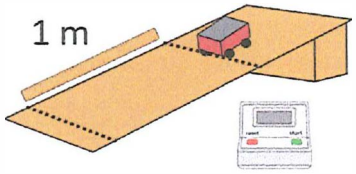
Each light gate is set up to measure time for card to pass; processor calculates speed at each gate.

Digital Filming

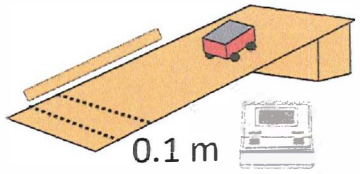
- multiple images recorded (frames); each frame is over a strict time interval

Recorded against a measurement background, any change can be observed.

Measuring Speeds (time and distance)

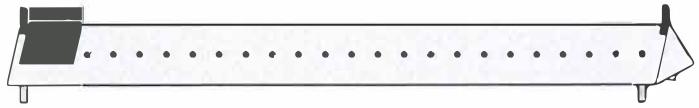


uniform speed – select greater distance



changing speed – select small distances

Ramp is 'banked up' to reduce effect of friction.



Air track removes almost all friction.

Apparatus	Advantages
Datalogging	• over very short intervals • consistent and not subjective • high resolution • removes reaction time (timing)
Digital filming	• not subjective • removes reaction time (timing) • removes measurement error while object moving (distance)

8.03: Forces and Motion

Recording Data

Collected data is generally recorded in a table.

Column headings (describe quantities and units).

IV far left column

Raw data processed, e.g. speed = d ÷ t

Data processed: mean = sum ÷ number

All raw data included

DV furthest right-hand column: processed DV

Repeated measurements with anomalies identified

Rows' values change systematically

CV included

Situation	Distance travelled (m)	Time taken (s)	Average Speed (m/s)	Average Speed (m/s)
Parachute	2.00	1.49	1.34	1.19
	2.00	1.78	1.12	
	2.00	1.78	1.12	
No parachute	2.00	0.17		2.43
	2.00	0.86	2.33	
	2.00	0.79	2.53	

Constant mass

Quantitative values recorded with appropriate significant figures and consistent

Processed values rounded:
Formulae
s.f. same as measurement
Mean
s.f. same as worst measurement

8.03: Forces and Motion

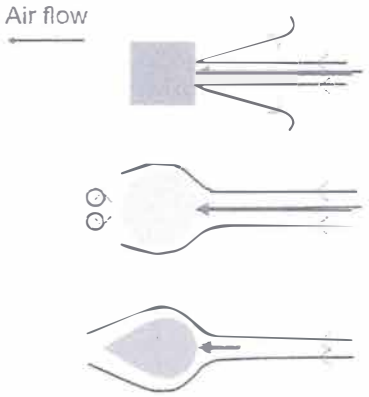
Applications of Technology on Science

Researchers select apparatus that:

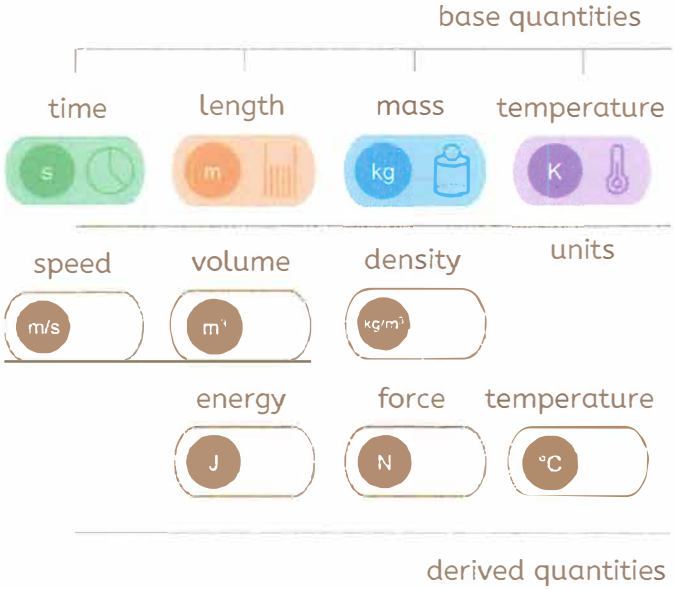
- Restricts control variables.
- Has higher resolution.
- Automates measurement (more often, longer duration).
- Removes random error related to human judgement (subjectivity).

Applications of Science on Industry

Knowledge of fluid flow around objects allows engineers to produce better designs, e.g. more efficient cars.



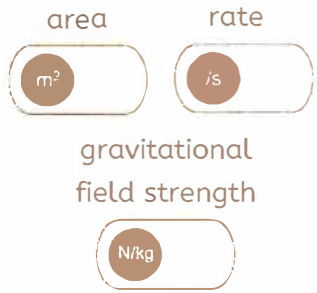
Measurement Values



Quantities and their units:

Base quantities: length, mass, time, temperature (K).

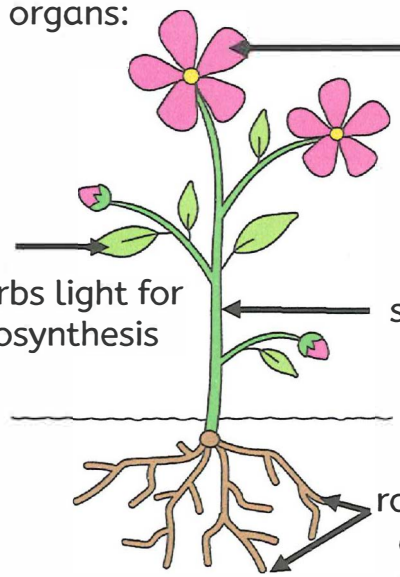
Derived quantities also include:



Plants and Their Processes

Plants as Organisms

Plant organs:



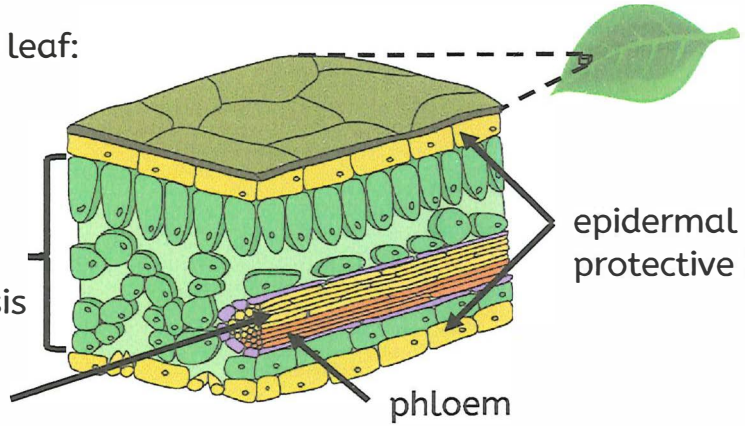
flower
the reproductive organ of the plant

leaf
absorbs light for photosynthesis

stem
connects the other organs and transports key substances

roots
anchor the plant and absorb water and minerals

Tissues in the leaf:



epidermal
protective layer

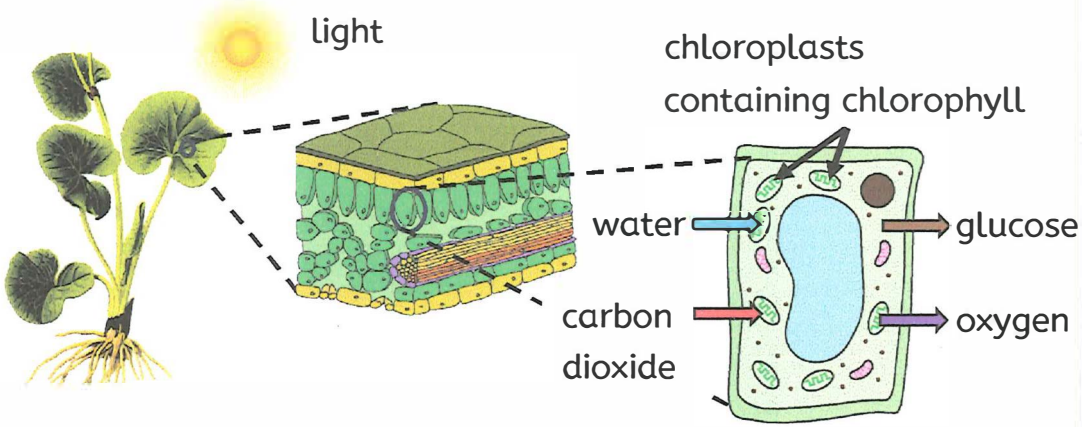
mesophyll
photosynthesis

xylem
transports water and dissolved minerals

phloem
transports dissolved sugars

Photosynthesis

Photosynthesis is a series of chemical reactions in which plants use carbon dioxide and water to make glucose and oxygen, driven by energy from light. Photosynthesis occurs in the chloroplasts and is absorbed by the green pigment called chlorophyll.



carbon dioxide + water → glucose + oxygen

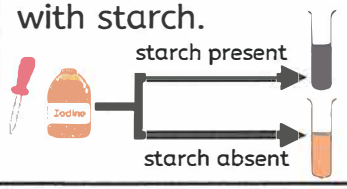
reactants: carbon dioxide + water
products: glucose + oxygen

Uses of glucose:

1. used by the plant for respiration to release energy
2. turned into cellulose to build cell walls
3. turned into starch and stored for use later by the plant

Photosynthesis is an endothermic process because it requires energy to be transferred from its surroundings.

We can test a leaf for starch using iodine. Iodine will turn from orange-brown to blue-black when it is in contact with starch.



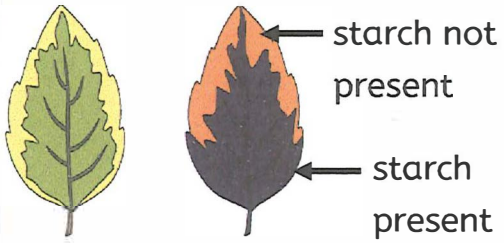
Plants and Their Processes

Photosynthesis Continued

A leaf is tested for starch using the following steps:

Step	Reason
Hold the leaf in the hot water	soften leaf
Cover the leaf with ethanol	remove chlorophyll
Place the boiling tube into the beaker of hot water	speed up removal
Rinse the leaf in the beaker of hot water	soften leaf again
Place the Petri dish containing the leaf on white tile	see colour change
Add a few drops of iodine solution to cover the leaf	test for starch

Results of the iodine test for starch on a variegated leaf:



Only green parts of the leaf photosynthesise and make starch, so iodine stays orange-brown on non-green parts.

When testing for starch, control measures should be taken using the hazardous substances:

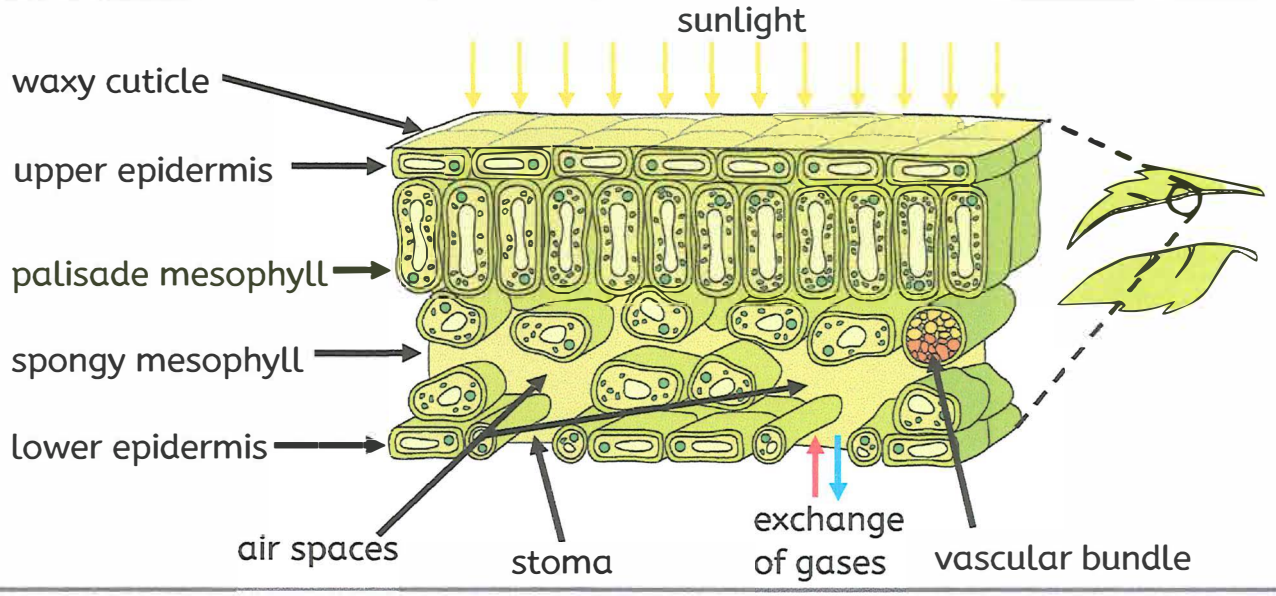
- iodine
- ethanol

Changing Understanding of Photosynthesis

People used to incorrectly believe that plants gain mass by taking in soil through roots. Van Helmont's experiment with the willow tree showed plants gain mass from water, not soil. Today, scientists know that plant mass comes from carbon dioxide, which is used in photosynthesis to make glucose for growth.

Leaf Structure and Adaptations

Leaf adaptation	Function of adaptation
Many chloroplasts	Contain chlorophyll to absorb light
Large surface area	Absorbs more light
Thin	Short diffusion distance for gases
Veins	Transport water, minerals, and sugars
Stomata (underside)	Allow gas exchange (CO_2 in, O_2 out)



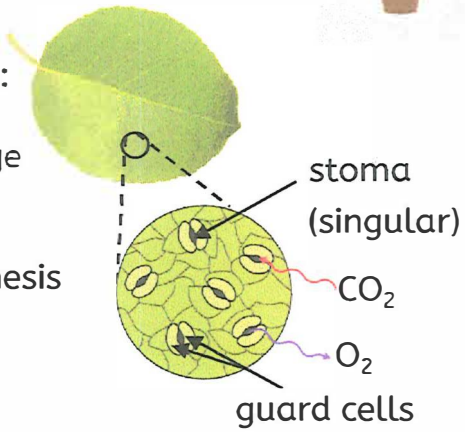
Plants and Their Processes

Leaf Structure and Adaptations Continued

Structure	Function	Adaptation
upper epidermis	allows light to pass through	thin and transparent
palisade mesophyll	photosynthesis	cells have lots of chloroplasts and are tightly packed
spongy mesophyll	supports diffusion of gases in and out of leaf	air spaces
lower epidermis	supports diffusion of gases in and out of leaf	stomata
vascular bundle	transports substances	xylem and phloem tissue
waxy cuticle	reduces water loss	waterproof

Guard cells and gas exchange:

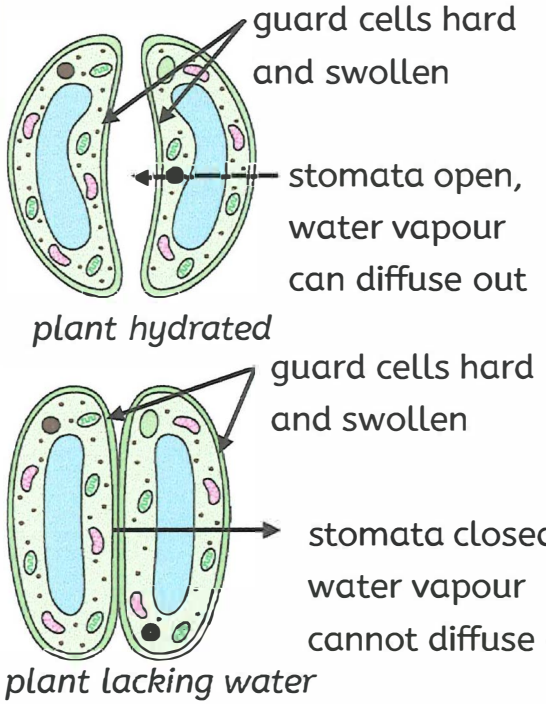
- Control opening/closing of stomata for gas exchange
- Sensitive to light
- Open stomata in day for CO_2 to enter for photosynthesis
- Close stomata at night when photosynthesis stops



A light microscope can be used to observe an imprint of the structure of the stomata. Stomata are on the underside of the leaf because it is cooler and more shaded.

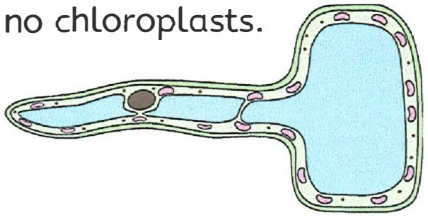
Guard cells and water loss:

- Guard cells open and close stomata to reduce water loss.



Root structure and adaptations

Root hair cells are adapted for the absorption of water and minerals, with a long extension to increase surface area. They contain many mitochondria to provide energy for active transport. They have no chloroplasts.



Water is essential for photosynthesis. It maintains the structure of the plant and enables chemical reactions by acting as a solvent in which reactants and products are dissolved.

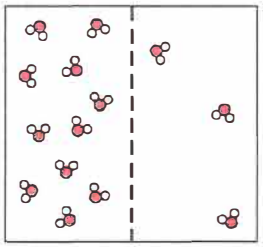
Plants also need minerals:

- Nitrates → healthy growth
- Phosphates → healthy roots
- Potassium → healthy leaves and flowers
- Magnesium → makes chlorophyll

Plants and Their Processes

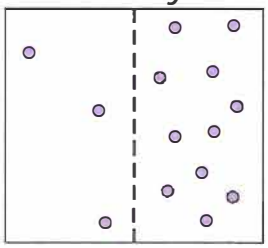
Root Structure and Adaptations Continued

Water is absorbed through osmosis, moving from an area of high water concentration in the soil to an area of lower concentration in root hair cells.



high → low
water concentration

Minerals are absorbed by active transport as they are in lower concentrations in soil than in root hair cells. Active transport requires energy from respiration, so root hair cells contain many mitochondria.

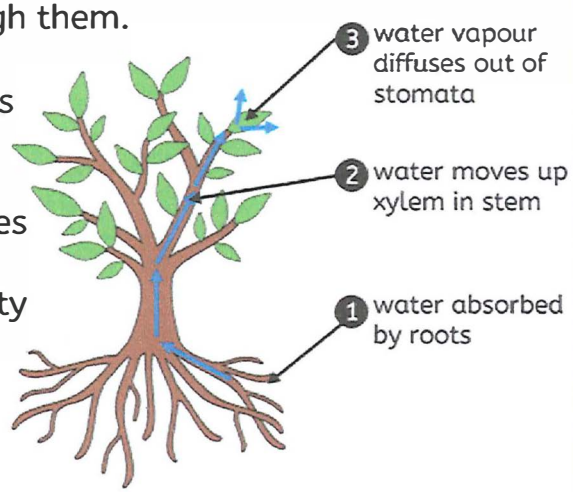


low → high
water concentration

Transpiration is the loss of water vapour from the leaves of plants, through the stomata. When the stomata are open, plants lose water vapour through them.

The rate of transpiration is increased by:

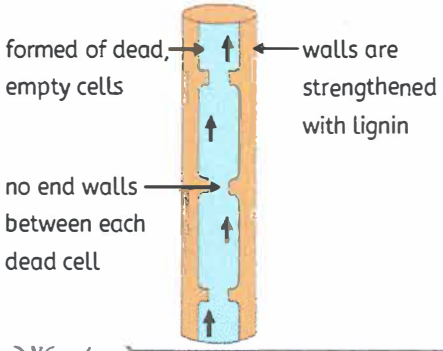
- increased temperatures
- increased light intensity
- increased wind
- decreased humidity



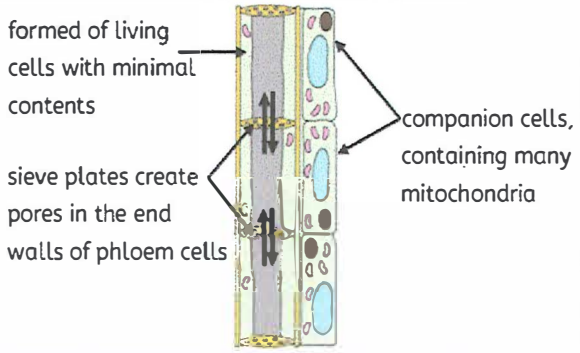
Transport in Plants

Xylem transports water and dissolved minerals up the stem, from roots to leaves. Phloem transports dissolved sugars. Sugars are transported up or down the stem, depending on where sugars are needed.

xylem adaptations



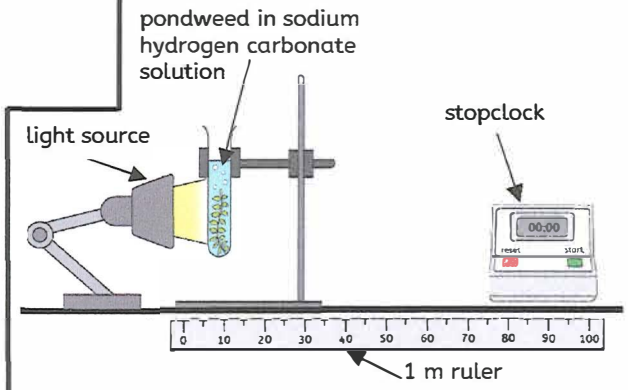
phloem adaptations



Rate of Photosynthesis

An increase in light intensity, temperature, chlorophyll, water and carbon dioxide increases the rate of photosynthesis.

Effect of light intensity on rate of photosynthesis



Variables

Independent: light intensity - distance between light and pondweed

Dependent: rate of photosynthesis - number of bubbles per minute

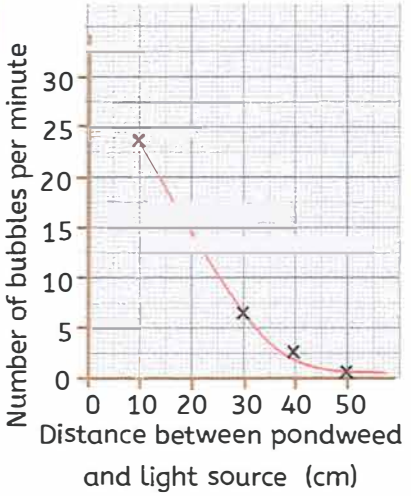
Control: temperature, CO_2, water, chlorophyll, time, size/mass of pondweed

Plants and Their Processes

Rate of Photosynthesis Continued

Step	Explanation
1. Set up the LED light source and meter ruler	it doesn't heat up during use, so temperature won't be affected
2. Fill the boiling tube with the sodium hydrogen carbonate solution	to provide carbon dioxide
3. Put the piece of pondweed into the boiling tube with the cut end at the top and keep it underwater	to observe bubbles of oxygen
4. Place the boiling tube with pondweed 10cm from the light source	this is the first independent variable light intensity to test
5. Leave the pondweed for three minutes	allows the photosynthesis rate to stabilise

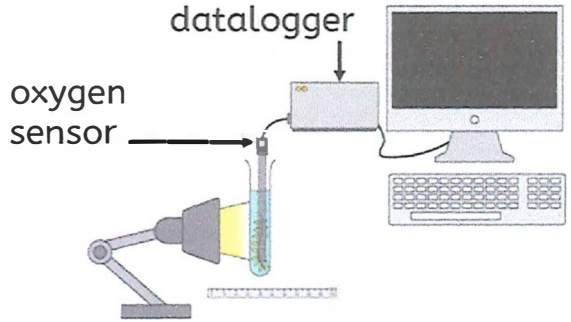
Typical results



As the distance between the pondweed and light increases, the number of bubbles per minute decreases. This is because less energy is transferred and absorbed by the chlorophyll for photosynthesis.

Datalogging and technology in science

Datalogging: Automatic data collection using sensors and computers (e.g. light, temperature, oxygen). Data is recorded at regular intervals (e.g., every second or minute). Technology improves experiments: Cameras, sensors, and computers make observations clearer and more accurate.

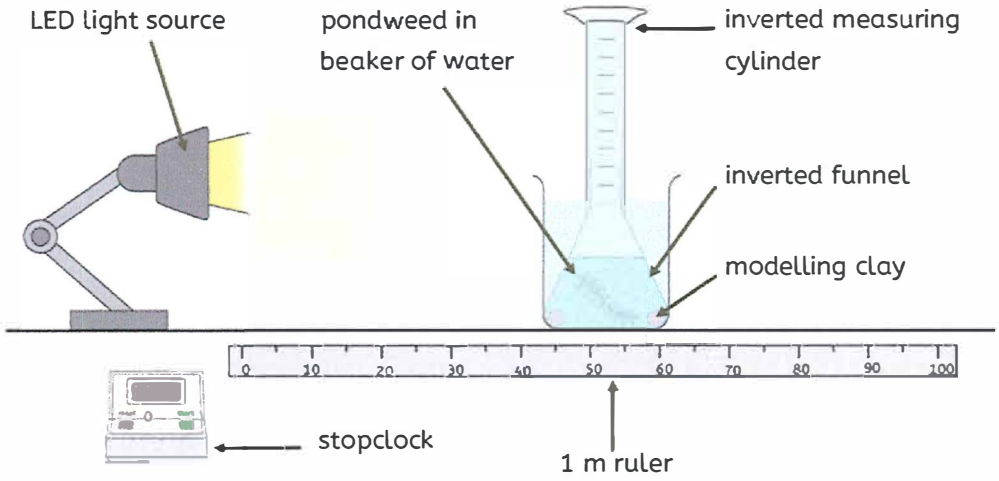


Limitations and improvements in measuring photosynthesis

Counting bubbles → Simple but inaccurate and biased (bubble size, bubble speed).

Better method → Measure volume of oxygen using inverted funnel and measuring cylinder (more accurate, objective).

Digital tools → Data loggers collect continuous data, reduce error and bias, improve validity and analysis.

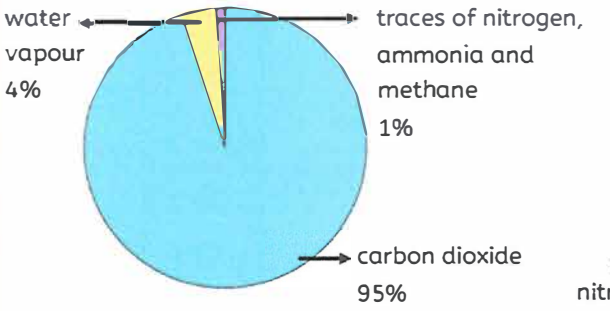


Plants and Their Processes

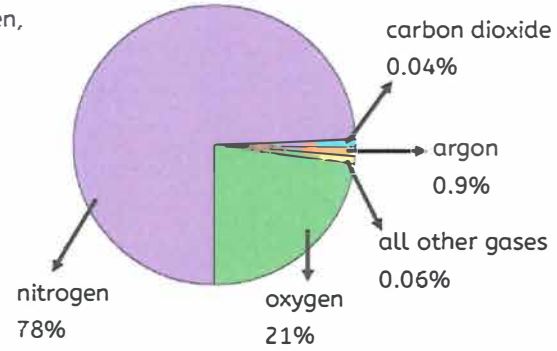
Plants and the Atmosphere

Early Earth's atmosphere was mostly carbon dioxide, with almost no oxygen. Over time, oxygen rose and CO_2 fell.

Earth's early atmosphere

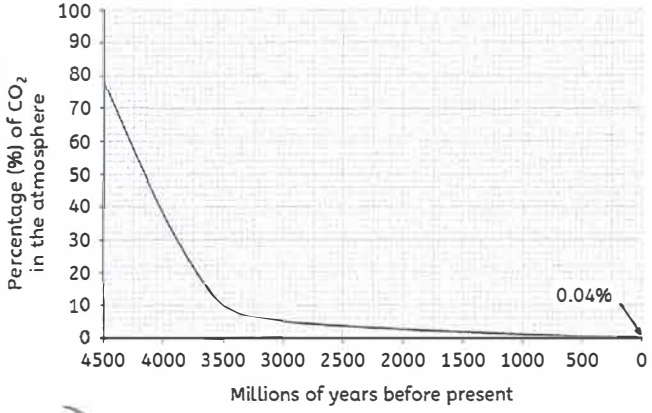


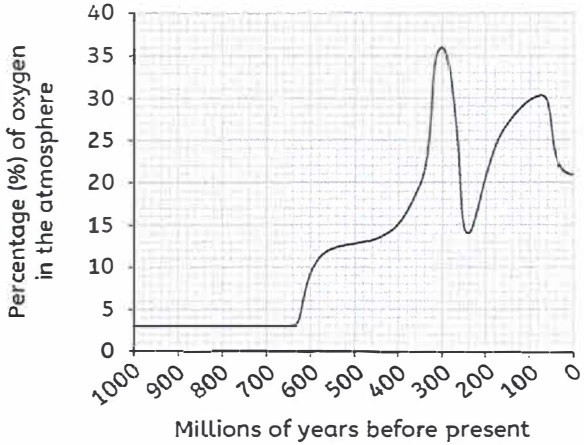
Earth's atmosphere today



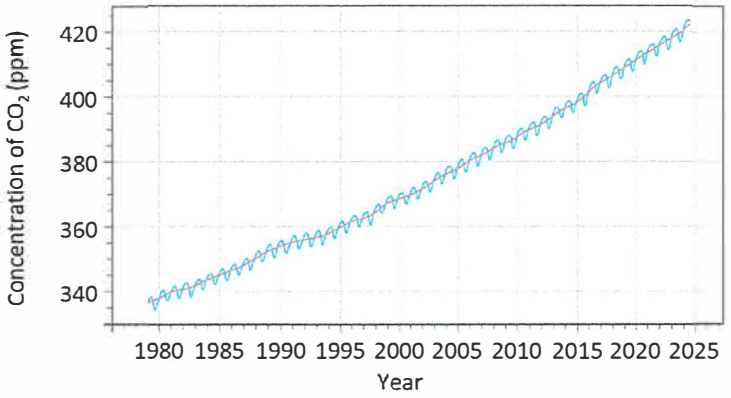
Carbon dioxide levels decreased because the oceans formed and carbon dioxide dissolved into them. Plants and algae then used it in photosynthesis.

Oxygen levels increased because algae and plants released oxygen during photosynthesis. Fluctuations occurred because early oxygen was absorbed by oceans and seabed rocks.





Global carbon dioxide measurements



Deforestation reduces the number of plants, increasing carbon dioxide levels.

Plants as Producers

- Plants are producers that make their own food through photosynthesis. Plants provide food for humans and other animals, forming the basis of food chains.
- Foods that contain starch can be identified using iodine.
- Raw data in tables may need to be processed by finding frequency.
- Insect pollination is essential for crop growth and food production.
- A significant portion of our food relies on pollinators.
- The decline in bee populations threatens food security.

Starch Test Result	Tally	Frequency
Starch present	𝍸 𝍸 𝍸 ///	18
No starch	𝍸 𝍸 //	12

8.05: Electricity 1

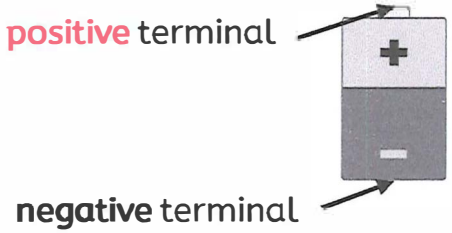
Electric Circuits

- A complete conducting loop
- Components connected into circuit by two electrical contact points
- With an energy source

Circuit Symbols

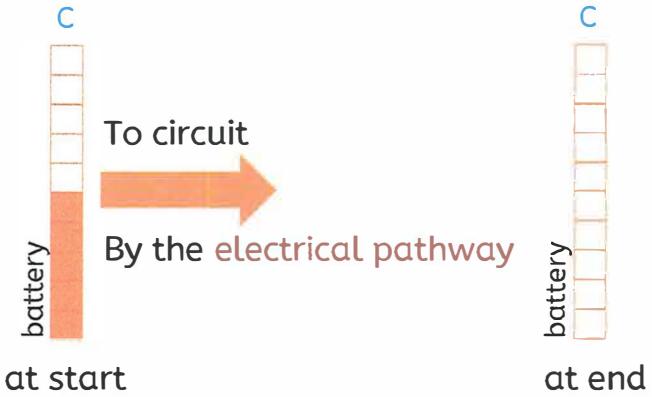
component	symbol
wire	
switch (open)	
cell (battery)	
bulb	
motor	M
buzzer	

Batteries



- An energy source for circuits
- Two terminals
- Chemical reaction of reactants inside when terminals connected in a circuit

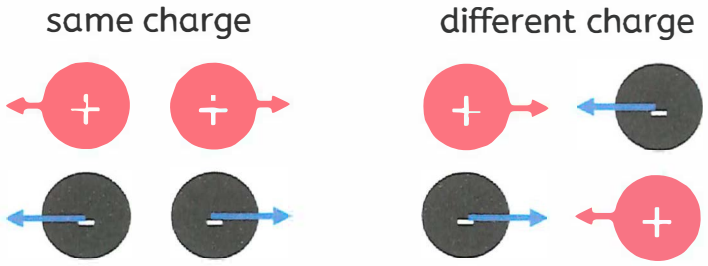
- Batteries run down when the circuit is working



Electrostatic Force

- All electrical effects are caused by an electrostatic force
- Acts between charged objects
- Electrical charge is a property of some objects

Effects of Electrostatic Force



8.05: Electricity 1

Electrical Conductors

poor electrical conductor

Particles with no separation, fixed in position, vibrating

good electrical conductor

Also has freely moving charged particles of the same type

In a Working Circuit

- Particles carrying same charge
- Electrostatic forces exerted
- Repel

- One charged particle caused to move
- Repels nearby charged particle
- Net movement of all charged particles
- At the same time

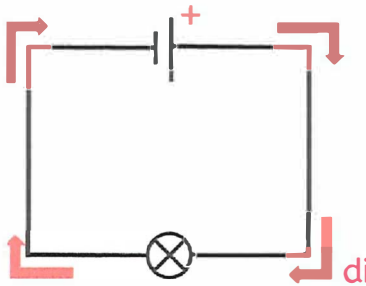
Electric Current

- Rate of flow of charge, measured in amps (A)

These particles carry a total of 1 C of charge.

If all pass this point in one second, the size of the current is 1 A.

$$\text{current (A)} = \frac{\text{charge flow (C)}}{\text{time taken (s)}}$$



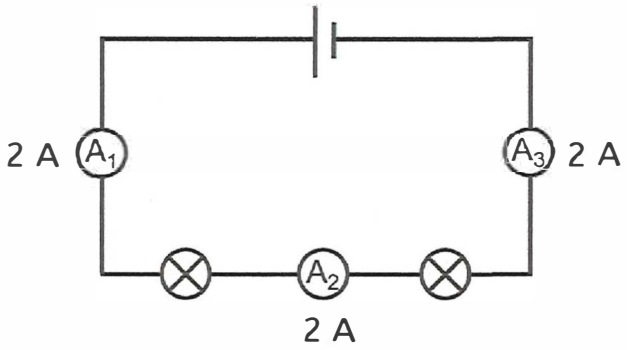
Current flows 'from positive to negative'

direction of conventional current

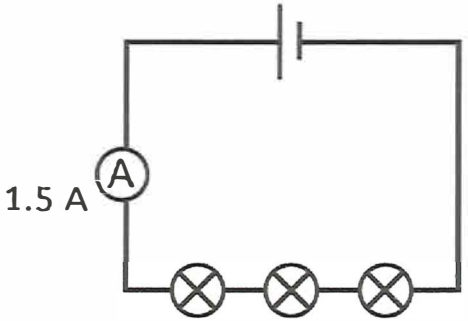
8.05: Electricity 1

Electric current is

- a quantity
- **the same size** in all parts of a series circuit



Changing Number of Components

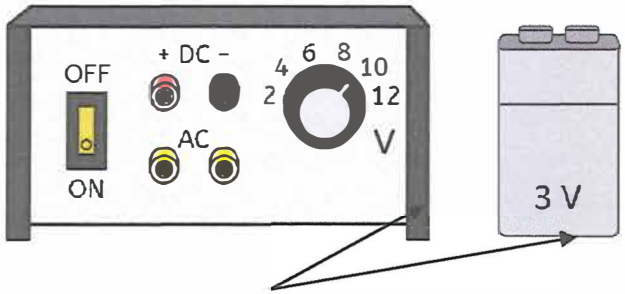


More components

- Each component resists flow of charged particles
- Harder for current to flow
- Current decreases

Voltage

- an electrical push



All energy sources for circuits have a **voltage**.

Changing Voltage

1.5 V → electrostatic force on charged particle by battery

3.0 V → greater electrostatic force on charge particle by battery

- A **higher voltage** of battery provides a **greater push** on the current.

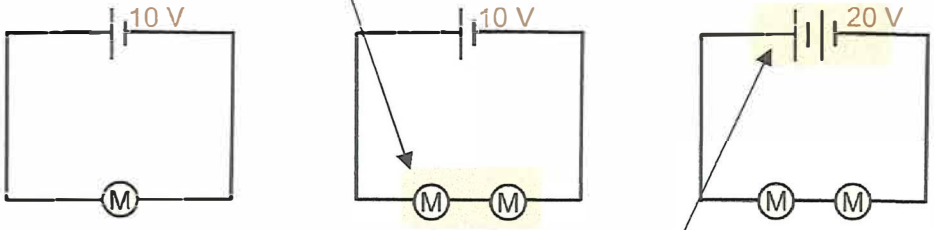
8.05: Electricity 1

	 buzzer	 bulb	 motor
increasing voltage of energy source	gets louder	gets brighter	gets faster
increasing number of devices	each gets quieter	each gets dimmer	each gets slower

Changing Number of Components

More components:

- harder to push current through the circuit
- decreases current

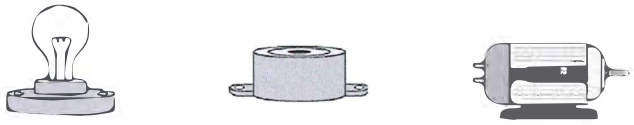


Increase voltage:

- though harder to push current
- battery pushes harder
- increases current again

Energy Transfer in Circuits

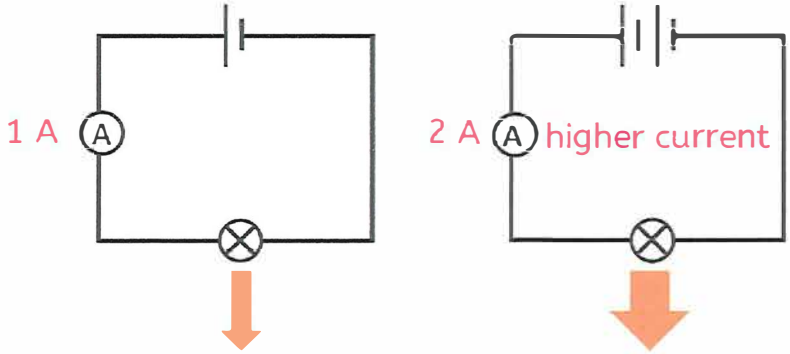
charged particles/ current by electrical pathway



by radiation pathway

by mechanical pathway

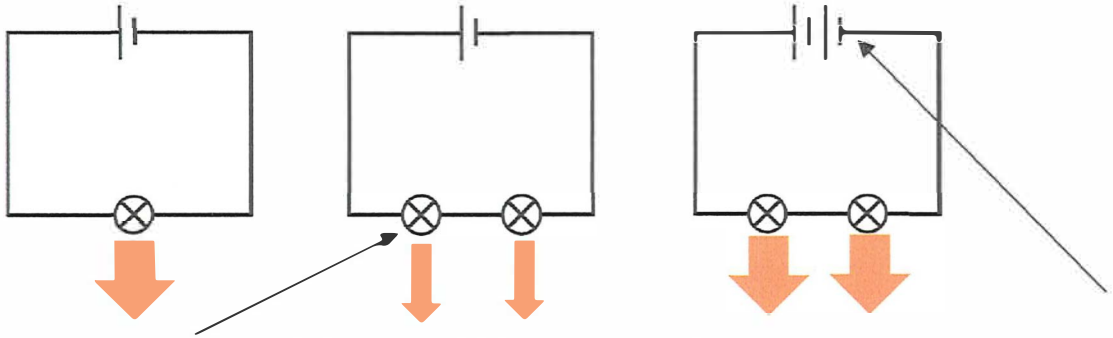
Changing Voltage



bulb **working harder** brighter

8.05: Electricity 1

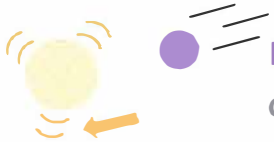
Changing Number of Components



- Harder to push current through two components
- Current decreases
- Less energy transferred each second

- More energy needed to push current with same effect
- Increase voltage

Dissipated Energy



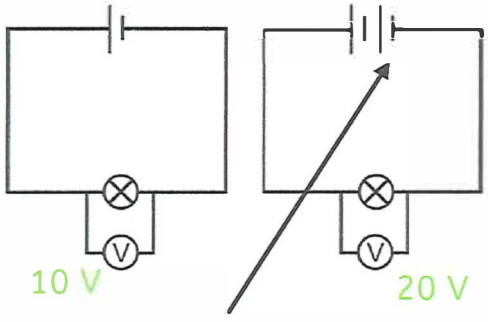
Moving charged particles collide with fixed particles

Energy transfers to particles of circuit

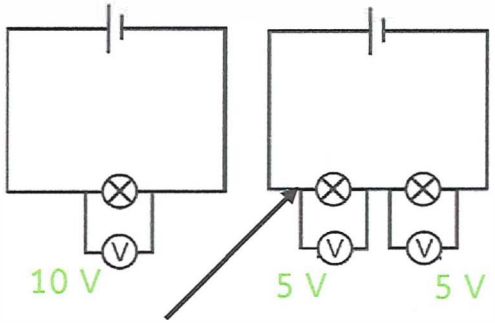
Fixed particles vibrate more
Components get hotter

- **Thermal store** of surroundings increases

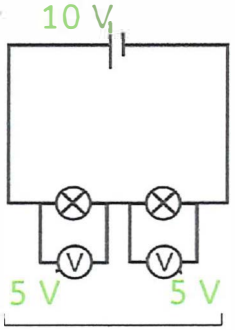
Voltage Across Components



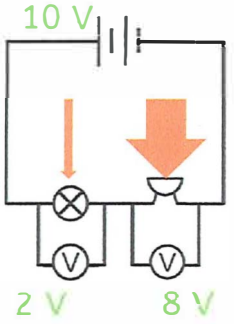
If supply voltage increases, voltage across each bulb increases



If number of bulbs increases, voltage across each bulbs decreases



The sum of the voltages across components equals the supply voltage



Current is same through both components.

Greater voltage across buzzer

More energy transferred at buzzer

It must be harder to push current through buzzer than bulb

8.05: Electricity 1

Comparing Terms

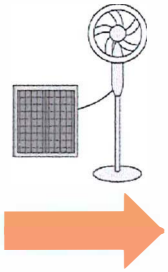
electricity — The flow of charged particles

current	voltage	energy transfer
The **rate of flow** of one coulomb of charge	The 'electrical **push**' on the current	The effect of how hard it is for the current to be pushed between two points

Power

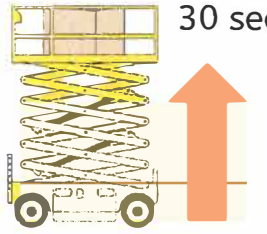
- rate of energy transfer by an object, measured in watts (W)

More Powerful



a **higher current** is flowing

greater rate of energy transfer



30 seconds

a force moves the box in **less time**

greater rate of energy transfer

$$\text{power (W)} = \frac{\text{energy transferred (J)}}{\text{time taken (s)}}$$

Domestic Appliances

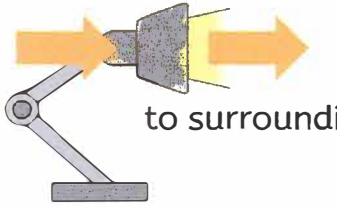
Lower power appliance → less energy each second

Higher power appliance → more energy each second

- Work faster, work harder or go further
- Appliances that heat need to be most powerful

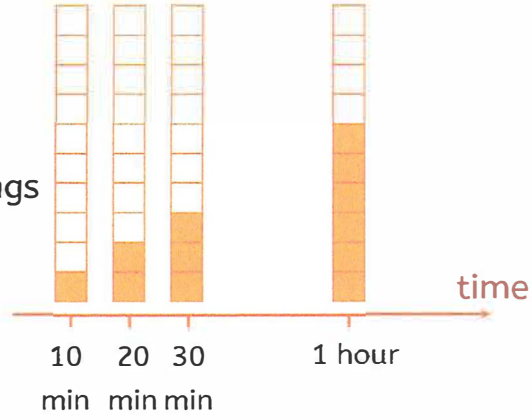
Working Over Time

from current



to surroundings

100 W



8.05: Electricity 1

Costs of Electricity

Electricity companies supply households

Households are charged:

- for the number of domestic electrical units supplied
- a standing charge

cost (p) = number of units (kWh) x price per unit (p)

Air Fryer
Model: AF100UK JM1
220-240V ~ 50-60Hz 1550W

One unit = one kWh

energy supplied (kWh) = power (kW) × time (h)

- If power is in watts, it is converted to **kilowatts**
- If time used for is in seconds, it is converted to **hours**

Sources of Electricity

- Electricity is a **secondary source** of energy
- The UK electricity supplies originate from primary sources

fossil fuels (coal, oil and natural gas)

nuclear fuel

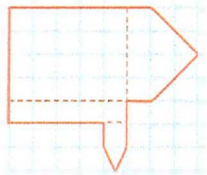
renewables (wind, solar etc.)

raw resources

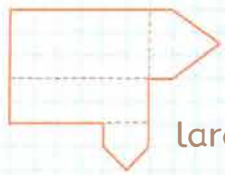
- There are disadvantages to using any source
- **Using less electricity** (or any energy source) saves money and is better for the environment

Efficiency

More efficient



Less efficient



less energy transferred usefully

larger proportion wasted

More efficient appliances cost less and cause less environmental damage - only if they are not used more.

8.05: Electricity 1

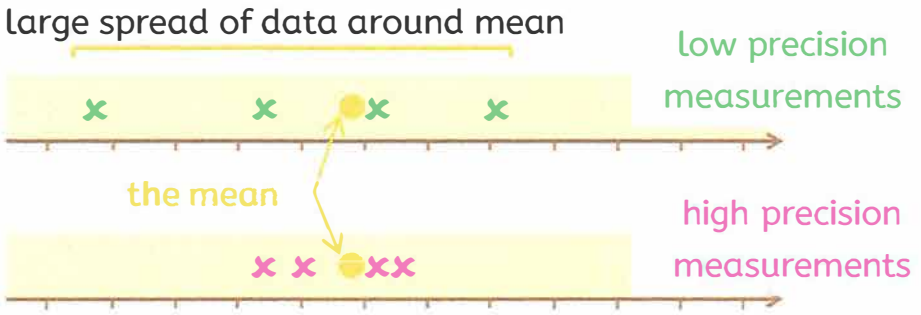
Validity

valid data

- with low measurement error
- that is accurate
- that is precise
- that is repeatable
- that is reproducible

- represents the real situation and is trustworthy

Precision Measurements are precise if there is little spread around the mean.



Developing the Method

Researchers plan to collect valid data:

- select apparatus and techniques known to give accurate and precise data
- measure over appropriate range, with systematic intervals
- often **trial** experiments to finalise the method

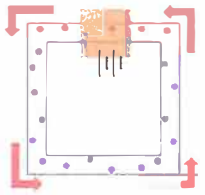
Interpreting Data

Researchers ensure all data is included in their report before publication:

- Collected data, including control variable data
- Processed data, for example, means and calculated results

Electric Circuit Model

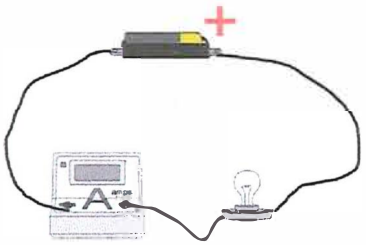
- Charged particles are all part of the circuit; no charged particles are lost from it
- The energy source provides an 'electrical push' on the nearby charged particles
- Their movement affects others and so on
- All charged particles start to move at the same time, drifting at the same rate, in the same direction



8.05: Electricity 1

Selecting Apparatus and Techniques

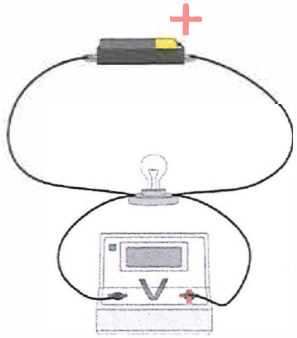
Measuring Current



An **ammeter** measures the size of the **electric current** flowing in a part of a circuit.

Connect **in series** to components.

Measuring Voltage



A **voltmeter** measures the **voltage**, the **push** exerted **on the current** to **transfer energy to the component**.

Connect **across** the two contact points of a component.

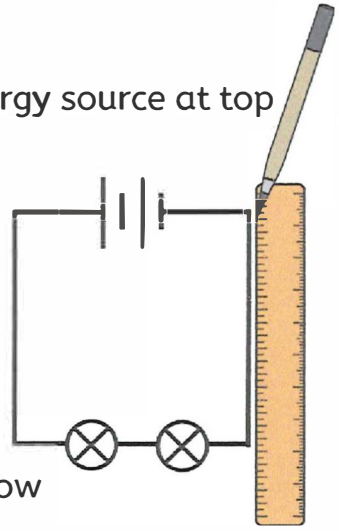
Circuit Set-Up

Series circuits are set up, so that there is

- A single, complete conducting loop
- With one component following another

Circuit Diagrams

- Represent real circuits.
- Simplify connections between components.



Energy source at top

Use a **ruler** and **pencil**

No gaps between wires and components

'Big' diagram e.g. eight lines deep

Devices in a row

Use **circuit symbols**

8.05: Electricity 1

Applications of Science on Industry

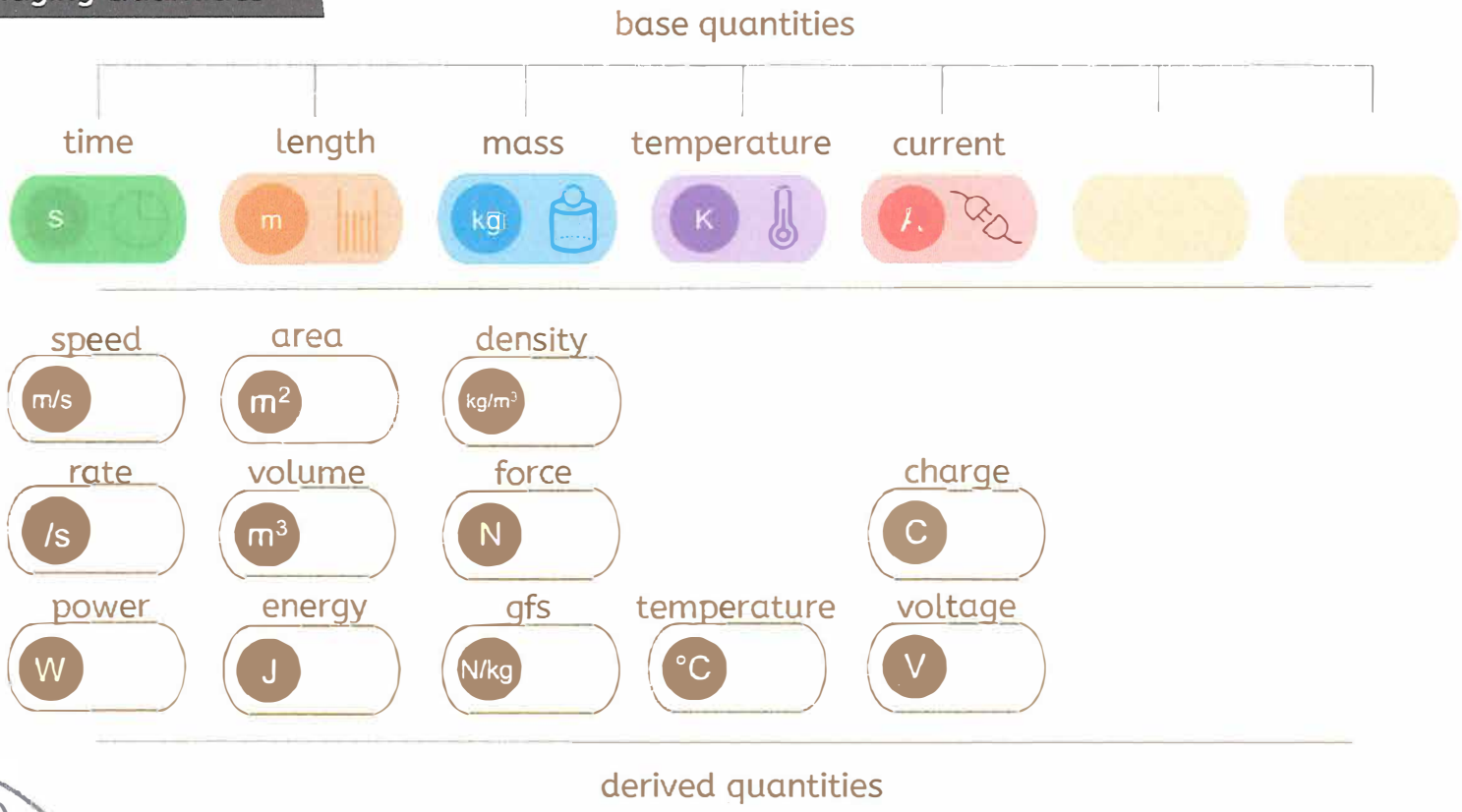
Mechanical engineers use scientific knowledge to design solutions to our energy needs:

Electrified Transport

- Cars
- Buses
- Trains
- Trams
- Lorries

Less air pollution
Less greenhouse gases
More demand for electricity
More demand for (new) raw materials

Managing Quantities



Converting Quantities

1000 W = 1 kW

÷ 1000

60 min = 1 h

÷ 60

Interactions and Interdependence

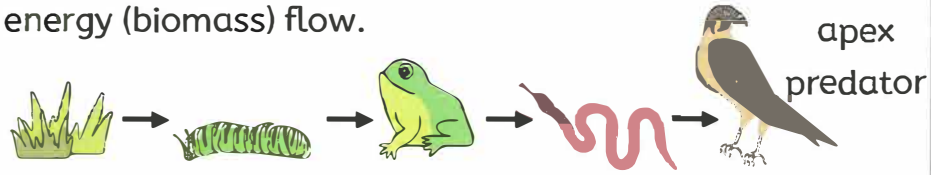
Interdependence

Key term	Definition
Population	A group of organisms of the same species living in an area
Community	A group of different populations living in the same area and interacting
Ecosystem	A community of living organisms interacting with each other and their non-living surroundings (e.g. soil, rocks, water, air, light)

Feeding relationships are shown in food chain diagrams. The trophic level is the position of an organism in a **food chain**. Food chains always start with a **producer** and end with a **consumer**.

Biomass is the dry mass of one or more organisms. It is transferred through feeding relationships.

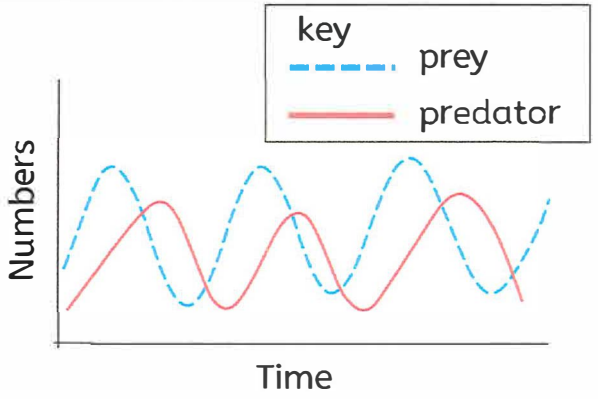
Arrows indicate the direction of energy (biomass) flow.



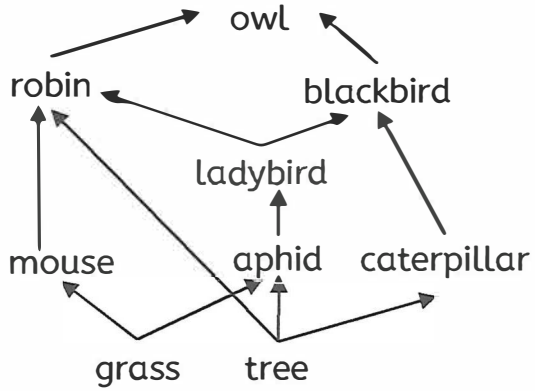
The **size of a population** is the number of organisms of one species living in a particular area and **changes due to births**, **deaths** and **migration**. These processes are affected by factors such as **new predators**, **disease**, **seasonal changes**, **natural disasters** and **human activities** like habitat destruction or conservation.

All species in an ecosystem are **interdependent.** They depend on each other for resources like food, shelter, oxygen and minerals.

Changes in one population affects others.



- **Predator** and **prey** populations are **interdependent**: more prey means predator numbers rise, but as predators increase, prey numbers fall, causing predator numbers to drop later.
- This cycle, with a time **lag between peaks**, helps maintain a **stable community** where populations stay relatively constant.



Food webs show interconnected food chains and energy transfer, giving a more realistic picture of feeding relationships. Changes in one population can have impacts throughout the food web, including indirect impacts through competition or shared resources. Human activities can also disrupt this balance.

Interactions and Interdependence

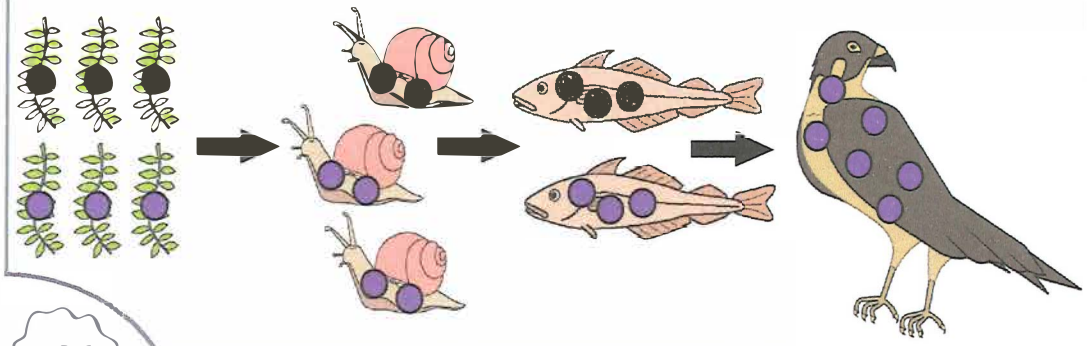
Bioaccumulation

- **Fertilisers** supply minerals like nitrates and phosphates to help plants grow and boost food production.
- **Fertilisers** can reduce minerals in soils and pollute water, causing algae to overgrow on the top of the water and block sunlight. This kills producers and disrupts food chains.

- **Pesticides** kill pests to protect crops. **Herbicides** kill producer pests and **insecticides** kill consumer pests.
- Pesticides can also harm pollinators, beneficial insects, and other nearby plants. This reduces producers and pollinators, disrupting food chains and ecosystems, and can even lower crop production in the long term.

Bioaccumulation happens when **toxic substances**, like pesticides, build up in organisms because they cannot be broken down. These toxic substances pass along food chains and become more concentrated at each trophic level, which can harm or kill top predators.

● = toxic substance e.g. pesticide

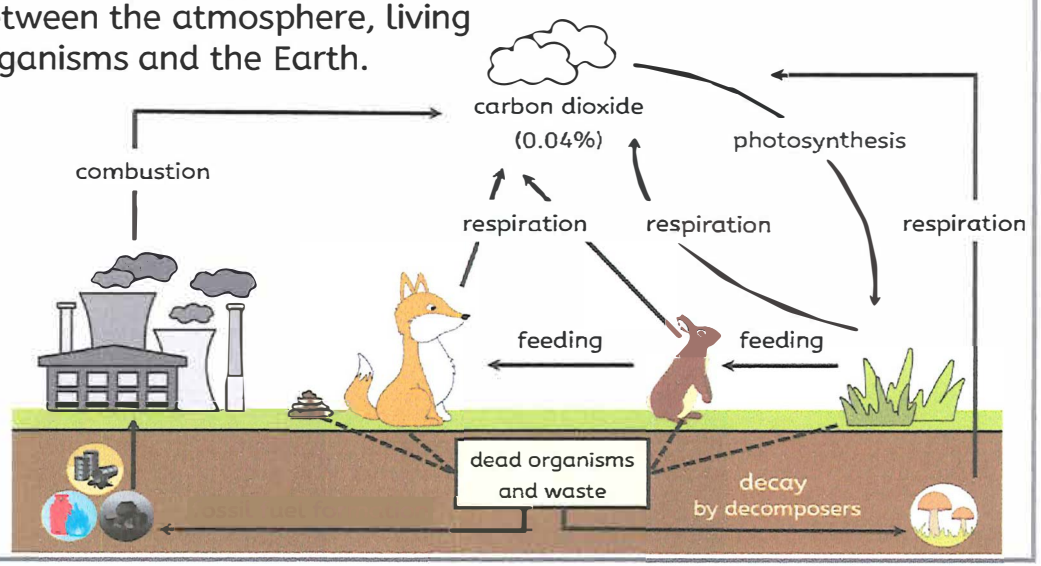


Materials Cycling

- **Decay** is the breakdown of dead organisms and waste by **decomposers**.
- Decay recycles nutrients by releasing them back into the ground, so that it can be used for new plant growth and to support food chains.
- Decay also returns carbon dioxide to the atmosphere for photosynthesis, cleans the environment, and helps with fossil formation by breaking down the soft tissues of a dead organism and leaving behind hard parts.

The **ideal conditions** for decay are:
1. **Plenty of oxygen**, so that decomposers can respire.
2. **Warm temperatures** so that decomposers are more active.
3. **Moisture** to allow chemical reactions to take place.

The **carbon cycle** is a closed system that continuously recycles carbon between the atmosphere, living organisms and the Earth.



Interactions and Interdependence

Classification

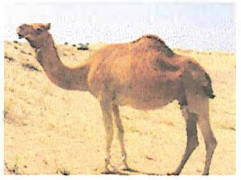
- **Classification** is the sorting of items into groups based on shared characteristics. The scientific practice of classifying organisms is called **taxonomy**.
- Organisms can be classified based on observable physical features and microscopic characteristics such as cell structure.
- **Carl Linnaeus** developed the modern classification system. Organisms are grouped into kingdom, phylum, class, order, family, genus and species.
- **Kingdom** is the largest group, with many organisms.
- **Species** is the smallest group, with just one type of organism.
- Classification helps scientists identify and name organisms accurately, track species for conservation, predict characteristics, understand relationships and study evolution.

An **adaptation** is a characteristic that allows an organism to compete, survive and reproduce in its environment. Adaptations can be:

- **Structural** (physical features like thick fur, sharp claws and spines on plants)
- **Behavioural** (actions like migration, huddling for warmth and growing towards light)
- **Functional** (internal processes like producing venom, conserving water and slowing heart rate during hibernation).

Competition and Adaptation

- **Competition** is the struggle between organisms for the same limited resource. The more similar the needs, the more intense the competition.
- Animals compete for food, water, shelter and mates.
- Plants compete for sunlight, water, minerals, space, pollinators and seed dispersers.
- **Interspecific competition** occurs between different species and **intraspecific competition** occurs within the same species.

 Polar bear	White coat → camouflage Large paws → spread weight over ice Thick layer of fat → insulation to keep warm Thick coat → insulation to keep warm Small ears → small surface area Small tail → small surface area Sharp claws →kill prey and grip ice Sharp teeth → kill and eat prey
 Camel	Hump with fat → stay cool (fat in one place) Sandy colour → camouflage Large feet → spread weight over sand Long eyelashes → keep sand out Minimal sweat/ urine → conserve water
 Cactus	Shallow long roots → absorb water quickly Waxy skin → minimise water loss Thick fleshy stems → store water Spines instead of leaves → reduce water loss Spines → protection from being eaten

Interactions and Interdependence

Natural Selection, Evolution and Extinction

Individuals within a species show genetic variation because offspring inherit a random mix of **genes** from their parents. This causes differences in **characteristics**, some of which give an **advantage in competition** and make individuals **better adapted to survive and reproduce**.

- **Natural selection** is a process by which organisms that are better adapted to their environment (due to genetic variation) are more likely to survive, reproduce and pass on their genes to their offspring.
- Over many generations, these beneficial characteristics become more common in the population.
- This idea was proposed by Charles Darwin.
- The process of natural selection involves the following steps:

1. Variation	Individuals within a species have different characteristics due to random genetic variation.
2. Advantage	Some characteristics can give individuals an advantage.
3. Competition	This advantage make them more likely to compete successfully.
4. Survival	This makes them more likely to survive.
5. Reproduction	They are more likely to reproduce and have offspring.
6. Inheritance	They are more likely to pass on their genes to their offspring. Over generations these characteristics become more common.

- **Evolution** is the process in which the characteristics of species change over many generations, sometimes leading to new species.
- Darwin's theory of natural selection explains how evolution occurs : organisms better adapted to their environment survive, reproduce and pass on their genes.
- Over billions of years, life evolved from simple ancestors into more complex organisms.
- **Fossil evidence** supports this scientific theory, showing older rocks contain simple organisms and newer rocks contain more complex ones, despite gaps in the fossil record.

- **Extinction** is the complete loss of all members of a species because it could not adapt to its environment.
- Causes of extinction include climate change, habitat destruction, pollution, new diseases, new predators, new competitors and natural disasters.
- Human activities like deforestation, overhunting, introducing species and climate change make extinction more likely.
- Species at risk of extinction are called **endangered**.

Datalogging and Technology in Science

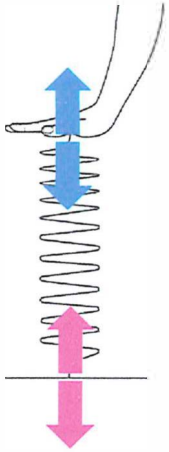
Researchers use GPS and datalogging technology to monitor populations, studying predator-prey interactions, behaviour and habitats. This supports conservation efforts.

8.07: Forces and Work

Support Forces Objects supporting another in **static equilibrium** experience distortion.

static equilibrium: unmoving and having balanced forces acting on it

Compression process of squashing, causing contraction



normal contact force on hand by spring

normal contact force on spring by hand

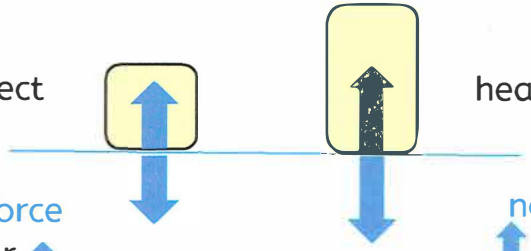
normal contact force on spring by table

normal contact force on table by spring

interaction pairs

size of forces in a pair are the **same**.

Most solid objects can experience some compression, even if it cannot be seen.



normal contact force on box by floor

gravity force on box by Earth

Heavier objects: **greater normal contact** forces

Because: **greater gravity forces**

normal contact force on box by floor

gravity force on box by Earth

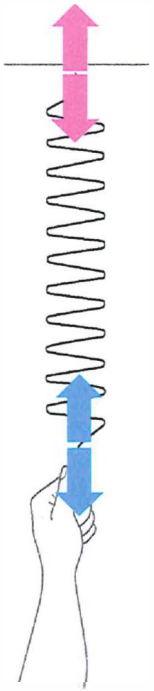
- When compression is happening, normal contact forces are acting.
- Flexible connectors cannot be compressed, e.g. ropes.

8.07: Forces and Work

Support Forces

Tension process of stretching, causing extension

All solid objects can experience some tension, even if it cannot be seen.



tension force on 'ceiling' by spring

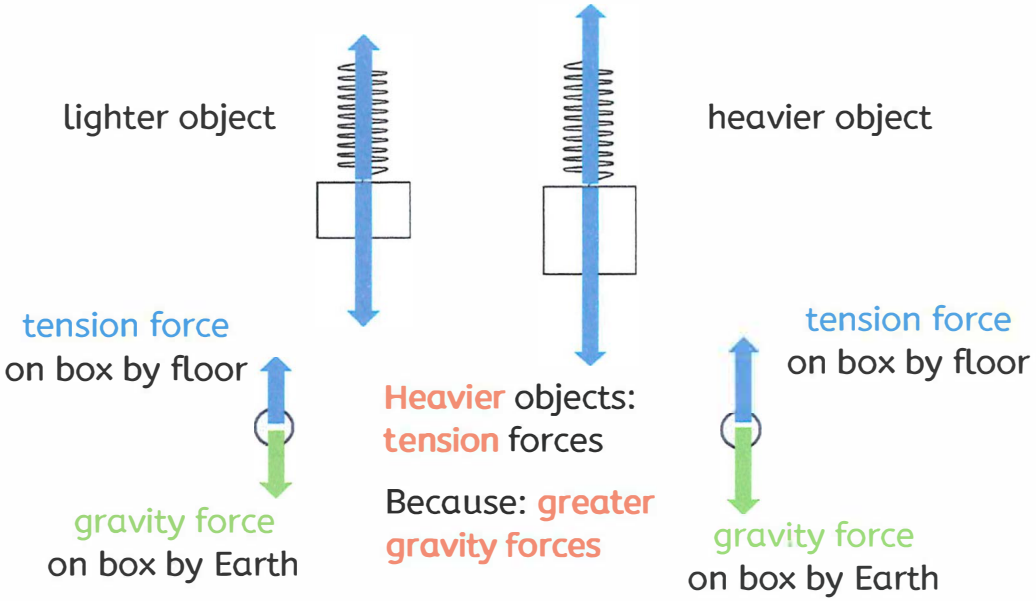
tension force on spring by 'ceiling'

tension force on spring by hand

tension force on spring by hand

interaction pairs

size of forces in a pair are the **same**.

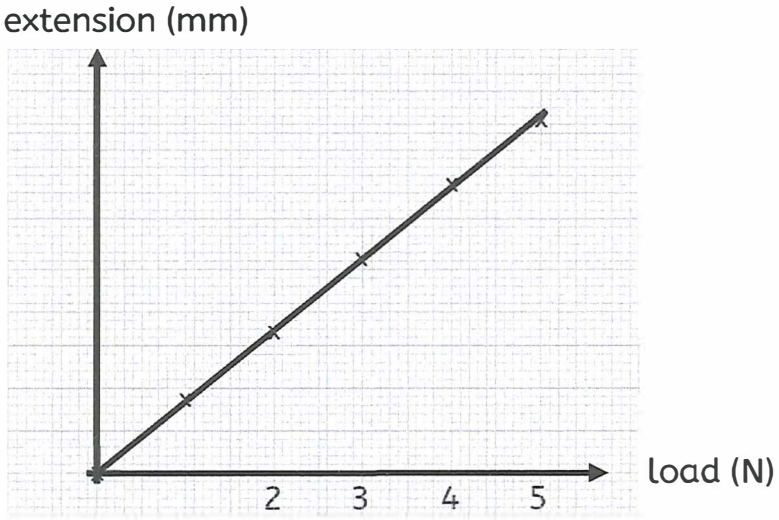


- When tension is happening, tension forces are acting.

8.07: Forces and Work

Support Forces

Force-extension Relationship



- As load increases, extension increases **in proportion**.
- This relationship is known as **Hooke's Law**.
- When objects extend under tension and return to their original shape and size, they are behaving **elastically**.
- Every material has its limits: **elastic limit**.
- Above this limit:
  permanent change to shape and size; no longer elastic.

Work

Mechanical Work

Doing work is a **process** which results in energy transfer.

Mechanical work is done when a **force** is exerted and moves an object through a **distance**.

- Greater force on object, greater work done.
- Greater distance moved, greater work done.

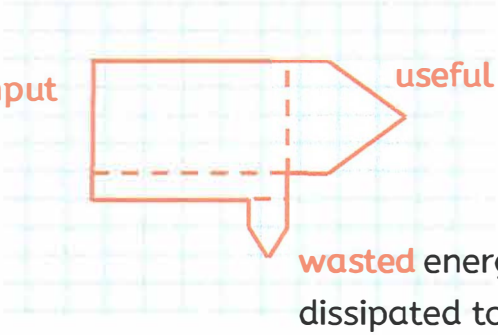
work done (J) = force (N) × distance moved (m)

During mechanical work, energy can be transferred to a variety of stores.

by **mechanical pathway**

Efficiency

the proportion of useful energy transfer by an object



$$\text{efficiency} = \frac{\text{useful work output (J)}}{\text{total work input (J)}}$$

8.07: Forces and Work

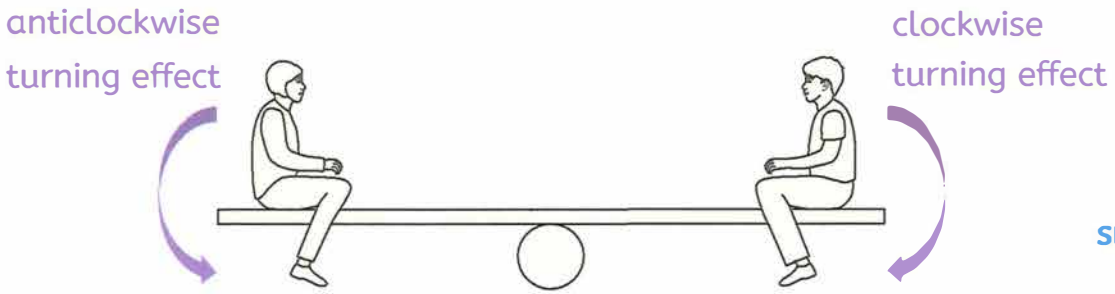
Turning Effects

Objects turn if they have:
- a **pivot** to turn around
- a **force** acting **a distance** from the pivot.

- The turning effect is how strongly a force makes something turn around a pivot.
- Greater force on object, greater turning effect.
- Greater distance of force from pivot, greater turning effect.

turning effect (Nm) = force (N) × distance from pivot (m)

Rotational Equilibrium unmoving and having balanced turning effects acting on it; no overall turning effect



In rotational equilibrium

total clockwise turning effect = total anticlockwise turning effect

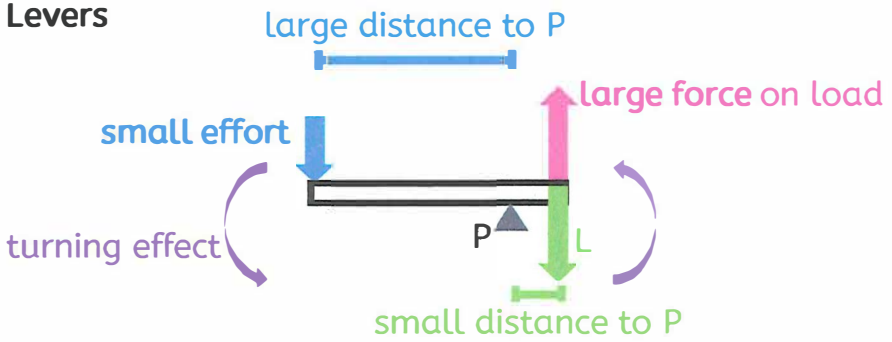
If turning effects are not balanced, object tips in direction of the larger turning effect.

Simple Machines

Include levers, pullies and gears.

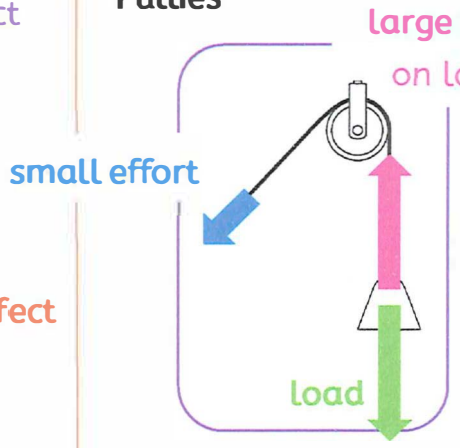
Effort force is applied (input force), results in an output force (with a **different size** or **direction**).

Levers



- Lever turns about a pivot
- **Longer distance** from pivot means **less effort** needed.

Pullies

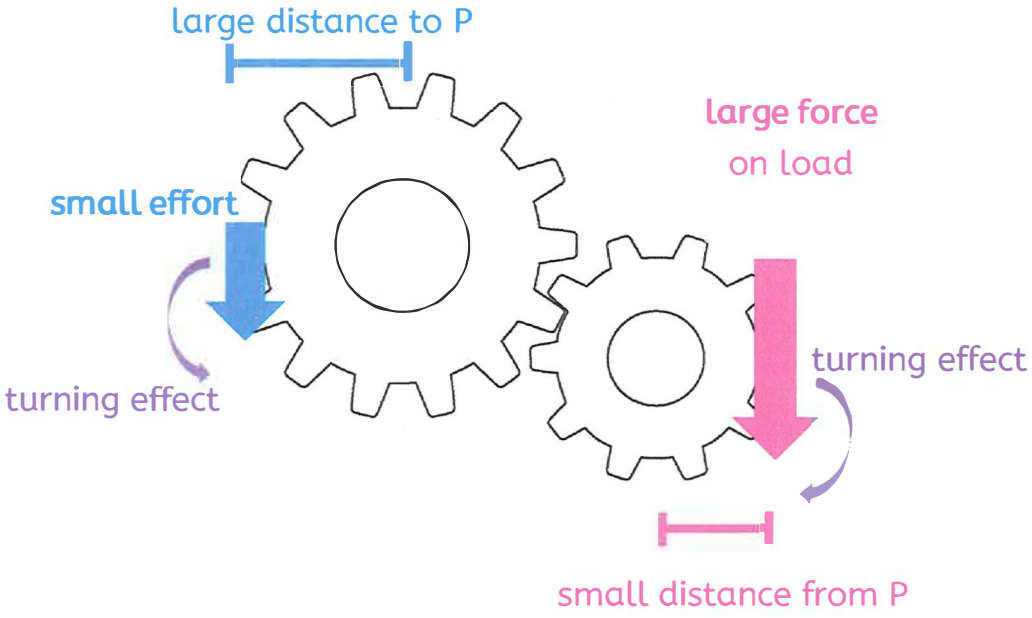


Easier to pull down on a rope attached to a heavy load than to pick it up directly.

Several pullies = **less effort** by **increased distance** the load is pulled through.

8.07: Forces and Work

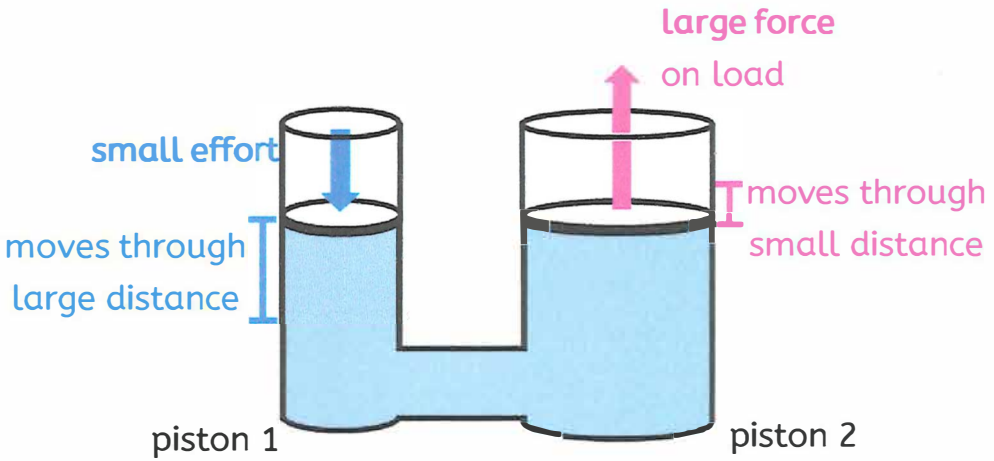
Gears Toothed wheels (cogs) that fit together and turn each other.



turning effect on gear 1 = turning effect on gear 2

Hydraulic Machines

A more advanced machine, putting an enclosed liquid under pressure.



Liquids cannot be compressed.

work done on piston 1 = work done by piston 2

All machines are **not 100 % efficient.**

The useful work done (output) is always less than the total work done (input).

Wasted energy is transferred to the thermal store of the surroundings.

Effort moves **larger distance** and **more friction** against the applied force.

8.07: Forces and Work

Seeking Evidence

- data which has been shown to be valid

evidence → explanation

- Researchers base claims only on the evidence.
- Leads to greater confidence in their claims.

valid data

- represents the real situation and is trustworthy

Critically Thinking about the Research

Method Validity

- Control of variables (IV, DV, CV), range, measurement intervals
- Method Design (apparatus, resolution, technique, skill)

Data Validity

- Accuracy
- Precision
- Repeatability
- Reproducibility

Interpretation and Conclusion Validity

- Data processing
- Charts or graphs
- Described patterns
- Explained using scientific knowledge

Limitations of Findings

- Unexpected data, limitations and bias
- Further research (to improve accuracy and precision, or scope

Reflecting on the Data

- Researchers check if data is within expected boundaries, e.g. when weighing a person, the measurement is the same as for a mouse.
- Researchers consider the measurement bias for an experiment, e.g. the force measured to pull a brick up a ramp could be 0.2 N more or less than it should be as it stops and starts.

8.07: Forces and Work

Measurement Error

- the difference between the measured value and the true value of the quantity being measured

Always some uncertainty in measurement

no control over	some control over
random error	systematic error
environmental	method, apparatus, skill

- repeat
- identify anomalies
- mean
- measure over time
- graphs to average out effect of random error

- control/ monitor environment
- control procedure/ apparatus
- measurement technique

8.07: Forces and Work

Measurement Values

base quantities

time	length	mass	temperature	current		
s	m	kg	K	A		

base units

rate	speed	density			
/s	m/s	kg/m^3			

frequency	acceleration	force	temperature	charge	
/s Hz	m/s^2	$kg.m/s^2$ N	°C	A.s C	

energy and work done		power	gfs		
N.m J		J/s W	N/kg		

loudness	turning effect				
dB	N.m				

derived units

derived quantities

Acids and Alkalis

Acids, Bases, and Alkalis

Term	Definition	Properties
Acid	a family of chemicals that react in similar ways and have a pH less than 7	• some are edible and found in foods (e.g. citrus fruits) but lab acids may be harmful • taste sour (never tasted in lab) • can be corrosive and cause chemical burns • concentrated acids are more corrosive
Base	a family of chemicals that react in similar ways and have a pH greater than 7	• taste bitter (never tasted in lab) • some are soluble in water (called alkalis)
Alkali	a soluble base; has a pH greater than 7	• many cleaning products are alkalis e.g. bleach • taste bitter (never tasted in lab) • can feel slippery or soapy • can be corrosive and cause chemical burns • concentrated alkalis are more corrosive
All alkalis are bases, but not all bases are alkalis because some bases are insoluble		

Hazard signs to be aware of when dealing with acids and alkalis:


corrosive


moderate health hazard (irritant)

Other chemical hazard symbols:


oxidising


flammable


serious health hazard


toxic


environmental hazard

Risks of Working With Acids and Alkalis	Control Measures
Splashes of acids or alkalis can damage eyes.	Wear eye protection.
People may not know how to work with acids and alkalis.	Educate people how to work with acids and alkalis.
Strong acid or alkali fumes can irritate the lungs.	Use in a well-ventilated area.
Some acids and alkalis can react with other chemicals.	Store away from reactive chemicals, in labelled, corrosion-resistant containers.
Acids or alkali spills can harm wildlife or the environment.	Dispose of acids and alkalis carefully and follow instructions.

Acids and Alkalis

Indicators and pH Scale

- Solutions can be acidic, alkaline or neutral.
- Acidic solutions form when acids dissolve in water.
- Alkaline solutions form when alkalis dissolve in water.
- Solutions that are neither acidic nor alkaline are neutral.
- Pure water is neutral.

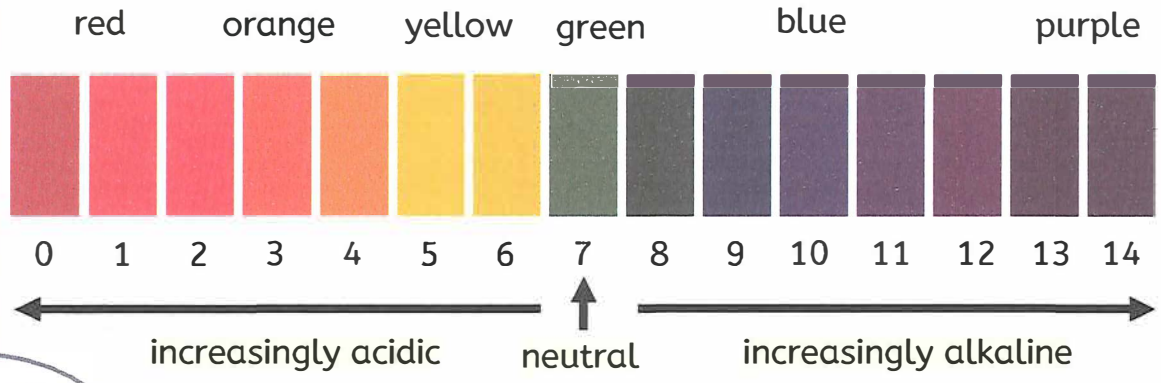
An **indicator** changes colour to show whether a solution is acidic, neutral or alkaline.

Many flowers, fruits and vegetables (plants) contain chemicals called pigments that change colour in acids or alkalis. These can be extracted and made into a solution that acts as a simple indicator.

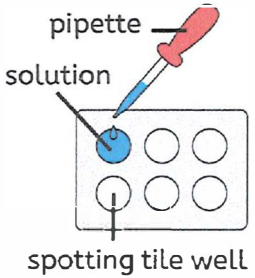
	Acidic Solution	Alkaline Solution	Neutral Solution
Blue litmus	turns red	stays blue	stays blue
Red litmus	stays red	turns blue	stays red

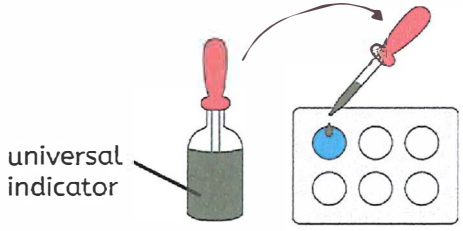
- Simple indicators like litmus paper do not tell you the pH of an acid or alkali - only if it is acid or alkali.
- They can't tell how acidic or how alkaline a solution is.

- Universal indicator can tell us how acidic or how alkaline a solution is.
- This is measured using the pH scale, which runs from pH 0 to pH 14.
- Neutral solutions are exactly pH 7.
- Acidic solutions have a pH less than 7. The closer to pH 0, the more acidic a solution is.
- Alkaline solutions have a pH more than 7. The closer to pH 14, the more alkaline a solution is.



Universal indicator can be used to determine the pH of a range of solutions. Once added to a solution, the colour can be observed and compared to colours on the pH scale chart.





A pH meter is an electric device which measures pH and provides a specific pH value. It provides a more accurate and precise measurement of pH, rather than a colour that is then compared to a reference.

Acids and Alkalis

Acids and Metals

Reacting Metals With Acids

metal + acid → metal salt + hydrogen

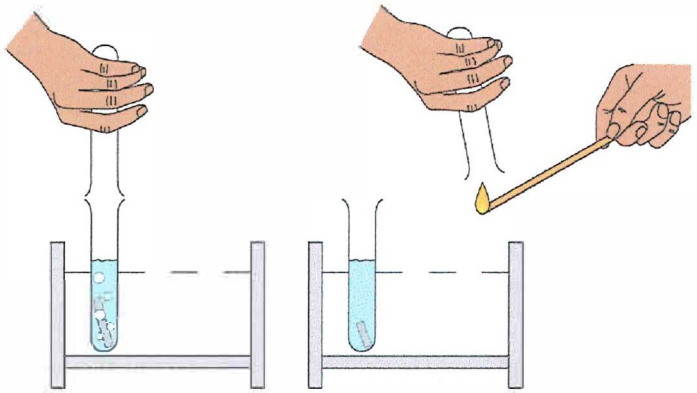
e.g. zinc + hydrochloric acid → zinc chloride + hydrogen

- When an acid reacts with a metal, bubbles of hydrogen gas can be observed.
- The metal will get smaller as it reacts with the acid (corrosion of the metal).
- The reaction is usually exothermic, indicated by an increase in temperature.

- first name of salt = metal
- surname of salt = from the name of the acid

Name of Acid	Chemical Formula	Type of Salt
hydrochloric acid	HCl	chloride
sulfuric acid	H_2SO_4	sulfate
nitric acid	HNO_3	nitrate

The presence of hydrogen can be tested for using a lit splint. Hold the lit splint to the gas and listen for a squeaky pop sound. This indicates the presence of hydrogen.



Neutralisation

The pH of a solution can be changed by adding an acid or base/ alkali.

- Adding an acid to water will decrease the pH from 7.
- Adding a base/ alkali to water will increase the pH from 7.

- When acids and bases or alkalis are mixed in the correct quantities, a neutral solution is made.
- When bases/ alkalis are added to acids, the pH increases, becoming less acidic and more neutral.
- When acids are added to bases, the pH decreases, becoming less alkaline and more neutral.

When an acid reacts with an alkali (or base) in the correct quantities, a neutral salt solution is formed. This is called **neutralisation**.

acid + alkali → salt + water

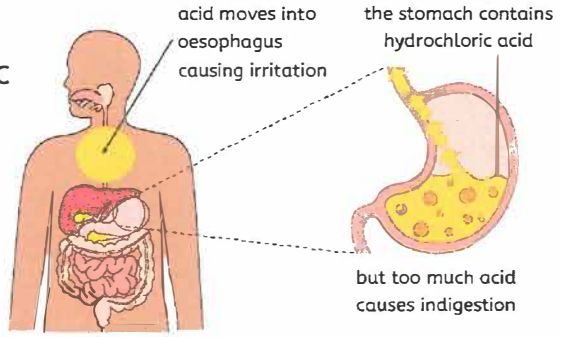
e.g. sodium hydroxide + hydrochloric acid → sodium chloride + water

The salt formed is named after the metal in the alkali (base) and the name of the acid in the reaction.

Acids and Alkalis

Neutralisation (Continued)

Indigestion is caused by excess hydrochloric acid in the stomach. The acid moves into the oesophagus causing irritation and a burning sensation. Indigestion remedies,



called antacids, are bases that alleviate symptoms by reacting with stomach acid and neutralise it.

It is possible to test different antacids by reacting them with acid to see which one is the most effective at neutralising it.

If a different group or a different method gives the same results, the data is **reproducible**. This shows that when compared to data from other enquiries, the results are still consistent and therefore trustworthy.

Acid Rain

- All rain is naturally slightly acidic (around pH 5.5) because carbon dioxide dissolves in it.
- Acid rain has a pH below 5 and is caused by pollutant gases such as:
  - sulfur dioxide - released when fossil fuels that contain sulfur are burned.
  - nitrogen oxides - form when nitrogen and oxygen in the air react at high temperatures in vehicle engines and power stations
- These gases react with water vapour, oxygen, and other chemicals to form sulfuric acid and nitric acid, which dissolve in rain.
- Acid rain reacts with metals (causing corrosion) and rocks (chemical weathering), damaging buildings, statues and metal structures. It makes lakes and rivers more acidic, which can kill fish and other aquatic organisms.
  It damages the waxy cuticle of leaves, reducing photosynthesis, and removes minerals from soil, slowing plant growth.

Pollutants travel. Acid rain can fall far from where pollutants were released.

Metal Oxides and Non-Metal Oxides

- A metal oxide is a compound that consists of metal atoms chemically joined to oxygen atoms.
- A non-metal oxide is a compound that consists of non-metal atoms chemically joined to oxygen atoms.

Metal Oxides	Non-Metal Oxides
usually solids at room temperature	often gases at room temperature e.g. sulfur dioxide
act as bases, with a pH greater than 7	most are soluble in water and react with water to form acidic solutions e.g. carbonic acid
some react with water to form an alkali (e.g. sodium hydroxide)	

- Metal oxides are bases and can react with acids to neutralise them.
- The general equation for the neutralisation reaction between a metal oxide and acid is: acid + metal oxide → salt + water
  e.g. hydrochloric acid + copper oxide → copper chloride + water

The salt formed is named after the metal in the metal oxide (base) and the name of the acid in the reaction.

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Geography

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8.04: Tectonics

Structure of the Earth

1	crust	(n) the rocky, outer layer of earth made up of rock and minerals
2	mantle	(n) a layer of dense rock found below the crust
3	outer core	(n) a liquid layer of mostly molten metals that lies between the mantle and inner core
4	inner core	(n) a solid ball of metals that lies at the centre of earth
5	continental crust	(n) parts of Earth's crust that are found below landmasses
6	oceanic crust	(n) parts of Earth's crust that are found below oceans

Theory

1	tectonic plates	(n) individual sections of the Earth's crust and the upper mantle that lies beneath it
2	plate boundary	(n) locations where tectonic plates meet and interact
3	convection currents	(n) the movement of fluids because of temperature differences
4	subduction	(n) the process where one tectonic plate slides beneath another and sinks into the mantle, usually when a denser oceanic plate meets a lighter continental plate
5	continental drift	(n) a theory that proposed earth's continents were once one landmass (supercontinent) that gradually drifted apart over time
6	Pangaea	(n) a supercontinent made up of all the world's land masses before they were broken up into the different continents we recognise today
7	geological timescale	(n) a timeline that shows the history of the Earth, divided into eons, eras, periods and epochs
8	era	(n) a major division of time within an eon, marked by significant changes in Earth's life and landforms

Volcanoes and Earthquakes

1	shield volcano	(n) a wide, gently sloping volcano formed by runny (low-viscosity) lava that flows easily over long distances, building a shape similar to a warrior's shield
2	composite volcano	(n) a tall, steep-sided volcano made of alternating layers of ash and thick, sticky lava; these volcanoes often produce explosive eruptions
3	lava	(n) molten rock that has erupted onto the Earth's surface from a volcano and begins to cool and solidify
4	magma	(n) molten rock located beneath the Earth's surface in the mantle or crust, which can rise through cracks and erupt as lava
5	geothermal energy	(n) energy produced by heat from beneath the Earth's surface, often used for electricity or heating
6	epicentre	(n) the point on the Earth's surface directly above the focus; it is usually where the shaking is felt most strongly and where the most damage occurs
7	focus	(n) the point inside the Earth's crust where the earthquake starts; it is the place where the rocks first break and release energy in the form of seismic waves
8	seismic waves	(n) waves of energy that travel through the Earth during an earthquake
9	Moment Magnitude Scale	(n) a modern scale used to measure the total energy released by an earthquake (Mw)
10	seismometer	(n) the instrument that detects and measures ground vibrations caused by seismic waves (earthquakes)

8.04: Tectonics

Living Near Volcanoes

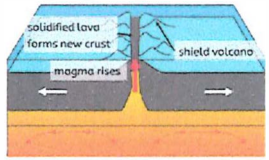
Opportunities	Challenges
fertile soils	volcanic eruptions
geothermal energy	gases
tourism	ash clouds

Preparing for Earthquakes

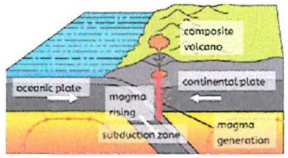
	Advantages	Disadvantages
Earthquake resistant buildings	designed to withstand shaking and therefore are less likely to collapse	expensive to build
Earthquake drills	people can react quickly and calmly without panic	people can forget proper actions if drills are not repeated regularly or if they do not feel realistic enough
Training emergency services	response teams can mobilise quickly and respond more efficiently	requires significant time, funding, technology and ongoing training
Land use planning	keeps people away from the most dangerous fault lines or areas	difficult and costly to move communities

Types of Plate Boundaries

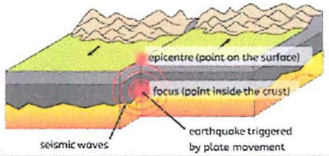
1 **constructive** — (n) a type of tectonic plate boundary where two plates move apart, allowing magma to rise and create new crust, often forming mid-ocean ridges or rift valleys



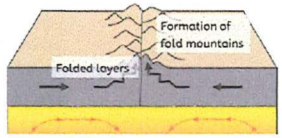
2 **destructive** — (n) a type of tectonic plate boundary where an oceanic plate is forced beneath a continental plate (subduction); this process destroys crust, generates magma, and often leads to explosive volcanic eruptions



3 **conservative** — (n) a type of tectonic boundary where two plates slide past each other horizontally, often causing earthquakes



4 **collision* (additional)** — (n) a type of tectonic plate boundary where two continental plates move towards each other and collide



Earthquake Case Study: Nepal 2015

Location: Asia, landlocked, between India and China, in the Himalayan mountain range.

Magnitude, focus and epicentre: Gorkha earthquake 7.8 Mw. Collision boundary between the Indian and Eurasian plates. Focus depth 15-16km (shallow). Epicentre was 80km northwest of Kathmandu, the capital city.

Effects	Responses
8,773 people were killed and over 23,000 injured	ActionAid supported more than 150,000 people and provided food to over 18,500 families and emergency shelter to 7,000 families
600,000 homes were destroyed	The Oxfam International programme helped more than 600,000 people; provided clean water, sanitation, food and shelter
7000 schools were damaged or destroyed	Disasters Emergency Committee (DEC) raised £87 million from 13 charities which was used to rebuild schools with earthquake resistance

8.03: Ecosystems

Classification of Ecosystem

1	ecosystem	(n) A community of living organisms interacting with each other and their environment in a particular area.
2	biome	(n) A large-scale ecosystem and an area of the world that, because of a similar climate, have similar landscapes, animals (fauna) and plants (flora).
3	habitat	(n) The place where an organism lives.
4	**biodiversity**	(n) The variety of plans and animals found in a particular ecosystem or biome.
5	**sustainability**	(n) Meeting the needs of the present without compromising the ability of future generations to meet their own needs.

Features of an Ecosystem

1	flora	(n) The plants of a particular region, habitat or geological period.
2	fauna	(n) The animals of a particular region, habitat or geological period.
3	food chain	(n) A diagram that models the feeding relationships between populations.
4	food web	(n) A network of interconnected food chains showing how energy and nutrients flow between different organisms in an ecosystem.
5	organism	(n) Something that is living or used to be alive.
6	interdependence	(n) Interdependence refers to the way that species, places, environments and systems are connected, and how a change in one can impact others.
7	adaptation	(n) A feature or characteristic that helps a plant or animal survive and reproduce in its environment.

Climatic Features

1	climate	(n) The average weather conditions of an area over thirty years.
2	temperature	(n) A measure of how hot or cold something is, often recorded in degrees Celsius (°C).
3	precipitation	(n) Water falling to the ground in all forms (rain, snow, sleet or hail).
4	climate graph	(n) A visual that shows the average monthly temperature and rainfall for a particular location, allowing us to see patterns in climate throughout the year.
5	solar insolation	(n) The amount of the sun's energy received at the Earth's surface in a specific place and time.

Major Global Biomes

1	tundra	(n) A cold, treeless biome found at high latitudes or at high altitudes, where the ground is frozen for most of the year (permafrost).
2	hot desert	(n) A dry biome with very low rainfall, high daytime temperatures and sparse vegetation, such as the Sahara Desert.
3	temperate forest	(n) A forest biome found in regions with moderate temperatures and rainfall, usually with four distinct seasons.
4	savannah grasslands	(n) A large open area covered mainly with grasses and scattered trees, found in tropical or subtropical regions (savannah).
5	tropical rainforest	(n) Found in both the northern and southern hemisphere mainly on or around the equator. Vegetation is vast and varied, climate is humid, hot and wet year-round.

8.03: Ecosystems

Biome 1: The Taiga, Russia

1 taiga	(n) A cold forest biome found in northern regions, made up mainly of coniferous (pine) trees; also called a boreal forest.
2 permafrost	(n) Ground that remains continuously frozen for two or more consecutive years, often found in polar and subarctic regions.
3 deciduous	(adj) Trees or plants that shed their leaves annually.
4 evergreen	(adj) Trees or plants that retain their leaves throughout the year.
5 logging	(n) The cutting down of trees to sell the wood for profit (legally or illegally).
6 deforestation	(n) The permanent removal of trees, often to make space for farming or construction.
7 Indigenous communities	(n) Groups of people who are the original inhabitants of a region and have distinct cultural traditions, languages, and ways of life that are closely connected to their natural environment.

Location: Northern Hemisphere, along the Arctic circle. Siberia, Russia.

Features: Low biodiversity, infertile soils, very cold and dry climate.

Animal and plant adaptations: Moose and black spruce tree

Threats	Management strategies
Logging	Selective logging
Mining and energy resources	Mine zoning
Tourism	Low impact tourism
Threats to Indigenous communities	Cultural protection

Biome 2: The Coral Triangle, Philippines

1 coral reef	(n) A large underwater structure made of the skeletons of coral polyps, providing habitat for many marine species.
2 polyp	(n) A small, soft-bodied organism that builds coral skeletons; the basic living unit of a coral reef.
3 colony	(n) A group of organisms of the same species living closely together, often for mutual benefit.
4 Marine Protected Areas (MPAs)	(n) Specific zones in the ocean where human activities such as fishing, mining, and tourism are restricted or carefully managed.
5 ecotourism	(n) Tourism directed towards natural environments, intended to support conservation efforts and observe wildlife responsibly.

Location: Shallow tropical waters, around coastlines and islands.

Features: High biodiversity, warm water 23-29°C, shallow clear water 60m or less.

Animals and plant adaptations: Clown fish, sea turtle, seagrass

Threats	Management strategies
Coral bleaching	MPAs
Overfishing	The Bantay Dagat sea patrols
Pollution from land	Funding reef-positive businesses
Tourism	Green fins ecotourism

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8.03 Transatlantic Slave Trade

Key Vocabulary

1	Act	(n) a law or formal decision made by parliament or leaders of a country.
2	Abolish	(v) to formally put an end to something.
3	Auction	(n) public or private sale where goods, property, or services are sold to the highest bidder.
4	Enslave	(v) to force someone to remain in conditions such as slavery.
5	Resistance	(n) refusal to accept or obey something.
6	Oppression	(n) denying individuals or groups their rights, freedom, or dignity.
7	Trade	(n) the exchange of good, services or resources between people, businesses or countries.
8	Transatlantic Slave Trade	the forced migration of 12 million Africans to European colonies in the Americas.

Key Individuals

William Wilberforce	MP who introduced bills in Parliament to abolish slavery.
Olaudah Equiano	Former enslaved person and a member of the Sons of Africa group.
Thomas Clarkson	One of the first men to join the Abolition Committee. Collected evidence in the horrors of the slave trade.
Mary Prince	The first black women to publish her experiences of slavery in her autobiography.

Themes and Threads

Power

The control a person or group has in a country.

For example, the Americas and Europe had the power of enslaved people who worked on plantations.

This includes threads such as empire and protest.

Identity

The qualities and characteristics that make a person who they are and what they value as important.

For example, the beliefs of the Quakers were used as an argument to abolish slavery.

This includes threads such as beliefs.

Connectivity

The act of joining or being linked to somewhere, someone or something else.

For example, the slave trade involved the forced migration of enslaved people from Africa to the Americas.

This includes threads such migration and trade

8.04 Time of Revolutionary Change

Key Vocabulary

1	Agriculture	(n) farming animals and crops.
2	Domestic	(n) work in the home.
3	Dual burden	(n) when a person (typically women) have responsibility in paid employment as well as unpaid work in the home.
4	Enclosure	(v) land surrounded by a barrier.
5	Exhibition	(n) an event at which objects are put out in a public space for people to look at.
6	Industrial Revolution	(n)The shift from farming societies to factory-based production using new technology and transport.
7	Innovation	(n) improving something or creating something that is a new technology.
8	Progress	(n) an improvement or change in a positive direction.
9	Rural	(n) countryside
10	Urban	(n) towns and cities

Language of change	
Extent of change	major/significant/continuity
Rate of change	rapid/gradual/slow
Impact of change	Long term, short-term, turning point

Themes and Threads

Power

The control a person or group has in a country.

For example, factory owners had control over their workers.

This includes threads such as class systems and protest.

Identity

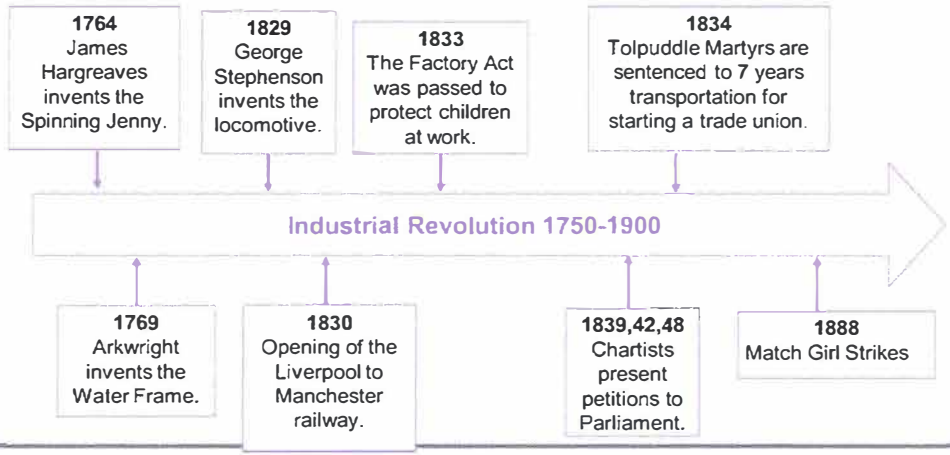
The qualities and characteristics that make a person who they are and what they value as important.

For example, the industrial revolution created a 'dual burden' for working class women.

This includes threads such as women.

Connectivity

The act of joining or being linked to somewhere, someone or something else.
For example, goods produced in factories were traded across the UK and wider world.
This includes threads such as migration and trade.



8.05 The British Empire

Key Vocabulary

1	Britannia	A female figure used as the personification of the British Empire.
2	Colony	A country that is part of an empire.
3	East India Company	A trading company that gradually took control of India on behalf of the British government.
4	Economy	The system of how money is used within a country.
5	Empire	A group of countries ruled by one single country referred to as the "mother" country.
6	Industrial Revolution	(n)The shift from farming societies to factory-based production using new technology and transport.
7	Imperialism	The act of building an empire.
8	Nationalism	Belief that your country is better than all others.
9	Rural	(n) countryside
10	Urban	(n) towns and cities

1	Australia	Used as a location for criminals.
2	Caribbean	Sugar, cocoa, coffee were grown and taken to Britain.
3	Africa	Enslaved people were transported to the Caribbean to produce raw material for Britain.
4	India	Provided species, jewels and silks that Britain traded for a profit across the Empire.

Themes and Threads

Power

The control a person or group has in a country.

For example, factory owners had control over their workers.

This includes threads such as class systems and protest.

Identity

The qualities and characteristics that make a person who they are and what they value as important.

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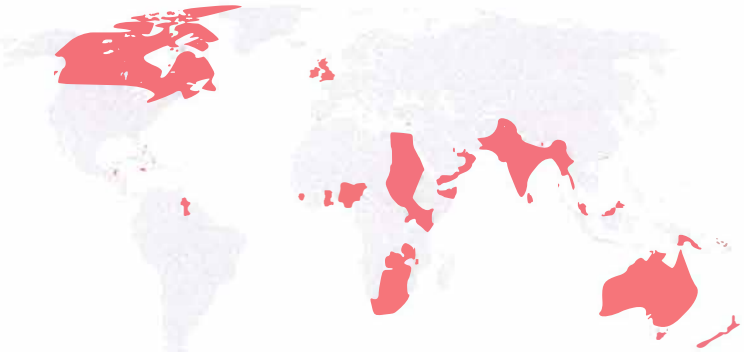

Map of the British Empire

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French

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Unit 5: Holidays

5.1.1: Où es-tu allé(e) en vacances l'année dernière? - Where did you go on holiday last year?	
Je suis allé(e)/on est allé(e)	I went/we went
Je suis resté(e)	I stayed
Au bord de la mer	By the sea
À la campagne	To/in the countryside
À la montagne	To/in the mountains
En /Au/Aux + country	To/in + country
Dans un hôtel/appartement	In a hotel
Dans un camping	On a campsite
Dans une caravane	In a caravan
Près de	Near to

5.1.2: Comment as-tu voyagé? - How did you travel?	
Comment as-tu voyagé ?	How did you travel?
J'ai voyagé/on a voyagé	I travelled/we travelled
En avion	By plane
En voiture	By car
En train	By train
En bateau/ferry	By boat/ferry
À vélo	By bike

5.2: Qu'est-ce que tu as fait? - What did you do?	
J'ai nagé/On a nagé dans la mer	I /we swam in the sea
Elle/Il a nagé dans la piscine	S/he swam in the pool
J'ai/On a visité les monuments	I/we visited the monuments
Elle/Il a visité les sites touristiques	S/he visited the tourist sites
J'ai bronzé/On a bronzé	I/we sunbathed
J'ai/on a pris des photos	I/we took photos
J'ai/on a fait de la plongée	I/we went diving
J'ai/on a mangé	I/we ate
Je me suis/on est détendu(e)	I/we/relaxed
J'ai/on a fait du shopping	I/we went shopping
J'ai/on a acheté des souvenirs	I/we bought souvenirs
Je suis/on est aiié(e) à un parc aquatique	I/we went to a water park
J'ai/on a vu les sites historiques	I/we saw the historic sites

5.3: C'était comment? - How was it?	
C'était...	It was...
décevant	Disappointing
Je me suis/on s'est bien amusé(e)	I/we had a good time

Unit 5: Holidays

5.4: Parle-moi de tes meilleures/dernières vacances - Tell me about your best/last holiday(s)	
Mes meilleures/dernières vacances étalent...(+adjective)	My best/last holiday was/holidays were...
Pendant les grandes vacances	During the summer holidays
Pendant les vacances de Noël	During the Christmas holidays
L'année dernière	Last year
Le premier jour/le deuxième jour	On the first/second day

5.5.1: Où passes-tu tes vacances? - Where do you go on your holidays?	
Qu'est-ce que tu fais normalement en vacances?	What do you normally do on holiday?
Où passes-tu tes vacances ?	Where do you go on holiday?
Je vais/on va	I go/we go
Je/on voyage	I/we travel
Je me détends/On se détend	I relax/we relax

5.5.2: Quelle sorte de vacances préfères-tu? - What sort of holidays do you prefer?	
Les vacances actives/culturelles	Active/cultural holidays
Les vacances relaxantes/reposantes	Relaxing holidays
Rester en Angleterre	To stay/staying in England
Explorer	To explore/exploring
Me détendre	To relax/relaxing
Le temps (le soleil)	The weather (the sun)
La nourriture	The food

5.6.1: Quels sont tes projets pour les vacances? - What are your plans for the holidays?	
Cet été	This summer
Cette année	This year
Je vais/On va (+infinitive)	I'm/We're going
Je veux/on veut (+infinitive)	I want/we want
Je voudrais/On voudrait (+infinitive)	I/we would like
Aller (+ en/au/aux/à/à la/au)	To go (to)
Passer une semaine/un week-end	To spend a week/weekend
Rester	To stay
Se détendre	To relax

5.6.2: Qu'est-ce que tu voudrais faire pendant les vacances? - What would you like to do during the holidays?	
Je voudrais/j'aimerais	I would like
Passer un mois (+à/au/en/aux/à la)	To spend a month (in)
C'est mon rêve de	It's my dream
Ce serait...	It would be...

Unit 6: Going Out and Staying In

6.1.2: Qu'est-ce que tu aimes faire? - What do you like doing?	
Pendant mon temps libre	In my free time
J'ai une passion pour (le sport/le cinéma /les animaux/ la lecture)	I have a passion for (sport/cinema/animals/ reading)
Le meilleur sport est...(+le/la)	The best sport is...
Le pire sport est...(+le/la)	The worst sport is...
Depuis (un an/deux ans)	For (one year/two years)

6.2.1: Qu'est-ce que tu vas faire ce weekend? - What are you going to do at the weekend?	
Ce weekend	This weekend
Je vais (+ infinitive)	I'm going (to...)

6.2.2: Tu veux aller au cinéma ce soir/samedi soir? - Do you want to go to the cinema this evening/on Saturday evening?	
Samedi après-midi	Saturday afternoon
À quelle heure ?	At what time?
À huit heures/À huit heures et demie	At eight o'clock/at half past eight
Oui, bonne idée	Yes, good idea
Je veux bien	I want to/ I'd like to
D'accord	OK
Peut-être	Maybe
Je n'en ai pas envie	I don't want to
Non, je ne peux pas	No, I can't
Non, je suis désolé(e)	No, I'm sorry

6.3.1: Qu'est-ce que tu regardes à la télé? - What do you watch on television?	
Je regarde	I watch
J'aime regarder	I like watching
Les infos	The news
Un documentaire	A documentary
Un feuilleton	A soap opera
Un jeu télévisé	A gameshow
Une série (américaine)	An (American) series
Une émission de téléréalité	A TV reality programme
Une émission de sport	A sports programme
Un film historique	A historical film
Un film d'action	An action film
Un film de science-fiction	A science fiction film
Un film fantastique	A fantasy film
Une comédie	A comedy
Est-ce que tu aimes... ?	Do you like...?
Elles/ils sont...	They are...

Unit 6: Going Out and Staying In

6.3.2: Quelle musique écoutes-tu? - What music do you listen to?	
J'écoute (+du/de la)	I listen to
J'aime écouter (+du/de la)	I like listening to
Le rap/rock/métal/reggae	Rap/rock/Metal/Reggae
La pop	Pop
La musique électronique/classique	Electronic music/classical music
Mon chanteur préféré est	My favourite singer (male) is
Ma chanteuse préférée est	My favourite singer (female) is
Mon groupe préféré est	My favourite band/group is
Les paroles (sont...)	The lyrics (are...)
La mélodie (est...)	The tune (is...)

6.5: On fête! - Let's party!	
Qu'est-ce que tu vas acheter ?	What are you going to buy?
Qu'est-ce que tu vas apporter à la fête ?	What are you going to bring to the party?
Je vais acheter	I'm going to buy
Je vais porter	I'm going to wear
Nouveau/nouvel/nouvelle	New
Chic	Stylish
À la mode	Fashionable
Un pantalon	Trousers
Un jean	Jeans
Un costume	A suit
Une robe	A dress
Une jupe	A skirt
Une veste	A jacket
Une chemise	A shirt
Des baskets	Trainers
Je vais apporter	I'm going to bring
La nourriture	Food
Un gâteau	A cake
Des chips	Crisps
Des pâtes	Pasta
Du chocolat	Chocolate
Des boissons (gazeuses)	(Fizzy) drinks

6.6: Role-plays	
(Est-ce que) je peux vous aider ?	Can I help you?
Dans le magasin	In the shop
Vous avez... ?	Do you have...?
Une autre taille	Another size
Quelle taille voulez-vous ?	Which size do you want?
Une taille plus grande/petite	A bigger size/ smaller size
Une autre couleur	Another colour
Où est... ?/Où sont... ?	Where is.../where are...?
Ça coûte combien ?	How much does that cost?
Ça coûte...	It costs...
Combien de personnes ?	How many people?
Une table pour deux/trois personnes	A table for two/three people
Avez-vous une carte ?	Do you have a menu?
Je n'ai pas de (fourchette/couteau)	I don't have (a fork/knife)
Il y a un problème	There is a problem

Unit 7: Daily Routine, Health and Fitness

7.1: Comment est ta routine? - What's your daily routine like?	
Je me lève	I get up
Je me lave	I have a wash
Je me brosse les dents	I brush my teeth
Je me douche	I shower
Je prends le petit-déjeuner	I have breakfast
Je vais au collège (à/en + transport)	I go to school (by + transport)
Je quitte le collège	I leave school
Je rentre chez moi	I return home
Je me repose	I relax
Je me couche	I go to bed
À ... heures (et demie/quart)	At ... o'clock (half past/quarter past)
À ... heures moins le quart	At quarter to ...

7.1.2: Que changerais-tu au sujet de ta routine? - What would you change about your routine?	
Je changerais beaucoup/peu	I would change a lot/little
Je voudrais pouvoir (+infinitive)	I would like to be able (to...)
Me lever	To get up
Me coucher	To go to bed
Rentrer chez moi	To return home
Avoir plus de temps au lit/chez moi	To have more time in bed/at home
Tôt	Early
Tard	Late
Plus tôt	Earlier
(Une heure) plus tard	(An hour) later

7.1.3: Qu'est-ce que tu as fait hier? - What did you do yesterday?	
Je me suis levé(e) à	I got up at...
Je me suis douché(e)	I showered

7.2.1: Es-tu en forme? - Are you fit?	
Je (ne) suis (pas) en bonne forme	I'm (not) fit/healthy
Je (ne) suis (pas) sain(e)/en bonne santé	I am (not) healthy
Je bois de l'eau	I drink water
Je bois des boissons gazeuses	I drink fizzy drinks
Je (ne) mange (pas) sainement	I (don't) eat healthily
Je mange des sucreries	I eat sweets
Je mange du chocolat	I eat chocolate
Je mange des légumes	I eat vegetables
Je mange des fruits	I eat fruit
J'adore manger du fast-food	I love eating fast food
Ne...jamais	Never
Je fais de l'exercice	I exercise
Je (ne) suis (pas) actif/active	I am (not) active
Je dors huit heures par nuit	I sleep eight hours per night

Unit 7: Daily Routine, Health and Fitness

7.2.2: Qu'est-ce que tu vas faire pour rester en forme? - What are you going to do to stay fit?	
Je vais (+infinitive)	I'm going
Je dois (+infinitive)	I have to/must
Je peux (+infinitive)	I can
Je veux (+infinitive)	I want
Manger sainement	To eat healthily
Manger moins de	To eat less/fewer
Boire plus de	To drink more
Dormir plus	To sleep more
Éviter de	To avoid

7.3.2: Chez le médecin At the Doctor's	
Depuis quand ?	Since when?
Depuis (un jour/deux jours)	For (a day/two days)
Il faut (+infinitive)	You must
Rester au lit/au chaud	Stay in bed/warm
Prendre du sirop	Have/take some cough syrup
Prendre des pastilles pour la gorge	Have/take throat sweets
Prendre ce médicament	Take this medication
Aller chez le dentiste	Go to the dentist
Aller à la pharmacie	Go to the pharmacy

7.3.1: Qu'est-ce qui ne va pas? - What's the matter?	
Où as-tu mal ?	Where does it hurt?
J'ai mal (+au/à la/aux) ...	My ... hurts
à la tête	Head
à la gorge	Throat
à la jambe	Leg
au bras	Arm
au cou	Neck
au dos	Back
au pied	Foot
au ventre	Stomach
aux oreilles	Ears
aux yeux	Eyes
aux dents	Teeth
J'ai vomi	I've been sick
J'ai un coup de soleil	I have a sunburn
J'ai un rhume	I have a cold
J'ai la grippe	I have flu
J'ai de la fièvre	I have a fever
J'ai une toux/je tousse	I have a cough

Unit 8: School and future plans

8.1.1: C'est comment ton collège? - What's your school like?	
C'est un collège mixte	It's a mixed school
Un collège de filles/garçons	It's a girls'/boys' school
Est situé à...	Is situated in...
Il y a ... bâtiments	There are ... buildings
On porte un uniforme scolaire	We wear a school uniform
Un pull	A jumper
Un blazer	A blazer
Un chemisier	A blouse
Un pantalon	Trousers
Une chemise	A shirt
Une cravate	A tie
Une jupe	A skirt
Des chaussures	Shoes
Des chaussettes	Socks

8.1.2: Parle-moi de la vie extra-scolaire - Tell me about extra-curricular opportunities	
On a ... cours par jour	We have ... lessons a day
La journée commence à...	The day starts at...
La journée finit à...	The day finishes at...
Il y a beaucoup de clubs	There are lots of clubs
Une activité extra-scolaire	Extra-curricular activity
On peut (+infinitive)	You can
Participer à la chorale/au concours de talents	Participate in the choir/talent competition
Aller à l'étranger	Go abroad

8.1.3: Que penses-tu des règles de ton collège? - What do you think of the rules in your school?	
Il y a trop de règles	There are too many rules
Il faut/On doit (+infinitive)	You have to
Il est interdit de/on ne peut pas	You're not allowed to
Mâcher le chewing-gum	Chew chewing gum
Fumer	Smoke
Être à l'heure/en retard	Be on time/late
Écouter le prof	Listen to the teacher
Harceler les autres	Bully others
Utiliser un portable	Use a mobile phone
Avoir un piercing	Have a piercing
Porter du maquillage	Wear make up
C'est juste/injuste	It's fair/unfair

8.1.4: Que changerais-tu? - What would you change?	
Je (ne) changerais (pas) beaucoup	I would (not) change a lot
Les règles sont...	The rules are...
Je voudrais (+infinitive)	I would like
Arriver plus tard	To arrive later
Finir les cours plus tôt	To finish lessons earlier

Unit 8: School and future plans

8.2.1: Que font-ils/elles comme travail? - What do they do for a living?	
Ma mère/mon père est...	My mum/dad is...
Cuisinier/cuisinière	A cook
Infirmier/infirmière	A nurse
Pompier/pompière	A firefighter
Vendeur/vendeuse	A salesperson/shop assistant
Serveur/serveuse	Waiter/waitress
Chauffer/chauffeuse (de taxi/de bus)	(Taxi/bus) driver
Chômeur/chômeuse	Unemployed
Chanteur/chanteuse	A singer
Programmeur/programmeuse	A programmer
Danseur/danseuse	A dancer
Médecin	Doctor
Maçon	Builder
Électricien/électricienne	Electrician
Mécanicien/mécanicienne	Mechanic
Footballeur professionnel/professionnelle	A professional footballer
Avocat/avocate	Lawyer
Professeur	Teacher
Pilote	A pilot
Ingénieur	An engineer
Elle/il travaille dans un bureau	S/he works in an office

8.3: Qu'est-ce que tu voudrais faire à l'avenir? - What would you like to do in the future? Que serait ton métier idéal? - What would your ideal job be?	
Je voudrais être	I would like to be
J'espère être	I hope to be
Je voudrais avoir	I would like to have
Ma propre entreprise	My own business
Ça serait...	That would be...
Mon rêve	My dream
Bien payé(e)	Well paid

8.2.2: Est-ce qu'il/elle aime son boulot/métier? - Does he/she like his/her job?	
Elle/il aime son boulot/métier	S/he likes his/her job
Elle/il n'aime pas son boulot/métier	S/he does not like his/her job
Elle/il travaille avec des autres	S/he works with others
Elle/il travaille avec des enfants	S/he works with children
Elle/il travaille seul(e)	S/he works alone
C'est...	It's ....
Elle/il doit (+infinitive)	S/he has to/must
Nettoyer	To clean
Cuisiner	To cook
Parler avec les clients	To speak with customers
Travailler dehors/à l'extérieur	To work outside
Travailler sur un ordinateur	To work on a computer
Aider les autres	To help others
Elle/il a beaucoup de responsabilités	S/he has lots of responsibilities

8.4: Que vas-tu faire à l'avenir/dans cinq-dix-vingt ans? - What are you going to do in the future/in 5-10-20 years?	
Je vais/veux/voudrais (+infinitive)	I'm going/want/would like
J'espère (+infinitive)	I hope
Me marier	To get married
Avoir des enfants/une maison/voiture	To have a children/house/car
Avoir ma propre entreprise	To have my own business
Habiter à l'étranger	To live abroad
Étudier à l'université	To study at university
Voyager	To travel
Être content (e)	To be happy

Hartshill Academy
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Year 8

Spanish

Heart - Ambition - Respect - Tenacity

Unit 5: Holidays

5.1.1 ¿Adónde fuiste de vacaciones el año pasado? - Where did you go on holidays last year?	
Fui a	I went to
Fuimos a	We went to
Me alojé	I stayed
En la costa / En el campo / En la montaña	By the sea/in the countryside/in the mountains
En un hotel/apartamento	In a hotel/appartment
En un camping	On a campsite
En una caravana/roulotte	In a caravan
Cerca de	Near to
Lejos de	Far from

5.1.2 ¿Cómo fuiste? - How did you travel?	
Viajé / viajamos	I travelled/we travelled
En avión	By plane
En coche	By car
En tren	By train
En barco/ferry	By boat
En bici(cleta)	By bike

5.2 ¿Qué hiciste? - What did you do?	
Nadé en el mar/en la piscina	I swam in the sea/pool
Nadamos / nadó	We swam/ s/he swam
Visité los monumentos/los sitios turísticos	I visited the monuments/tourist sites
Visitamos / visitó	We visited/ s/he visited
Tomé / tomamos / tomó el sol	I/we/s/he sunbathed
Tomé / tomamos / tomó muchas fotos	I/we/s/he took photos
Hice / hicimos / hizo submarinismo/ buceo	I / we/s/he went scuba diving
Comí / comimos / comió	I/ we/s/he ate
Me relajé / nos relajamos / se relajó	I/ we/ s/he relaxed
Fui / fuimos / fue de compras	I/we/s/he went shopping
Compré / compramos / compró recuerdos	I/we/s/he bought souvenirs
Fui / fuimos / fue a un parque acuático	I/we/s/he went to a water park
Vi / vimos / vio sitios históricos	I/we/s/he saw the historic sites

5.3 ¿Cómo lo pasaste? - How was it?	
Fue/era...	It was...
Una desilusión	Disappointing
Lo pasé/pasamos genial/bomba/fenomenal **Lo pasé/pasamos fatal/muy mal/regular**	I/we had a good time I/we had a terrible time

Unit 5: Holidays

5.4 Háblame de tus mejores/últimas vacaciones - Tell me about your best/last holiday	
Mis mejores/últimas vacaciones fueron...	My best/last holidays were...
Durante las vacaciones de verano	During the summer holidays
Durante las vacaciones de Navidad	During the Christmas holidays
El año pasado	Last year
El primer/segundo día	On the first/second day

5.5.1 ¿Qué haces normalmente en vacaciones? - What do you normally do on holidays?	
¿Dónde vas de vacaciones ?	Where do you go on holiday?
Normalmente	Normally
En general	In general
Voy / Vamos a	I / we go to
Viajo / viajamos	I / we travel
Me relajo / nos relajamos	I relax / we relax

5.5.2 ¿Qué tipo de vacaciones prefieres? - What type of holidays do you prefer?	
Prefiero/me encanta(n)/me gusta(n)	I prefer / I love/ I like
Las vacaciones activas	Active holidays
Las vacaciones relajadas	Relaxing holidays
Las vacaciones culturales	Cultural holidays
Quedarme en Inglaterra	To stay/staying in England
Explorar	To explore/exploring
El tiempo (el sol)	The weather (the sun)
La comida	The food

5.6.1 ¿Qué planes tienes para las próximas vacaciones - What are your plans for the next holidays?	
Este verano	This summer
Este año	This year
Voy/Vamos a + infinitive	I'm/We're going
Quiero + infinitive	I want
Me gustaría / quisiera (+infinitive)	I /We would like
Pasar una semana/ un fin de semana	To spend a week/weekend
Relajarme	To relax
Alojarme	To stay (accommodation)

5.6.2 ¿Cómo serían tus vacaciones ideales? - What would your ideal holiday be?	
Me gustaría/ quisiera	I would like
Ir a	To go (to)
Pasar un mes en	To spend a month (in)
(Este) es mi sueño	This is/It's my dream
Sería...	It would be...

Unit 6: Going Out And Staying In

6.1.2 ¿Qué te gusta hacer en tu tiempo libre? - What do you enjoy doing in your free time?	
En mi tiempo libre	In my free time
Me apasiona (+ noun or infinitive) Me apasiona el esquí acuático / Me apasiona practicar el esquí	I have a passion for I am passionate about water ski / I am passionate about practising water ski
Desde hace... años	For ... years

6.2.1 ¿Qué planes tienes para el fin de semana? - ¿Qué vas a hacer este fin de semana? - What are you going to do at the weekend?	
Este fin de semana	This weekend
Voy a (+ infinitive)	I'm going to (+ verb/activity)

6.2.2 ¿Quieres ir al cine el sábado por la tarde? - Do you want to go out Saturday afternoon?	
¿Quieres + infinitive?	Do you want (to)...?
Salir conmigo	To go out with me
El sábado por la tarde/noche	Saturday afternoon/evening
¿A qué hora?	At what time?
A las ocho / a las ocho y media	At eight o'clock / at half past eight
Sí, buena idea	Yes, good idea
De acuerdo, vale	OK
Quizá(s)	Maybe
No me apetece	I don't fancy it
Lo siento, no puedo	Sorry, I can't

6.3.1 ¿Qué prefieres ver en la tele? - What do you prefer watching on tv?	
Prefiero / me gusta ver	I prefer to watch
Las noticias	The news
Los documentales	Documentaries
Las telenovelas	Soap operas
Los concursos	Gameshows
Las series americanas	(American) series
Los realities	TV reality programmes
Las emisiones deportivas	Sports programmes
¿Qué tipo de película te gusta ?	What genre of films do you like?
Las películas históricas	Historic films
Las películas de acción	Action films
Las películas de ciencia ficción	Science fiction films
Las películas de fantasía	Fantasy films
Las comedias	Comedies
Las películas de terror	Horror films
¿Te gusta... ?	Do you like...?
¿Cuál es tu programa de televisión favorito?	What is your favourite TV programme?
Son...	They are...

Unit 6: Going Out And Staying In

6.3.2 ¿Qué tipo de música prefieres? - What type of music do you prefer?	
Escucho/prefiero	I listen to/I prefer
Me gusta/prefiero escuchar	I like listening to/I prefer listening to
El rap / rock / heavy metal / reguetón	Rap / rock / metal / regeton
El pop / la música pop	Pop
La música electronica / clasica	Electronic music / Classical music
Mi cantante / artista / grupo favorito/a	My favourite singer / artist / band
La letra	The lyrics
La melodía	The tune

6.5 Vamos de fiesta - Let's party	
¿Qué vas a comprar ?	What are you going to buy?
¿Qué vas a llevar a la fiesta?	What are you going to bring to the party?
Voy / va / vamos a comprar	I'm going to buy
Voy / va / vamos a llevar	I'm going to wear
Bisutería, joyas	Jewellery
Un pantalón	Trousers
Unos vaqueros	Jeans
Un traje	A suit
Un vestido	A dress
Una falda	A skirt
Una chaqueta	A jacket
Una camisa	A shirt
Zapatillas de deporte / deportivas	Trainers
La comida	Food
Una tarta	A cake
Patatas fritas	Crisps
Bocadillos	Sandwiches
Chocolate	Chocolate
Bebidas (gaseosas)	(Fizzy) drinks

6.6 Role Plays	
¿(en qué) Puedo ayudarle?	Can I help you?
En la tienda	In the shop
¿Tiene... ?	Do you have...?
Un espejo	A mirror
Otra talla	Another size
¿Qué talla necesita?	Which size do you want?
Quisiera	I would like
Una talla más grande / pequeña	A bigger size/ smaller size
¿Dónde está(n)?	Where is.../where are...?
¿Cuánto es?	How much does that cost?
Son... euros	It costs...
En el restaurante	At the restaurant
¿Cuántas personas?	How many people?
Una mesa para dos/tres personas	A table for two/three people
La cuenta, por favor	Please
¿Tiene menú ?	Do you have a menu?
No tengo (tenedor, cuchillo, cuchara)	I don't have (a fork/knife)
Hay un problema	There is a problem

Unit 7 : Daily Routine, Health & Fitness

7.1.1 ¿Cómo es tu rutina diaria? - What's your daily routine like?	
Me levanto	I get up
Me lavo	I have a wash
Me lavo los dientes	I brush my teeth
Me ducho	I shower
Desayuno	I have breakfast
Voy al instituto	I go to school
Termino el instituto	I leave school
Vuelvo a casa	I return home
Merlendo	I have a snack
Ceno	I eat dinner
Me relajo	I relax
Me acuesto	I go to bed
A las...	At ... o'clock
A las ... y cuarto / y media	At quarter / half past ...
A las ... menos cuarto	At quarter to ...

7.1.2 ¿Qué cambiarías de tu rutina?	
Cambiaría mucho/poco	I would change a lot/little
Me gustaría (+infinitive)	I would like
Me gustaría poder (+infinitive)	I would like to be able
Levantarme	To get up
Acostarme	To go to bed
Volver a casa	To return home
Tener más tiempo	To have more time
Pronto	Early
Tarde	Late
Antes/ más pronto	Earlier
(Una hora) más tarde	(An hour) later

7.1.3 ¿Qué hiciste ayer?	
Me levanté a las...	I got up at...
Me duché	I showered
Fue...	It was...

7.2.1 ¿Llevas una vida sana?	
¿Estás en forma?	Are you fit?
(No) Estoy en (buena) forma / estoy sano/a	I'm (not) fit/healthy
(No) Llevo una vida sana	I am (not) healthy/I lead a healthy life
Bebo suficiente/poca agua	I drink enough/little water
Bebo muchas bebidas gaseosas	I drink a lot of fizzy drinks
(No) como sano	I (don't) eat healthily
Como demasiados caramelos	I eat too many sweets
Como pescado (muy) a menudo	I eat fish (very) often
(No) como suficiente verdura	I (don't) eat enough vegetables
Como fruta dos veces al día	I eat fruit twice a day
Me encanta la comida rápida	I love fast food
(No) soy activo/a	I am (not) active
Duermo ocho horas (al día)	I sleep eight hours per night

Unit 7 : Daily Routine, Health & Fitness

7.2.2 Qué debemos hacer para llevar una vida sana? & ¿Qué vas a hacer para mantenerte en forma? - What should we do to keep healthy?	
Para llevar una vida sana	To have a healthy life
Para mantenerse en forma	To stay fit
Voy a (+infinitive)	I'm going to
Debemos (+infinitive)	We should
Se debe (+infinitive)	One/you should
Hay que (+infinitive)	We must
Comer equilibradamente	To eat a balanced diet
Comer más/menos	To eat more/less (fewer)
Beber más	To drink more
Dormir más	To sleep more
Evitar	To avoid

7.3.2 En el médico - At the doctor's	
¿Qué le pasa ?	What's the matter?
¿Dónde le duele ?	Where does it hurt?
¿En qué puedo ayudarle ?	How can I help?
¿Desde hace cuánto tiempo ?	Since when?
Desde hace (un día/dos días)	For (a day/two days)
Debe	You must
Tomar un jarabe	Have/take some cough syrup
Tomar pastillas	Have/take pills
Tomar este medicamento/medicina	Take this medication
Ir al dentista	Go to the dentist
Ir a la farmacia	Go to the pharmacy
Dormir	Sleep
¿Qué me recomienda ?	What do you recommend?

7.3.1 ¿Qué te pasa?	
¿Dónde te duele ?	Where does it hurt?
Tengo dolor de/en (+article)... Tengo dolor de cabeza Me duele(n) la cabeza (los brazos)	My ... hurts
Cabeza (la)	Head
Garganta (la)	Throat
Pierna (la)	Leg
Brazo (el)	Arm
Cuello (el)	Neck
Espalda (la)	Back
Pie (el)	Foot
Vientre (el)	Stomach
Oído(s) (el/los)	Ears
Ojo(s) (el/los)	Eyes
Diente(s) / muela(s) (el/los; la/las)	Teeth
He vomitado	I've been sick
Me he quemado con el sol	I have a sunburn
Tengo un resfriado	I have a cold
Tengo la gripe	I have flu
Tengo la fiebre	I have a fever
Tengo tos	I have a cough

Unit 8: School and Future plans

8.1.1 ¿Cómo es tu instituto? - What is your school like?	
Es un colegio/instituto mixto	It's mixed school
Es un colegio de chicas/chicos	It's an all-girls/boys school
Está en/cerca de...	It is situated in/close to...
Hay... edificios	There are ... buildings
Llevamos uniforme	We wear a school uniform

8.1.2 ¿Qué actividades extraescolares haces? & ¿Cómo es un día típico en tu instituto? What co curricular activities do you do? & What is a typical day at school like?	
Tenemos... clases al día	We have ... lessons a day
El día empieza a las ...	The day starts at...
El día termina a las...	The day finishes at...
Después del instituto	After school
Hay muchas actividades y clubs	There are activities and clubs
Una actividad extracurricular	An extra-curricular activity
Se puede	You can
Participar en el coro	Participate in the choir

8.1.3 ¿Qué opinas de las reglas de tu instituto? - What do you think about the school rules?	
Hay demasiadas reglas/normas	There are too many rules
Hay que (+infinitive)	You have to...
No se puede (+infinitive)	You're not allowed to...
Masticar chicle	Chew chewing gum
Fumar	Smoke
Ser puntual	Be on time
Llegar tarde	Be late
Escuchar al/a la profe	Listen to the teacher
Acosar a los demás	Bully others
Utilizar el móvil	Use a mobile phone
Tener un piercing	Have a piercing
Llevar maquillaje	Wear make up

8.1.4 ¿Qué cambiarías? - What would you change?	
(No) cambiaría muchas cosas	I would (not) change a lot
Las reglas/normas son	The rules are
Me gustaría (+infinitive)	I would like
Llevar vaqueros	To wear jeans
Llevar zapatillas de deporte	To wear trainers
Llevar maquillaje	To wear make up
Llegar más tarde	To arrive later
Terminar las clases antes	To finish lessons earlier
Utilizar mi móvil	To use my mobile phone

Unit 8: School and Future plans

8.2.1 ¿En qué trabaja(n)? ¿Qué hacen tus padres? - What do your parents do?	
Mi madre/padre es...	My mum/dad is...
Cocinera/o	A cook
Enfermera/o	A nurse
Bombera/o	A firefighter
Dependiente	A salesperson/shop assistant
Camarera/o	Waiter/waitress
Médica/o	Doctor
Obrera/o	Builder
Electrista/o	Electrician
Conductora/conductor (de taxi/de bus)	(Taxi/bus) driver
Abogada/o	Lawyer
Mecánica/o	Mechanic
Profesora/profesor	Teacher
Madre/padre a tiempo completo	Stay-at-home mum/dad
Trabaja en	He/she works
Una oficina / una fábrica / al aire libre	In an office/a factory/outside
Está en paro	S/he is unemployed
Está jubilada/o	S/he is retired

8.2.2 ¿Qué les gusta de su trabajo?	
Le encanta su trabajo	He/she likes his/her job
No le gusta su trabajo	He/she does not like his/her job
Trabaja con otros	He/she works with others
Trabaja con niños	He/she works with children
Trabaja sola/o	He/she works alone
No le gusta (+infinitive)	He/she likes/doesn't like
Tiene que (+infinitive)	He/she has to/must
Limpiar	To clean
Cocinar	To cook
Hablar con los clientes	To speak with customers
Trabajar al aire libre	To work outside
Trabajar con el ordenador	To work on a computer
Ayudar a los demás	To help others
Tiene muchas responsibilidades	He/she has lots of responsibilities
Un buen sueldo	A good salary

Unit 8: School and Future plans

8.2.2 ¿Qué les gusta de su trabajo?	
Me gustaría/quiero ser	I would like/want to be
Espero ser	I hope to be
Piloto	A pilot
Ingeniera/o	An engineer
Cantante	A singer
Bailarina/bailarín	A dancer
Programadora/programador	A programmer
Deportista profesional	A professional sportsperson
Tener mi propio negocio	Have my own business
Viajar por todo el mundo	Travel the world
Sería	That would be...
Mi sueño	My dream

8.4 ¿Qué harás en el futuro / dentro de 5-10-20 años? - What will you do in the future / in 5-10-20 years from now?	
Dentro de 5-10-20 años	In five/ten/twenty years
Voy a (+infinitive)	I'm going to...
Quiero (+infinitive)	I want to...
Espero (+infinitive)	I hope to ...
Me gustaría/quisiera (+infinitive)	I would like to...
Casarme	To get married
Tener hijos	To have children
Tener una casa/un coche	To have a house/car
Tener mi propio negocio	To have my own business
Vivir en el extranjero	To live abroad
Estudiar en la universidad	To study at university
Viajar por todo el mundo	To travel
Ser feliz	To be happy/rich
Ser rica/o y famosa/o	To be rich and famous
Tendré	I will have
Podré (+ infinitive)	I will be able to

Hartshill Academy
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Year 8

Music

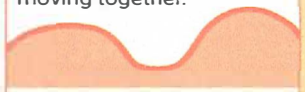
Heart - Ambition - Respect - Tenacity

Music for ensemble

Year 8 - Music

eduqas

Texture

MONOPHONIC	A single melodic line. 
HOMOPHONIC	A chordal style or melody and accompaniment: moving together. 
POLYPHONIC	A more complex (contrapuntal) texture with a number of different lines. 
Melody and accompaniment	A tune with accompaniment (e.g. chords).
Unison	All parts play/sing the same music at the same time.
Chordal	The music moves in chords (e.g. like a hymn/ chorale).
Descant	A decorative, higher pitched line.
Countermelody	A new melody, combined with the theme.
Round	A short (vocal) canon.
Canon	The melody is repeated exactly in different parts but starting at different times, with parts overlapping.
Drone	Long held notes.
2-3-4 part texture	Textures which have 2/3/4 different lines.

Jazz and blues

Scat: vocal improvisation using wordless/ nonsense syllables.
Improvised: music made up on the spot.
Blue notes: flattened 3rd, 5ths, 7ths.
Syncopation: off-beat accents.
Call and response: a phrase played/sung by a leader and repeated by others.
Walking bass: bass line that 'walks' up and down the notes of a scale/arpeggio.
Swing style: 'jazzy' rhythm with a triplet/ dotted feeling.

A jazz ensemble may contain:
Rhythm section
- Drums
- Bass (guitar or double bass)
- Piano/guitar

'Horn section'
- Trumpet
- Trombone
- Saxophone

Some groups use a wider range of instruments e.g. clarinet, violin.

12 bar blues

Chords

I	I	I	I
IV	IV	I	I
V	IV	I	I/V

Example in C major

C	C	C	C
F	F	C	C
G	F	C	C/G

Chamber music

Chamber music was music for a small ensemble, originally played in a small room in someone's home.
Baroque: The **trio sonata** featured one or two soloists, plus **basso continuo** (which consisted of a low-pitched instrument such as a cello playing a bassline, with an instrument playing chords e.g. harpsichord).

Classical: String quartets (two violins, a viola and a cello) were popular. They had **four** movements, with the 1st movement usually in sonata form.

Romantic: Chamber music groups were more varied in the Romantic era, using a wider range of instruments (e.g. piano quintet, horn trio). Performances happened in larger concert halls as well as in small 'chambers'.

A piece of music for:

DUET	2 performers
TRIO	3 performers
QUARTET	4 performers
QUINTET	5 performers
SEXTET	6 performers
SEPTET	7 performers
OCTET	8 performers

Musical theatre

Musical numbers may include:
Solo: a song for one singer.
Duet: a song for two singers.
Trio: a song for three singers.
Ensemble: a song sung by a small group.
Chorus: a large group (usually the full company/cast).
Recitative: a vocal style that imitates the rhythms and accents of speech.
Overture: an orchestral introduction to the show, which usually uses tunes from the show.
The orchestra/band is used to **accompany** the voices and to **underscore**.

Voices

Soprano
Alto
Tenor
Bass

The band/orchestra (sometimes called the 'pit' orchestra), may use **strings**, **woodwind** (sometimes called 'reeds'), **brass** and **percussion** and/or a rock/pop band, depending on the style. Most shows also use keyboards or synths.

THE HISTORY OF MUSIC IN AMERICA

AS A RESULT OF THE SLAVE TRADE

KNOWLEDGE ORGANISER

OVERVIEW

Between the 16th and 19th centuries, millions of Africans were taken to America through the transatlantic slave trade. They were forced to leave their homelands, languages and traditions behind. Despite unimaginable hardship, enslaved Africans kept their musical heritage alive. Over time, their music, instruments, rhythms and spirituals blended with European and indigenous influences to create powerful new genres that shaped American culture and the world.

> "Music was a way to survive, to remember, to resist and to communicate."

TIMELINE: KEY MOMENTS

- **1500s–1700s** — Transatlantic slave trade begins. Africans bring rich musical traditions, instruments (drums, rattles, banjos) and ways of making music using call and response, polyrhythms and improvisation.
- **1600s–1800s** — Spirituals and work songs develop on plantations as a way of coping, expressing faith and communicating.
- **1800s** — African American communities grow in cities. New music styles emerge: Blues, Ragtime and early Jazz.
- **1920s–1930s** — Jazz spreads across America and the world. Blues influences popular music.
- **1940s–1950s** — Rhythm and Blues (R&B) and Gospel grow. The foundations of Rock 'n' Roll are laid.
- **1960s–Present** — African American music continues to evolve and influence global genres: Soul, Funk, Hip-Hop, Neo-Soul, R&B, Rap and many more.

KEY TERMS

Transatlantic Slave Trade	The forced movement of millions of Africans to the Americas between the 1500s and 1800s.
Spirituals	Religious songs created by enslaved Africans expressing faith, hope and resistance.
Call and Response	A musical pattern where a leader sings or plays a phrase and others respond.
Polyrhythm	The use of two or more rhythms at the same time.
Blues	A style of music that expresses feelings of sadness and struggle, often using the 12-bar blues structure.
Ragtime	Upbeat piano music with a 'ragged' rhythm.
Improvisation	Making up music as you play.
Syncretism	The blending of different cultural or religious traditions.

FROM AFRICAN ROOTS TO AMERICAN MUSIC

SPIRITUALS & WORK SONGS
Born on plantations, these songs expressed faith, hope, pain and resistance. They laid the foundation for many American music styles.
Key features:
- Call and response
- Strong emotions
- Unaccompanied singing

BLUES
Developed in the Deep South in the late 1800s. The blues told stories of life's hardships and became a foundation for many genres.
Key features:
- 12-bar blues structure
- Blue notes (3b, 5b, 7)
- Guitar, harmonica, piano

RAGTIME
Popular in the early 1900s. A lively, syncopated piano style that influenced early jazz.
Key features:
- Syncopation
- March-like bass
- Piano music

JAZZ
Created in New Orleans in the early 1900s. Jazz is built on improvisation, swing rhythms and blended influences.
Key features:
- Improvisation
- Swing rhythm
- Brass instruments

GOSPEL
Church music that grew from Spirituals. It inspired and strengthened communities.
Key features:
- Strong vocals
- Clapping, stomping
- Built on [illegible] drums & harp
- Roots in R&B, Soul, Rock 'n' Roll
- Key instruments
- Influenced Americana
- Backed many marg

R&B, SOUL, ROCK 'N' ROLL & BEYOND
Built on Blues, Gospel and Jazz, leading to R&B, Soul, Rock 'n' Roll, Funk, Hip-Hop and many modern genres.
Key features:
- Strong backbeat
- Vocals and groove
- Strong backbeat
- Constant evolution
- Constant evolution

AFRICAN INFLUENCES THAT SHAPED AMERICAN MUSIC

- **Rhythm** is at the heart – complex rhythms (polyrhythms) and syncopation.
- **Call and response** – a way to communicate and build community.
- **Improvisation** – making music in the moment.
- **Strong connection** between music, dance and spirituality.
- Use of **instruments** like drums, banjos, shakers and later the blues harp.

INSTRUMENTS AND THEIR JOURNEY

African Drums
Used for rhythm, communication and ceremony.

Banjo
Adapted from African instruments. Became popular in folk and blues music.

Harmonica (Blues Harp)
Small, portable instrument that became key in the blues.

Piano
European instrument adopted and transformed in Ragtime and Jazz.

Guitar
Became central to blues, Rock, R&B and many other styles.

INFLUENTIAL MUSICIANS AND THEIR IMPACT

Folk and blues singer whose songs told.

Singer whom tongo told a vocal style.

LEAD BELLY (1888–1949)
"Empress of the Blues". shaped blues vocal style.

Jazz pioneer who brought jazz brought

LOUIS ARMSTRONG (1901–1971)
Jazz pioneer and trumpeter who brought JAZZ to the world.

Ray Charles Rhoe and Rose Blues artiodes

RAY CHARLES (1930–2004)
Blended Gospel, Blues and R&B. A true pioneer of Soul music.

"Queen of four-o'four generations.

TUPAC SHAKUR (1971–1996)
"Queen of Soul". Her voice inspired music spoke

Hip-Hop artist and poet whose music inspired change.

SUMMARY

- The music of America is deeply rooted in the experiences, resilience and creativity of Africans and their descendants.

  From Spirituals to Hip-Hop, their influence is everywhere.
- This music tells stories, builds connections and continues to shape cultures around the world.

REMEMBER

Music is more than entertainment – it is history, identity and power.

The Blues Knowledge Organiser

Year 8 and 9 - Music

Blues	The Blues is a genre of music originated by African Americans in the Deep South of the United States around the end of the 19th century. The genre has its roots in African musical traditions, and African-American work songs. 
Oppression	The exercise of authority or power in a cruel and unjust manner. People who are oppressed have their rights taken away, and are often forced to do things against their will. 
Bassline	The musical part which sits at the bottom of the texture. In the Blues, it follows a conventional pattern: **1, 3, 5, 6, b7, 6, 5, 3**
Chord	Two or more notes played simultaneously on a piano or guitar. There are three chords needed for the standard 12-bar blues: 
12 Bar Blues	A form commonly used in Blues music which is made up of 12 bar cycles. The chords appear in the following order: C C C C F F C C G F C C C = CEG, F = FAC, G = GBD
Quick Change Blues	Similar to the 12 bar blues, this form changes the final chord in the 12 bar sequence to G, making the piece feel as if it should continue.

Key Artists – Go the extra mile!

Muddy Waters (1913-1983) 	Muddy Waters was an American blues musician who is often cited as the "father of modern Chicago blues". We will listen to his song 'Hoochie Coochie Man' in lessons – get a head start by listening here: https://www.youtube.com/watch?v=U5QKpsVzndc
B.B. King (1925-2015) 	B.B. King was an American blues singer, electic guitarist, songwriter, and record producer. During his career, he earned the nickname 'The King of the Blues'. Listen to a song of his here: https://www.youtube.com/watch?v=oica5jG7FpU
Robert Johnson (1911-1938) 	Robert Johnson was an American blues singer-songwriter and musician. Even though his life was tragically short, he is one of the most prolific blues artists ever to have lived.