Name:_____

BROADOAK ACADEMY

Knowledge Organisers

Terms 5-6
Year 9

Contents

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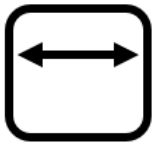
How to learn over time

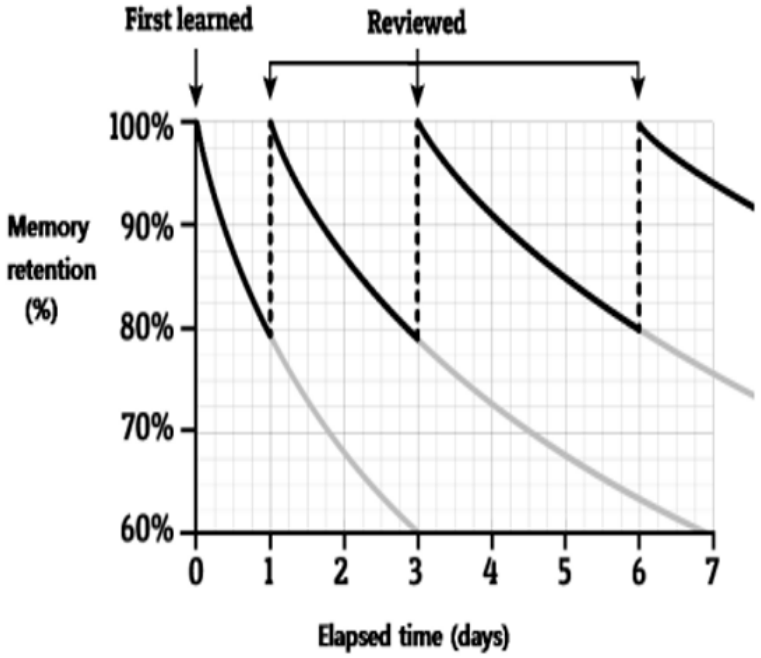
Successful Learning Takes Place Over Time

It's rare for anyone to be completely comfortable with something they learn for the first time. This could be a new piece of music, dance move, language or chemistry. We all have to practice. In most instances, the aim is to be at your optimum on the day it matters, e.g. the performance, race or exam. Everything leading up to this point is part of the process of improving. It's about the long-term rather than the short-term, which also means there are no quick fixes. During this period, it's okay to make mistakes; it's okay to feel frustrated. What matters is what you do about it.

Space out your learning on a subject



Spacing out your learning over time is far more effective than last-minute cramming. This is based on research into how we forget and how we remember. The speed at which we forget something will depend on many factors such as the difficulty of the material, how meaningful it was to us, how we learned it and how frequently we relearn or remember it. The last factor tells us that when we learn something for the first time, we need to review it quickly afterwards. The more times we force ourselves to remember something, the longer the gap between reviews, which the diagram below illustrates nicely. The Leitner system and Cornel Notes mentioned earlier provides a wonderful way of achieving this, but the principle applies to all of the learning strategies mentioned in this booklet.



Revision Strategies

List It

This is a simple free recall task that is very versatile. It can feel challenging, but this is a good thing, and it provides clear feedback on what you do and don't know. Choose a topic, set yourself a time limit and…

- List as many keywords as you can
- List as many facts as you can
- List as many key events/quotes/individuals as you can
- List as many causes of X as you can
- List as many consequences of Y as you can

Flashcards

Flashcards have the potential to be a powerful learning aid. However, how successful this is will depend on the thought you put into making them in the first place and then how they're used. It's very important to remember that they're for testing, not summarising.

Mapping

Mapping is a brilliant way of organising and learning information, demonstrated on various pages in this booklet. It helps you break down complex information, memorise it, and see the connections between different ideas.

Self-testing

Research has shown that every time you bring a memory to mind, you strengthen it. And the more challenging you make this retrieval, the greater the benefit. Self-testing improves the recall of information, transfer of knowledge and making inferences between information. Equally, there are many indirect effects, such as a greater appreciation of what you do and don't know, which helps you plan your next steps.

Flashcards

Flashcards are small sheets of paper or card with matching pieces of information on either side. They are a useful tool for learning facts and allow you to quickly check whether you have remembered something correctly.

When making and using flashcards:

Do:

- ✓ …make flashcards quickly.
- ✓ …put a single piece of information of each flashcard.
- ✓ …sort your flashcards according to your confidence with them (see below).
- ✓ …test yourself on the flashcards from memory.

Don't:

- X …spend more time making flashcards than actually using them.
- X …put lots of information onto each flashcard.
- X …revise the flashcards in the same order every time that you use them.
- X …only read through flashcards.

1861	groynes	osmosis	Where is the pharmacy?
Pasteur published his paper about germ theory.	A low wall on the coastline which slows longshore drift	Net movement of water from a high concentration to low concentration across a partially permeable membrane	Où est la pharmacie?

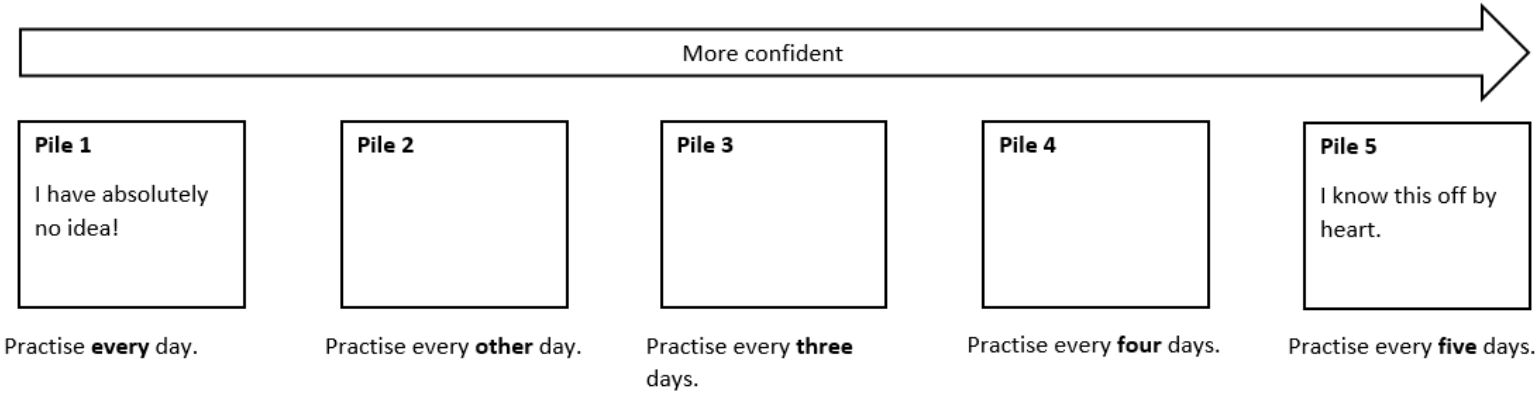
How to make flashcards:

- You can by a set of flashcards or use a free website such as Quizlet.
- Find the information you want to put onto flashcards using your existing revision resources (e.g. a knowledge organiser).
- Fold a piece of A4 paper into 10.
- Write the questions on the top half of the paper.
- Write the answers on the bottom half of the paper.
- Cut the paper along the dotted lines shown here.
- Fold the strips of paper so that the writing is on either side.

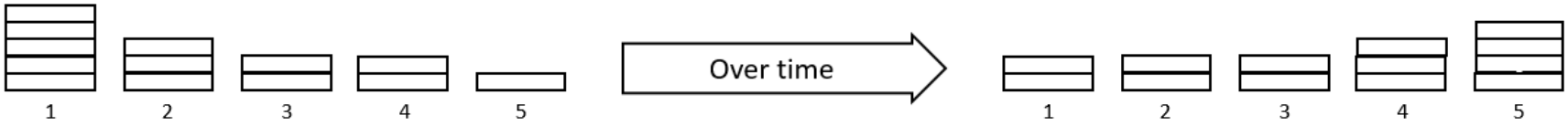
Definition 1	Definition 2	Definition 3	Definition 4	Definition 5
Answer 1	Answer 2	Answer 3	Answer 4	Answer 5

How to use flashcards:

1. Test yourself using the flashcards.
2. As you test yourself, sort the flashcards into up to five piles according to how confident you are with the content.
3. Put the piles into numbered envelopes (1-5).
4. Test yourself on the different piles on different days (see below):



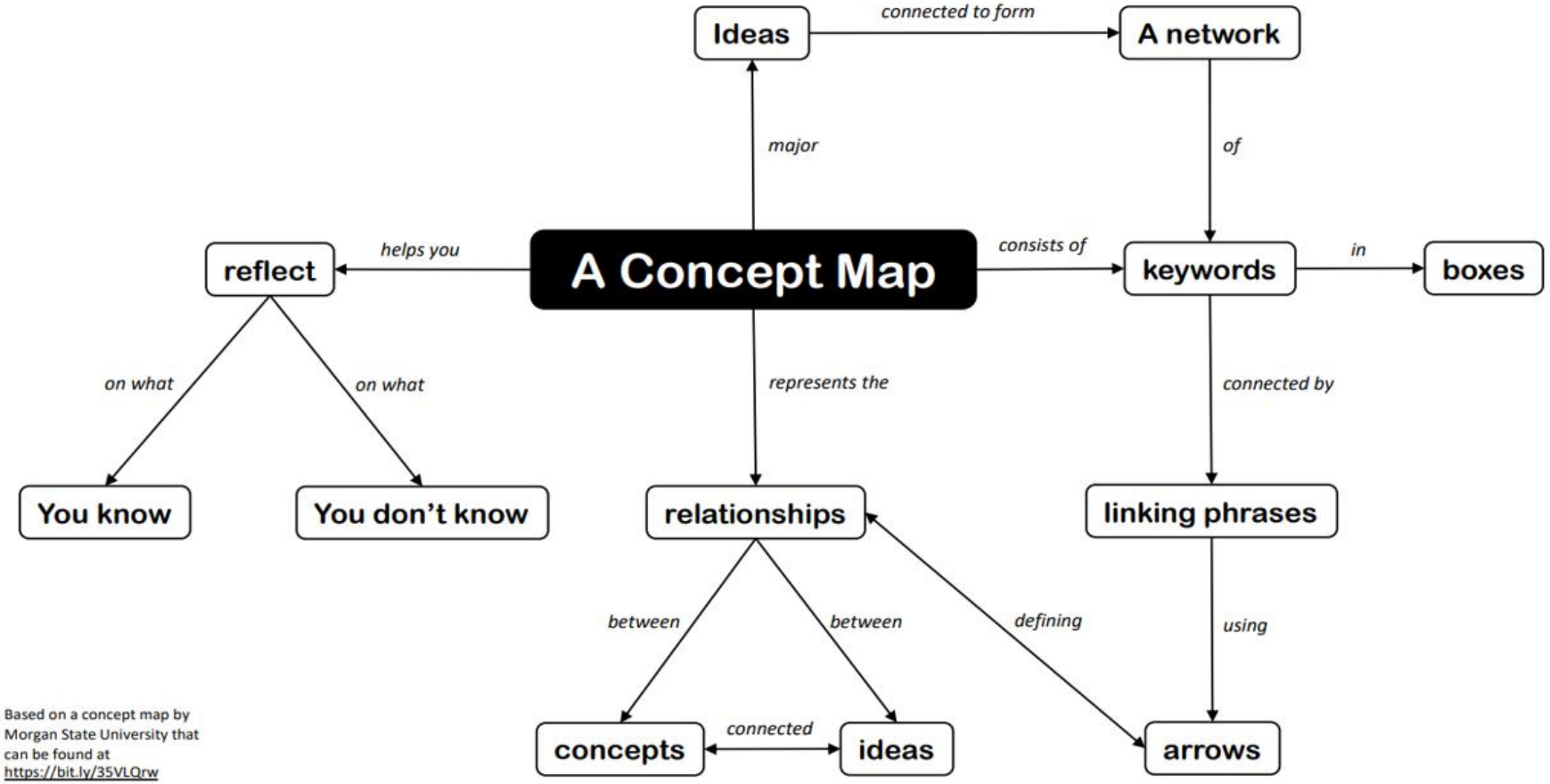
5. As you test yourself on the different piles, move the cards into different piles as you become more confident.



Useful resources:

www.quizlet.com – This free website allows you to quickly create flashcards which you can print, use on a computer, or use on your phone.

Mapping



Based on a concept map by Morgan State University that can be found at https://bit.ly/35VLQrw

BROADOAK ACADEMY

English

War of the Worlds

Context

At the time the novel was written (1898) the British Empire was by far the most dominant colonial power on earth. So vast was the British Empire that at the end of the 19th century the sun literally never set on it. London was (as it still is) the political capital of the United Kingdom and was the most populous city on earth throughout the last half of the 19th century, becoming the first city to have more than 5 million inhabitants by the 1880's. It is therefore natural that London was chosen as the starting point for an imagined alien invasion.

Towards the end of the 19th century there was a very real fear that it was the 'end of an age' and that an apocalypse could begin. In Britain this was partly due to this period coinciding with the ageing of Queen Victoria who was almost 80 when the novel was published. The Victorian era had seen the country become the first in the World to industrialise and build the largest Empire the world had ever seen. Queen Victoria died in January 1901.

Other fears included the fear of mass immigration from other parts of the British Empire as all citizens of British colonies were also British citizens. HG Wells used his own experiences in the novel and explored fear of the unknown, paranoia and the possibility of the world ending. He also used the novel to explore his own reservations about imperialism and explore the fragility of civilisation, showing how it can break down when faced with a seemingly unbeatable adversary.

Modern Context

What is space exploration?

Space exploration is the investigation by a crew or by machines of the reaches of the universe beyond Earth's atmosphere. The use of the information gathered should benefit all humankind.

Why is it significant?

Forty years after the first landing on the moon by two American astronauts, the significance of that historical step of human exploration is very different from what it was at that time. Then, it was a clear demonstration of the supremacy of U.S. technology over the world, and a symbol of the U.S. identity. Forty years later, it is not any more a matter of the moon and the United States, but rather of planet Earth and humankind; twenty-seven astronauts have seen planet Earth as a small and fragile golf ball floating in the universe and, as a result, helped develop the understanding that our future can only be global.

BROADOAK ACADEMY

English

War of the Worlds

The Author

H. G. Wells

English novelist, journalist, sociologist, and historian H.G. Wells was a prolific writer best known for such science-fiction novels as *The Time Machine* (1895) and *The War of the Worlds* (1898). He also wrote comic novels, histories, biographies, social commentaries, and short stories. Wells wrote his main works during the period that preceded World War I, as the Victorian Age was coming to an end. At the time people were questioning the social class system and the predetermined roles of males and females in society. Wells encouraged revolt against Christian beliefs and accepted codes of behaviour. In both his books and his personal life, he advocated for an almost complete freedom. Wells worked toward social equality, world peace, and what he considered to be the future good of humanity.

Wells's first published book was in 1893. Two years later he published his first novel, *The Time Machine*. The book tells of a nameless Time Traveller who uses an elaborate contraption to travel to the year 802,701. Scholars consider *The Time Machine* one of the earliest works of science fiction and the first with a "time travel" theme.

The Time Machine was immediately successful, so Wells began to write a series of science-fiction novels. *The Island of Doctor Moreau* (1896), about a mad scientist's experiments on animals, addresses such issues as evolution and ethics. *The Invisible Man* (1897) follows the life and death of a scientist who has gone mad. After learning how to make himself invisible, the scientist uses that ability to commit crimes, including murder. Wells's 1898 book *The War of the Worlds* details a catastrophic conflict between humans and extraterrestrial "Martians."

Timeline of Science Fiction

1726	**Gulliver's Travel** During his voyages the title character, Lemuel Gulliver, encounters utopian and dystopian societies as well as the flying island of Laputa, populated by scientists whose experiments are of no useful benefits
1818	**Frankenstein: Modern Prometheus** Frankenstein is seen as a warning against the expansion of science without a moral context.
1870	**Twenty Thousand Leagues Under the Sea** Captain Nemo and his undersea adventures on the Nautilus inspires real scientific development. In addition to imagining diving equipment, he expands on uses for a submarine.
1895	**The Time Machine** The late 19th Century witnesses the growth of new technologies, such as the steam engine, telephone and electricity. Against this backdrop, HG Wells introduces the idea of time travel.
1932	**Brave New World** Huxley imagines a dystopian world. His vision of the future questions where technology might take us.
1979	**The Hitchhiker's Guide to the Galaxy** Douglas Adams's series, originally written for radio, introduces humour to the genre by lampooning the jaded genre of the British space opera.

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English

War of the Worlds

The plot
Book 1

Ch 1 **The Eve of the War**	The Narrator describes Earth in the early twentieth century. During the last few years of the nineteenth century, Earth was being watched closely by a higher intelligence on Mars. Humans are unaware and dismiss the idea of life on Mars as impossible. The beings on Mars view humans much like humans view other animals, "as lowly and alien" as monkeys. Since Mars is older and smaller than Earth, the lifespan and resources of the planet are running out. The beings on Mars see the vast resources of Earth. The Narrator meets Ogilvy, an astronomer, and visits his observatory outside of Ottershaw. The two look at Mars through the telescope and see the venting of gases. They do not know that they are seeing the launch of projectiles toward Earth. While the projectiles travel toward Earth, life goes on peacefully, as no one is aware of the impending threat.
Ch 2 **The Falling Star**	A falling star is seen over Winchester. Ogilvy investigates and finds the crash site of a large metal cylinder in Horsell Common. It is still extremely hot, so he is unable to get very close. Ogilvy does notice that the end which protrudes from the ground is slowly rotating. He connects what he saw the previous night on Mars through his telescope and determines that there must be men inside. He runs to town, but people dismiss his story. He finds a London journalist, Henderson, and convinces him to come to the crash site. Finding that the cylinder has stopped moving, they return to town, where Henderson telegraphs the newspaper. When the Narrator reads of the crash site in his newspaper, he travels from his home in Woking to Horsell Common.
Ch 3 **On Horsell Common**	The Narrator arrives at the cylinder's crash site, where a small crowd has gathered at the edge of the crater. The table-sized end cap is no longer rotating, but he notices a yellowish-white metal between the cap and the cylinder. He believes that the cylinder must be full of information from Mars, and not living beings. He becomes impatient and returns home. He returns after the evening papers have reported "a message received from Mars." Henderson, Ogilvy, Stent (the Astronomer Royal) and several workmen are trying to unearth the portion of the cylinder that is still embedded in the ground. Ogilvy asks the Narrator to contact Lord Hilton, who owns the property, to remove all of the onlookers, who are impeding the excavation. The Narrator is pleased to be involved, finds out that Lord Hilton will be arriving by train soon, and heads to the train station.
Ch 4 **The Cylinder Opens**	The Narrator returns at sunset. Several hundred people have gathered. He elbows his way through the crowd and hears Ogilvy yelling to keep everyone back, since no one knows what is inside the cylinder. The end of the cylinder twists itself off and the Narrator stares into the dark emptiness of the cylinder. Gray tentacles, the thickness of a walking-stick, emerge from the cylinder, followed by a "rounded bulk" the size of a bear. The Narrator describes its movement as slow and painful, due to the difference in gravity between Mars and Earth. He adds that it is difficult to imagine the "strange horror" of a Martian's appearance, with a V-shaped mouth, large pair of eyes, rounded body and mass of tentacles. The Narrator retreats to a group of trees and tries to watch. The crowd has almost entirely dispersed, but he can no longer see what is happening in the pit around the cylinder.

BROADOAK ACADEMY

English

War of the Worlds

The characters			
The Narrator	The main protagonist and sole narrator. As an amateur astronomer, he is one of the first to notice a flash from Mars. He is courageous but he is occasionally overcome by fear during the invasion. He claims to have more first-hand knowledge of the Martians than any other living human.	**The Martians**	The technologically advanced aliens who invade Earth. They are extremely combative and relentless in their destruction of Earth and humans. Their major weapons are heat-ray guns and poisonous black vapor.
Henderson	A journalist from London. Henderson is the first person to believe Ogilvy about what he has seen, and he hurries to see for himself. Along with Stent and Ogilvy, he is part of the first group to approach the Martians.	**Oglivy**	A well-known astronomer and friend of the Narrator. He is the first to see fiery gas coming from Mars, and he invites the Narrator to look at Mars through his telescope the next night. Along with Stent and Henderson, he is part of the first group to approach the Martians
Stent	The Astronomer Royal. He leads a group of men to try to excavate the cylinder, and along with Ogilvy and Henderson, is part of the first group to approach the Martians.	**The Curate**	An unnamed man of the cloth and foil to the Narrator. His crisis of faith leaves him shaken and makes him behave in immoral ways. He refuses to accept the reality of the dire situation despite the concrete evidence that surrounds him.

BROADOAK ACADEMY

English

War of the Worlds

The plot Book 1	
Ch 8 Friday Night	Life continues as normal in the region around Horsell Common. Most of the people who were present have been killed, and those who escaped are treated as if they are deranged. Since Henderson stopped sending updates, the newspaper does not take the story seriously. Anyone else who has tried to approach the pit has been incinerated. A military regiment has been activated, however, and several dozen artillerymen deploy on the edges of the common to investigate. Just after midnight, a second cylinder streaks across the sky.
Ch 9 The Fighting Negins	The following day, the artillerymen surround the Martians at the first crash site. The Narrator travels down to the bridge and talks to a group of artillerymen who have not seen the Martians yet. They question the Narrator about the Martians and then argue amongst themselves about how to deal with them. The Martians have not left their pit and seem to be readying for a battle. The Narrator returns home, where he hears artillery shells thudding at the second Martian crash site. Explosions and gunfire erupt at the first Martian crash site, and several buildings around the Narrator's home are destroyed. He realizes that the Heat-Ray is within range of his home. He grabs his wife and servant, secures a horse and cart from his neighbour, and rides toward Leatherhead. The hills and buildings are burning behind him as he rides away.
Ch 10 In the Storm	The Narrator travels twelve miles to Leatherhead. He leaves his wife and servant with his cousins and turns back toward his home, so that he can return the horse and cart. He sees a third falling star and knows that it contains more Martians. Late at night, he nears his home. A hailstorm with lightning has started. The Narrator sees two large metal machines rise over the hill. He describes them as a tripod with a large dish at the top. He watches them break through lines of trees like a man walks through reeds. The Narrator tries to turn the horse cart, but instead it tumbles over, killing the horse. He hides as the two large machines pass near him. He finds cover and works his way home in the dark.

English

War of the Worlds

Key Words	
Colonialism	the policy or practice of acquiring full or partial political control over another country, occupying it with settlers, and exploiting it economically.
Imperialism	a policy of extending a country's power and influence through colonization, use of military force, or other means.
Literary heritage	Key texts that define a country's background and are seen as key texts worthy of study
Exodus	A mass departure of people
Evolution	The gradual development of something
Pulsate	To expand and contract in regular intervals
Astronomy	The branch of science that deals with objects in the sky such as planets and stars
Bulk	The mass or size of something
Steadfast	To not change or waver
Convulse	Violent movement of the muscles which causes the body to distort
Tumultuous	Making an uproar or loud, confused noise
Oppression	Prolonged cruel or unjust treatment or exercise of authority
Exploitation	To treat someone unfairly to benefit from their work

Motifs	
Red	It is a colour to warn of danger. The colour red and imagery of blood and fire appear throughout the novel to reinforce the danger coming from the red planet,
Noise and silence	Wells uses noise and silence in the book to set the tone, and the contrasts of noise and silence create an eerie mood in key parts of the book.

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English

War of the Worlds

Themes	
The Arrogance of Humans	Every human character in The War of the Worlds displays a level of arrogance that leads to problems for them. It never occurs to Ogilvy that the flaming gas is cause for alarm because he cannot fathom the intelligence of anything that is not human. This same belief in human superiority leads people to ignore the initial news items and eyewitness accounts and to think that the authorities can resolve the problem quickly and easily. Despite clear evidence that the Martians are technologically advanced, highly evolved, and very intelligent, the government and people have faith in the strength of their military's weapons.
Evolution and Natural Selection	The book is an homage to Darwin's theories of evolution and natural selection. At the time this book was written, Darwin's *On the Origin of Species* was almost forty years old, but his theories were not widely accepted yet. It becomes clear to the Narrator that the Martians are further along the evolutionary process than humans. Their brains are more sophisticated and they wield more advanced levels of technology. It is ironic, then, that something as small as bacteria takes them out.

Key Quotes
This was the deputation. There had been a hasty consultation, and since the Martians were evidently, in spite of their repulsive forms, intelligent creatures, it had been resolved to show them, by approaching them with signals, that we too were intelligent.
And before we judge them too harshly we must remember what ruthless and utter destruction our own species has wrought, not only upon animals, such as the vanished bison or dodo, but upon its inferior races. The Tasmanians, in spite of their human likeness, were entirely swept out of existence… in the space of fifty years.
In the end the red weed succumbed almost as quickly as it had spread. A cankering disease, due, it is believed, to the action of certain bacteria, presently seized upon it.
no writer… expressed any idea that intelligent life might have developed there far, or indeed at all, beyond its earthly level…. since Mars is older than our earth… it necessarily follows that it is not only more distant from time's beginning but nearer its end…. The immediate pressure of necessity has brightened their intellects, enlarged their powers, and hardened their hearts.
Never before in the history of the world had such a mass of human beings moved and suffered together…. it was a stampede… without order and without a goal, six million people unarmed and unprovisioned, driving headlong. It was the beginning of the rout of civilization, of the massacre of mankind.

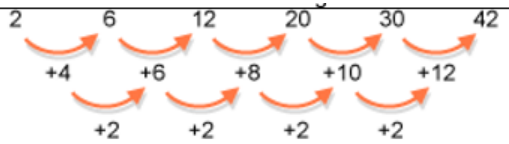
English

War of the Worlds

Poetry	
An Address to Potential Aliens by John Hegley	The poem consists of several rhetorical questions which makes the reader wonder if aliens, if they exist, share similarities to humans. Many of the examples are from the mundane aspects of life and the common experiences of being human.
You laughed and laughed and laughed by Gabriel Okara	Gabriel Okara's poem consists of 10 stanzas and describes the different interpretations of sounds, sights, and dances. The interaction that takes place within the poem is commonly thought to be between a white colonialist and an African native. Okara's poem presents a wiser African intellectual. The poem concludes with the African man teaching the White Man of his ignorance and helping him realize that the native beliefs of the African are not primitive nor removed from intellectual thought.
A Vision Simon Armitage	The poet speaks about town planning and how town planners were asked to draw up plans for future sustainable houses. Smaller displays were made that were featured in the town halls for the public to see. The poet describes those models complete with miniature detail and imagined inhabitants. The poem gives a beautiful description of the ideal civic life, subverted by the final revelation that the “Cities like dreams”, which these models encapsulate, are “now fully extinct”. The poet tells us how those displays were thrown away into the landfill sites and the planner’s dreams never came true.

Maths

Quadratic sequences

Quadratic Sequence	A sequence of numbers where the **second difference is constant**. A quadratic sequence will have a n^2 term.	

nth term of a quadratic sequence	1. Find the first and second differences. 2. Halve the second difference and multiply this by n^2. 3. Substitute $n = 1,2,3,4$ ... into your expression so far. 4. Subtract this set of numbers from the corresponding terms in the sequence from the question. 5. Find the nth term of this set of numbers. 6. Combine the nth terms to find the overall nth term of the quadratic sequence. Substitute values in to check your nth term works for the sequence.	Find the nth term of: 4, 7, 14, 25, 40.. Answer: Second difference = +4 → nth term = $2n^2$ Sequence: 4, 7, 14, 25, 40 $2n^2$ 2, 8, 18, 32, 50 Difference: 2, -1, -4, -7, -10 Nth term of this set of numbers is $-3n + 5$ Overall nth term: $2n^2 - 3n + 5$

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Maths

Other Types of Sequences

Arithmetic/ Geometric sequences

Arithmetic Sequences change by a common difference. This is found by addition or subtraction between terms

Geometric Sequences change by a common ratio. This is found my multiplication/ division between terms.

Term to term rule – how you get from one term (number in the sequence) to the next term.

Position to term rule – take the rule and substitute in a position to find a term. Eg. Multiply the position number by 3 and then add 2.

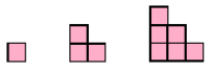
Other sequences

Fibonacci Sequence

1, 1, 2, 3, 5, 8 …

Each term is the sum of the previous two terms

Triangular Numbers – look at the formation



1, 3, 6, 10, 15 …

Square Numbers – look at the formation

1, 4, 9, 16…

Sequences are the repetition of a patten

Linear and Non Linear Sequences

Linear Sequences – increase by addition or subtraction and the same amount each time

Non-linear Sequences – do not increase by a constant amount – quadratic, geometric and Fibonacci

- Do not plot as straight lines when modelled graphically
- The differences between terms can be found by addition, subtraction, multiplication or division

Fibonacci Sequence – look out for this type of sequence

0 1 1 2 3 5 8 …

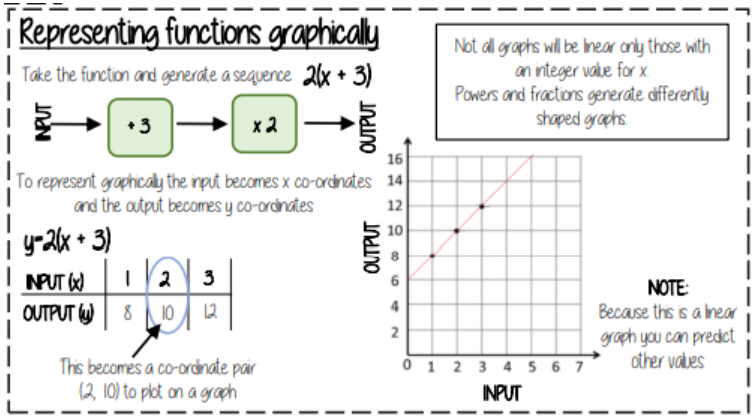
Each term is the sum of the previous two terms

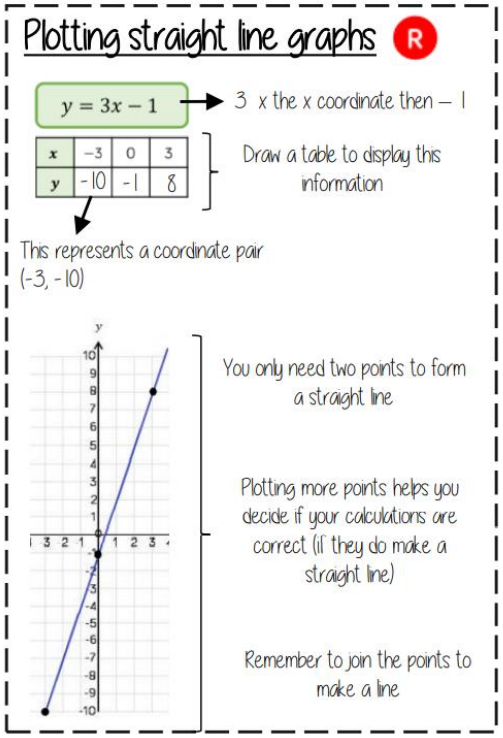
Geometric Sequence	A sequence of numbers where each term is found by **multiplying the previous one** by a number called the **common ratio, r**.	An example of a geometric sequence is: $2, 10, 50, 250$ … The common ratio is 5 Another example of a geometric sequence is: $81, -27, 9, -3, 1$ … The common ratio is $-\frac{1}{3}$

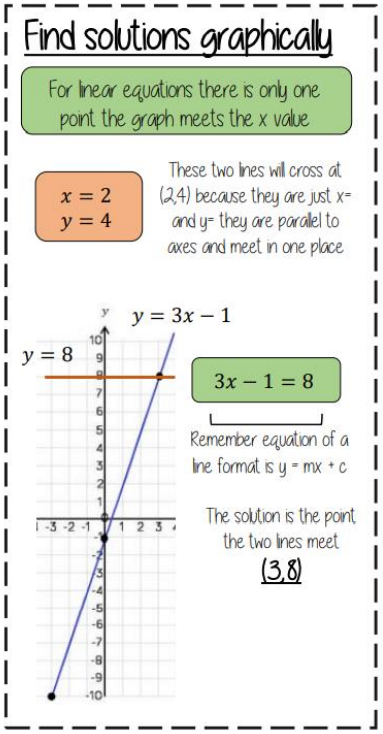
nth term of a geometric sequence	ar^{n-1} where a is the first term and r is the common ratio	The nth term of $2, 10, 50, 250$ …. Is $2 \times 5^{n-1}$

Maths

Straight line graphs







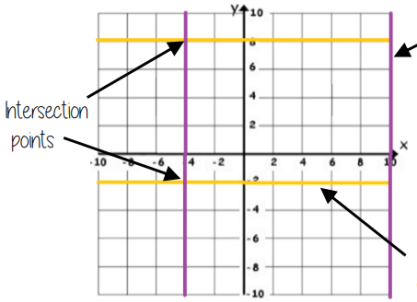
Gradient: the steepness of a line
Intercept: where two lines cross. The y-intercept: where the line meets the y-axis.
Parallel: two lines that never meet with the same gradient.
Co-ordinate: a set of values that show an exact position on a graph.
Linear: linear graphs (straight line) – linear common difference by addition/ subtraction
Asymptote: a straight line that a graph will never meet.
Reciprocal: a pair of numbers that multiply together to give 1
Perpendicular: two lines that meet at a right angle.

BROADOAK ACADEMY

Maths

Straight Line graphs

Lines parallel to the axes



Intersection points

All the points on this line have a x coordinate of 10

'a' can be ANY positive or negative value including 0

Lines parallel to the **y axis** take the form **x = a** and are **vertical**

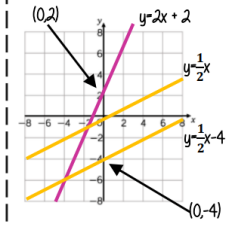
Lines parallel to the **x axis** take the form **y = a** and are **horizontal**

All the points on this line have a y coordinate of -2

e.g (3, -2) (7, -2) (-2, -2) all lay on this line because the y coordinate is -2

Compare Intercepts

$y = mx + c$ ← The value of **c** is the point at which the line crosses the y-axis. **Y intercept**



The coordinate of a y intercept will always be (0,c)

Lines with the **same** y-intercept cross in the **same** place

y = mx + c

The **coefficient** of x (the number in front of x) tells us the gradient of the line

$y = mx + c$ ← The value of **c** is the point at which the line crosses the y-axis. **Y intercept**

y and x are **coordinates**

The equation of a line can be rearranged. E.g.

$y = c + mx$

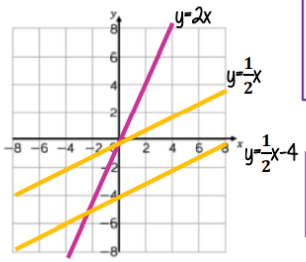
$c = y - mx$

Identify which coefficient you are identifying or comparing

Compare Gradients

$y = mx + c$

The **coefficient** of x (the number in front of x) tells us the gradient of the line



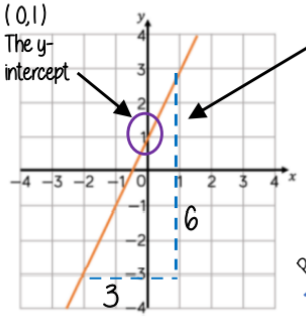
The **greater** the gradient – the **steeper** the line

Parallel lines have the **same** gradient

Positive gradients

Negative gradients

Find the equation from a graph



The Gradient $\frac{6}{3} = 2$

$y = 2x + 1$

The direction of the line indicates a positive gradient

Positive gradients

Negative gradients

Maths

Rearranging

Rearranging formulae

TASK 1

$y = ax + c$

$ax + c = y$

$ax = y - c$

$x = \frac{y-c}{a}$

The 'aim' is to get 'x' on its own (x = ...)

- c from both sides

divide both sides by a

TASK 2

$y = x^2 - a$

$x^2 = y + a$

$x = \pm\sqrt{y+a}$

+a to both sides

Don't forget the ± when you square root both sides

The highest common factor of 25 and 45 is **5**

TASK 3

$ax - b = cx + b$

$ax - cx = 2b$

$x(a - c) = 2b$

$x = \frac{2b}{a-c}$

Rearrange so that all the terms involving 'x' are on the same side

Factorise to isolate the 'x'

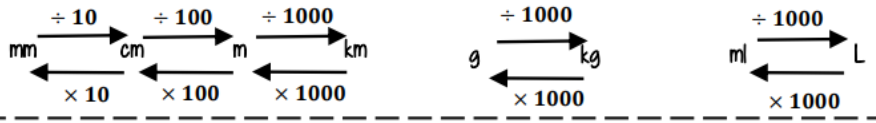
ax - cx = x(a - c)

Divide by (a - c) to leave 'x' on it's own

Maths

Units & Compound Measures

Units are important: Useful Conversions

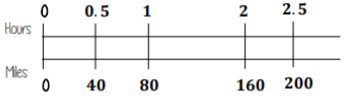


Speed, Distance, Time

"per" for every
e.g. 80 miles per hour (mph)
Travel 80 miles every hour

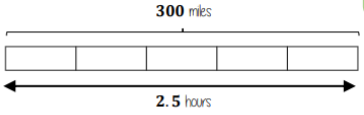
$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

You can use a double number line to help you calculate distance



e.g. A boat travels at a constant speed for 2.5 hours
It travels 300 miles.

Bar models can help to calculate mph



Each part is half an hour
Each part is 60 miles

Density, Mass, Volume

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

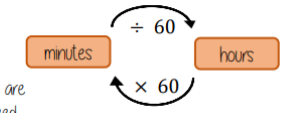
$$\text{volume} = \frac{\text{mass}}{\text{density}}$$

$$\text{mass} = \text{volume} \times \text{density}$$

volume of prism = Area of cross section × Depth

R

Speed, Distance, Time



Before calculations – make sure you are working in the same units as the speed

Learn or learn how to rearrange the formular for speed, distance and time

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

Substitute in the variables given

$$\text{distance} = \text{speed} \times \text{time}$$

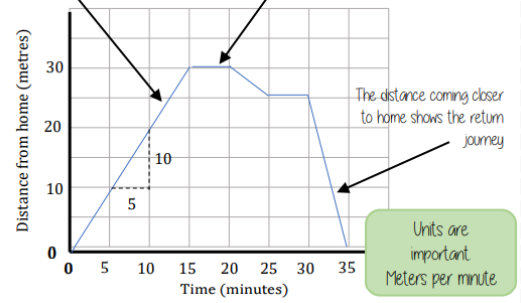
Distance – Time graphs

Gradient = speed

The steeper a gradient the faster the speed

$\frac{10}{5} = 2$ metres per min

Horizontal lines represent staying still



The distance coming closer to home shows the return journey

Units are important
Meters per minute

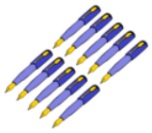
Maths

Direct & Inverse Proportion

Keywords

Proportion: a comparison between two numbers
Ratio: a ratio shows the relative size of two variables
Direct proportion: as one variable is multiplied by a scale factor the other variable is multiplied by the same scale factor.
Inverse proportion:: as one variable is multiplied by a scale factor the other is divided by the same scale factor.

Best buys

	4 pens costs £2.60	10 pens costs £6.00
'I pen costs...'	£2.60 ÷ 4 = £0.65	£6.00 ÷ 10 = £0.60
'1-pound buys...'	4 ÷ 2.60 = 1.54 pens	10 ÷ 6 = 1.67 pens

You could work out how much 40 pens are and then compare

Compare the solution in the context of the question

The best value has the lowest cost "per pen"

The best value means £1 buys you more pens

Direct Proportion

As one variable changes the other changes at the same rate.

4 cans of pop = £2.40

This is a multiplicative change

4 cans of pop = £2.40 → (×3) → 12 cans of pop = £7.20

4 cans of pop = £2.40 → (×0.5) → 2 cans of pop = £1.20

This multiplier is the same in the same way that this would be for ratio

Sometimes this is easiest if you work out how much one unit is worth first
e.g. 1 can of pop = £0.60

Inverse Proportion

As one variable is multiplied by a scale factor the other is divided by the same scale factor

Examples of inversely proportional relationships

Time taken to fill a pool and the number of taps running

Time taken to paint a room and the number of workers

T is inversely proportional to G. When T=2 then G=20

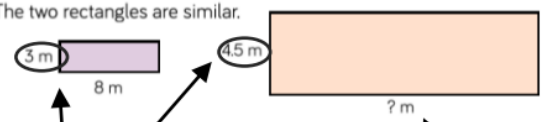
	÷ 2		× 4
T	1	2	8
G	40	20	5
	× 2		÷ 4

Maths

Scale Diagrams and Maps

Understand Scale Factor

The two rectangles are similar.



3 x 1.5 = 4.5

This is a multiplicative change

Use **corresponding** sides to calculate a scale factor

Missing length
8 x 1.5 = 12m

Scale factor can also be calculated by:

Bigger corresponding side
Smaller corresponding side

x SF

Small corresponding side ⟷ Big corresponding side

÷ SF

Draw and interpret scale diagrams

A picture of a car is drawn with a scale of 1:30

For every 1cm on my image is 30cm in real life

The car image is 10cm

Image	Real life
1cm	30cm
10cm	300cm

(× 10 between rows; × 10 between columns)

The car in real life is 210cm

Image	Real life
1cm	30cm
7cm	210 cm

(× 7 between rows; × 7 between columns)

Interpret maps with scale factors

÷ 10	÷ 100	÷ 1000
mm ⟷ cm	cm ⟷ m	m ⟷ km
x 10	x 100	x 1000

1 cm : 250 m

Ratios need to be in the same units

1 cm : 250m

1 cm : 25000cm

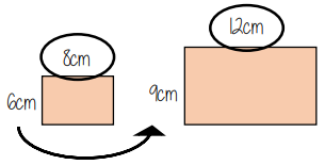
250 x 100 = 25000

For every 1cm on my map is 25000cm in real life.

Maths

Similarity

Information in similar shapes



Compare the equivalent side on both shapes

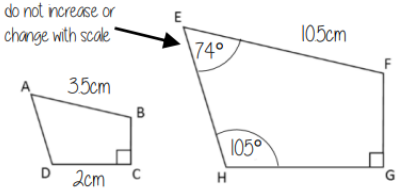
Scale Factor is the multiplicative relationship between the two lengths

Shape ABCD and EFGH are similar

Notation helps us find the corresponding sides

AB and EF are corresponding

Remember angles do not increase or change with scale



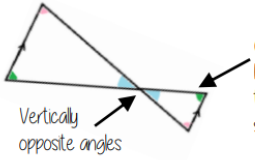
Similar triangles

Shares a vertex

Because corresponding angles are equal the highlighted angles are the same size

Parallel lines – all angles will be the same in both triangle

As all angles are the same this is similar – it only one pair of sides are needed to show equality



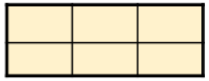
All the angles in both triangles are the same and so similar

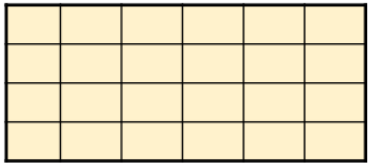
Vertically opposite angles

Recognise enlargement & similarity

Shapes are similar if all pairs of corresponding sides are in the same ratio

These shapes are similar because all sides are increased by the same ratio





Enlargements are similar shapes with a ratio other than 1

Keywords

Similar Shapes: shapes of different sizes that have corresponding sides in equal proportion and identical corresponding angles

Scale Factor: the multiple describing how much a shape has been enlarged

Enlarge: to change the size of a shape (enlargement is not always making a shape bigger)

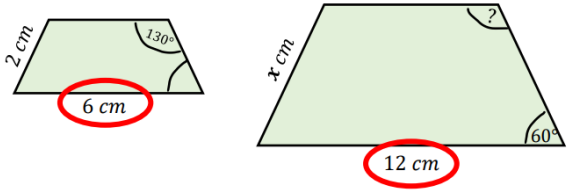
Corresponding: objects (or sides) that appear in the same place in two similar situations

Image: the picture or visual representation of the shape

Calculations in similar shapes

Don't forget that properties of shapes don't change with enlargements or in similar shapes

The two trapezium are similar find the missing side and angle



Corresponding sides identify the scale factor $\frac{12}{6} = 2$ Scale Factor = **2**

Calculate the missing side Length (corresponding side) x scale factor

$2cm \times 2$

$x = 4cm$

Enlargement does not change angle size

Calculate the missing angle Corresponding angles remain the same

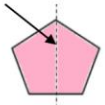
$130°$

Maths

Transformations

Lines of symmetry

Mirror line (line of reflection)

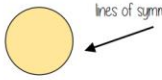


Rhombus
two lines of symmetry

Parallelogram
No lines of symmetry

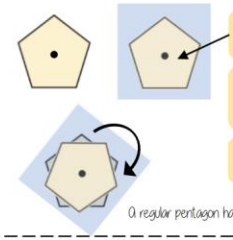
Shapes can have more than one line of symmetry... This regular polygon (a regular pentagon has 5 lines of symmetry)

A circle has an infinite amount of lines of symmetry



Rotational Symmetry

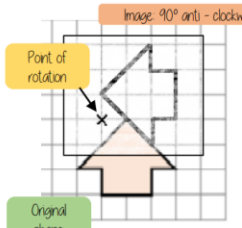
Tracing paper helps check rotational symmetry



1. Trace your shape (mark the centre point)
2. Rotate your tracing paper on top of the original through 360°
3. Count the times it fits back into itself

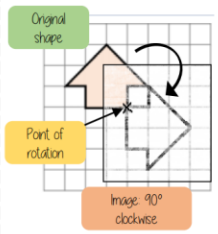
A regular pentagon has rotational symmetry of order 5

Rotate from a point (outside a shape)



1. Trace the original shape (mark the point of rotation)
2. Keep the point in the same place and turn the tracing paper
3. Draw the new shape

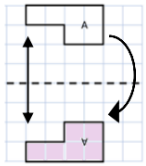
Rotate from a point (in a shape)



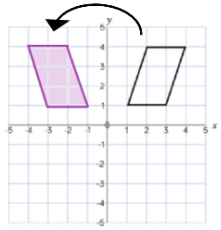
1. Trace the original shape (mark the point of rotation)
2. Keep the point in the same place and turn the tracing paper
3. Draw the new shape

Reflect horizontally/ vertically (2)

All points need to be the same distance away from the line of reflection

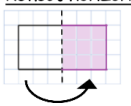


Reflection in the line y axis – this is also a reflection in the line x=0



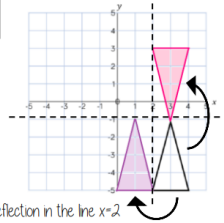
Lines parallel to the x and y axis
REMEMBER
Lines parallel to the x-axis are y = ____
Lines parallel to the y-axis are x = ____

Reflect horizontally/ vertically (1)

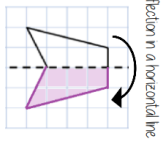


Note: a reflection doubles the area of the original shape

Reflection on an axis grid

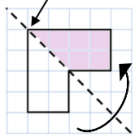


Reflection in a vertical line



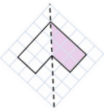
Reflect Diagonally (1)

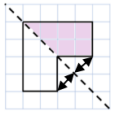
Points on the mirror line don't change position



Fold along the line of symmetry to check the direction of the reflection

Turn your image
If you turn your image it becomes a vertical/ horizontal reflection (also good to check your answer this way)

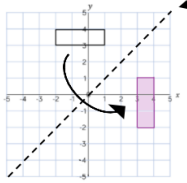




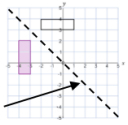
Drawing perpendicular lines
Perpendicular lines to and from the mirror line can help you to plot diagonal reflections

Reflect Diagonally (2)

This is the line **y = x** (every y coordinate is the same as the x coordinate along this line)



This is the line **y = -x**
The x and y coordinate have the same value but opposite sign



Turn your image
If you turn your image it becomes a vertical/ horizontal reflection (also good to check your answer this way)

Keywords

Mirror line: a line that passes through the center of a shape with a mirror image on either side of the line
Line of symmetry: same definition as the mirror line
Reflect: mapping of one object from one position to another of equal distance from a given line
Vertex: a point where two or more line segments meet
Perpendicular: lines that cross at 90°
Horizontal: a straight line from left to right (parallel to the x axis)
Vertical: a straight line from top to bottom (parallel to the y axis)

Maths

Transformations

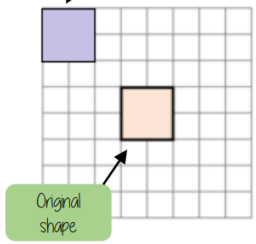
Translation and vector notation

Vector Notation → $\begin{pmatrix} 1 \\ -2 \end{pmatrix}$

How far left or right to move
Negative value (left)
Positive value (right)

How far up or down to move
Negative value (down)
Positive value (up)

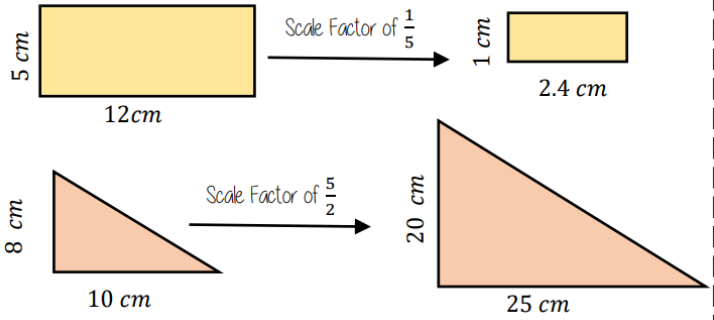
Translation $\begin{pmatrix} -3 \\ 3 \end{pmatrix}$



Every vertex has been translated by the same amount

Positive fractional scale factor

With a scale factor between 0 and 1 it makes the shape **smaller**

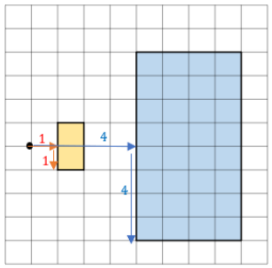


Keywords

Enlarge: to make a shape bigger (or smaller) by a given multiplier (scale factor)
Scale Factor: the multiplier of enlargement
Centre of enlargement: the point the shape is enlarged from
Similar: when one shape can become another with a reflection, rotation, enlargement or translation
Congruent: the same size and shape
Corresponding: items that appear in the same place in two similar situations
Parallel: straight lines that never meet (equal gradients)

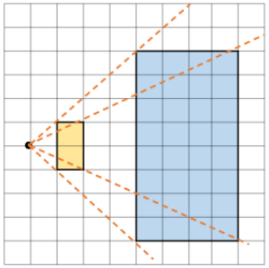
Enlarge a shape from a point

Scaled distances method



Scale the distance between the point of enlargement and each corresponding vertices

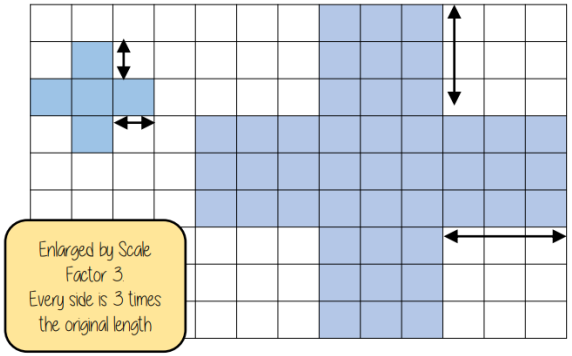
Rays method



Multiply the distance from the centre of corresponding vertices by the scale factor along the ray

Enlarge by a positive scale factor

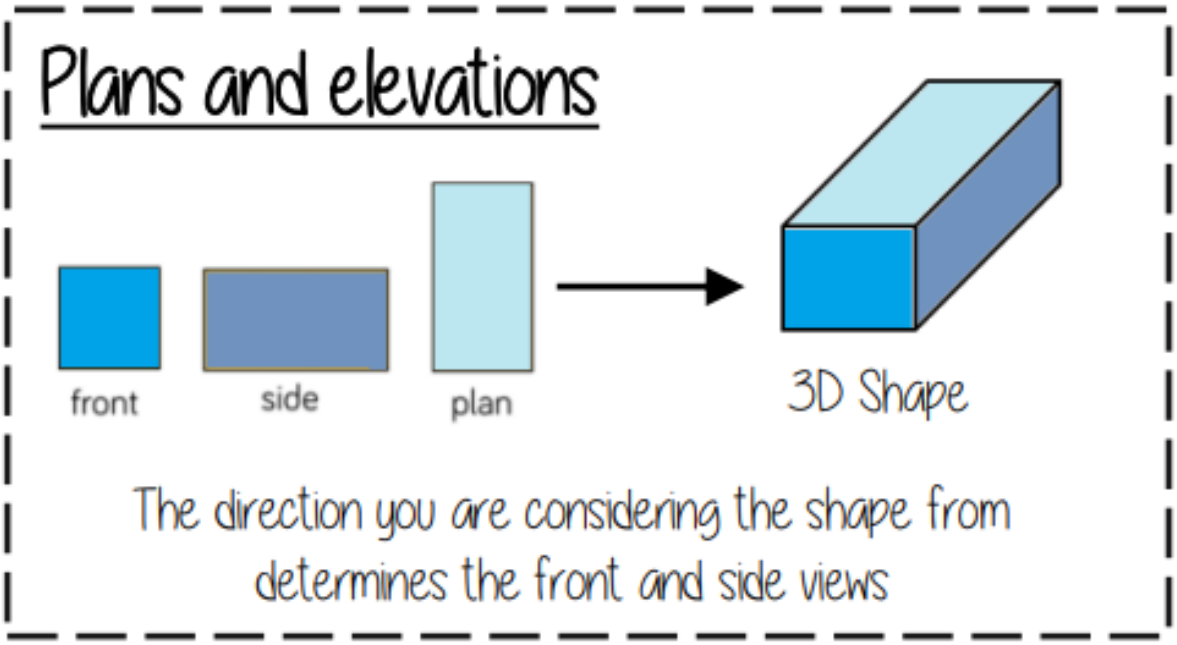
With a scale factor larger than 1 it makes the shape **bigger**



Enlarged by Scale Factor 3
Every side is 3 times the original length

Maths

Plans & Elevations

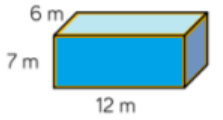


Maths

Surface Area

Surface area

Sketching nets first helps you visualise all the sides that will form the overall surface area



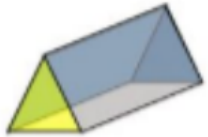
Sides 6 x 7, 6 x 7

Front and back 12 x 7, 12 x 7

Top and Bottom 12 x 6, 12 x 6

Sum of all sides is surface area

For cubes and cuboids you can also find one of each face and double it



For other shapes - not all the sides are the same, so calculate the individually

Surface area - cylinders

The area of the circle

π x radius^2

Circumference

The width of this face is the same as the circumference

π x diameter x height

$2 \times \pi \times \text{radius}^2 + \pi \times \text{diameter} \times \text{height}$

BROADOAK ACADEMY

C5-7: Bonding

Lesson sequence

1. Ionic bonding
2. Ionic compounds
3. Properties of ionic compounds
4. Covalent bonding
5. Covalent structures
6. Allotropes of carbon
7. Metallic bonding
8. Classifying materials

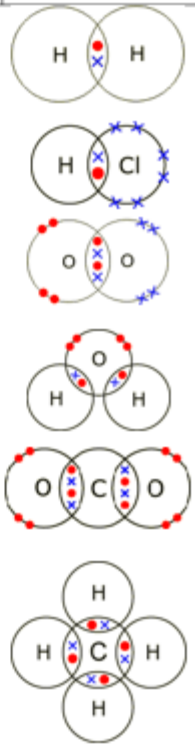
1. Ionic bonding	
*Bond	An attraction between two atoms that holds them together.
*Ion	An atom that has gained a charge by gaining or losing electrons.
*Charge	Whether an ion is positive or negative.
*Cation	Positive ion formed by losing electrons. Formed by metal atoms.
*Anion	Negative ion formed by gaining electrons. Formed by non-metal atoms.
**Size of charge	The number of electrons transferred affects the size of charge: losing two electrons makes a 2+ charge, gaining three electrons makes a 3- charge.
**How many electrons are gained or lost?	**Metals:** however many electrons are in the outer shell **Non-metals:** however many electrons are needed to fill the outer shell.
*Electrostatic force	A force of attraction between a positive and negative particle.
*Ionic bond	When two oppositely charged ions are held together by an electrostatic force.
**Forming ionic bonds	Electrons are transferred from a metal atom to a non-metal atom to form a positive metal cation and a negative metal anion. The oppositely charged ions are attracted to each other.

2. Ionic compounds	
*Chemical formula	Shows the number of atoms of each element present in one 'unit' of a compound.
*Writing formulae	- Each chemical symbol starts with a capital letter. -The number of each atom present is shown with a subscript number after the symbol. E.g. H_2SO_4.
**Determining ionic formulae	-Ensure the total number of positive and negative charges balance. - Change the number of each ion present by changing the subscript numbers.
*Compound ions	An ion made from two or more atoms that share a charge.
*Common compound ions	Hydroxide: OH^- Nitrate: NO_3^- Sulfate: SO_4^{2-} Sulfite: SO_3^{2-} Carbonate: CO_3^{2-} Ammonium: NH_4^+
**Including compound ions in formulae	If you need more than one, put brackets around it. E.g. $Mg(OH)_2$
*Ionic lattice	The structure of ionic compounds: a repeating 3D pattern of alternating positive and negative ions.
**Crystal	A piece of material with a regular shape and straight edges formed by the regular pattern of ions in an ionic lattice.

3. Properties of ionic compounds	
**Melting point of ionic compounds	High because melting needs a lot of energy to break strong ionic bonds.
*Solubility of ionic compounds	Many ionic compounds dissolve in water.
**Electrical conductivity of ionic compounds	Solid: Do not conduct because ions can't move. Liquid (molten or solution): Do conduct because ions can move.
**How ionic compounds conduct electricity	When they are in a liquid form, the positive cations move to the negative electrode (cathode) and the negative anions move the positive electrode (anode).

4. Covalent bonding	
*Covalent bond	An electrostatic attraction between two atoms and a share pair of electrons.
**Double bond	A covalent bond involving two shared pairs of electrons.
*Dot and cross diagram	A bonding diagram showing the electrons in the outer shell of each atom, with electrons drawn as dots or crosses.
*Hydrogen, H_2	Two overlapping circles both labelled H. One pair in the overlap.
**Hydrogen chloride, HCl	Two overlapping circles labelled H and Cl. One pair in the overlap, 6 electrons around Cl.
**Oxygen, O_2	Two overlapping circles both labelled O. Two pairs in the overlap, 4 electrons around each O.
**Water, H_2O	Three overlapping circles in a line labelled H, O, H. A pair in each overlap, 4 electrons around O.
**Carbon dioxide, CO_2	Three overlapping circles in a line labelled O, C, O. Two pairs in each overlap, 4 electrons around each O.
**Methane, CH_4	Five circles with one in the centre labelled C and 4 labelled H around it. A pair in each overlap.

**Valency	The number of covalent bonds an atom can form.
**Valency and groups	Group 4 = 4 (4 electrons needed) Group 5 = 3 (3 electrons needed) Group 6 = 2 (2 electrons needed) Group 7 = 1 (1 electron needed)
**Working out molecular formulae	Find the lowest common multiple of the valency of each atom. Use the number of an atom required to reach the LCM.



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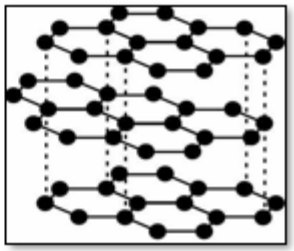
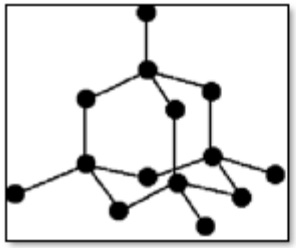
5. Covalent structures	
*Molecule	A particle made from two or more atoms bonded together.
*Simple molecular structure	A structure made of small molecules in which a few atoms join together to form a small particle.
**Structure of molecular substances	Atoms in a molecule are held together by strong covalent bonds. Neighbouring molecules are held close by weak intermolecular forces.
**Intermolecular force	A weak electrostatic force that holds two neighbouring molecules together.
**Melting point of simple molecular compounds	Low because melting only needs a little energy to break weak intermolecular forces.
**Electrical conductivity of simple molecular compounds	Do not conduct because there are no electrons that are free to move.
*Examples of simple molecular substances	Hydrogen gas, oxygen gas, water, carbon dioxide, methane.
*Giant molecular structure	A structure made of a repeating pattern of atoms covalently bonded together.
**Melting point of giant molecular compounds	High because melting requires breaking strong covalent bonds.
**Electrical conductivity of simple molecular compounds	Do not conduct (except graphite) because there are no electrons free to move.
*Examples of simple molecular substances	Silicon dioxide (silica), diamond, graphite.
*Polymer	A large molecule made of a small unit repeated many times.
*Monomer	A small molecule that can be joined together many times to form a polymer.

6. Allotropes of carbon	
*Allotrope	A different structural form of an element made of the same atoms just bonded together differently.
*Carbon's allotropes	Graphite, diamond, graphene, fullerenes
**Graphite	**Structure:** stacked sheets of carbon in a honeycomb pattern with delocalised electrons between them. **Properties:** sheets slide apart easily, excellent conductor **Uses:** lubricants
**Diamond	**Structure:** Repeating pattern of 4 atoms bonded to 4 others. **Properties:** Extremely hard. **Uses:** Cutting tools and drills
**Graphene	**Structure:** A single layer of atoms in a honeycomb pattern. **Properties:** Very strong, excellent conductor. **Uses:** None yet, but potentially many.
**Buckminster fullerene	**Structure:** Ball-shaped molecules of C_{60}. **Properties:** Low melting point **Uses:** None
**Carbon nanotubes	**Structure:** Cylinders made of carbons bonded in a honeycomb pattern. **Properties:** Very strong, excellent conductors **Uses:** Strong and flexible materials, electronics.





7. Metallic bonding	
*Structure of metals	A lattice of positive metal ions surrounded by a cloud of delocalised electrons.
**Delocalised electrons	Electrons that are not bound to a single atom but move freely around many.
**Metallic bonding	The electrostatic attraction between the lattice of positive metal ions and the cloud of delocalised electrons.
**Electrical conductivity of metals	Metals are good conductors because the electrons are free to move.
**Comparing the conductivity of metals	Metals with more electrons in the outer shell – such as Al – are better conductors than those with fewer – such as Li – because there are more delocalised electrons that are able to move.
*Malleable	When a substance dents when it is hit instead of shattering.
**Malleability of metals	Metals are malleable because the atoms are arranged in regular sheets and these sheets can easily slide over each other when hit.
**Melting point of metals	High because melting them requires breaking the strong force of attraction between the lattice of metal ions and the cloud of delocalised electrons.

8. Bonding models	
**Classifying materials	The properties of a material can be used to determine the type of bonding in it.
**Properties of ionic compounds	High melting point, often soluble in water, solid does not conduct electricity, liquid/solution does.
**Properties of simple molecular compounds	Low melting point, does not conduct electricity, sometimes soluble in water.
**Properties of giant molecular compounds	High melting point, does not conduct electricity (except graphite), insoluble in water.
**Properties of metallic compounds	High melting point, does conduct electricity, insoluble in water.
**Bonding models	The ideas and drawings that we use to explain the bonding of atoms.
**Problems with bonding models	- Dot and cross diagrams make electrons seem different, they are not -Atoms appear stationary but are actually vibrating -Atoms don't appear to be touching when they actually are.

BROADOAK ACADEMY

B4: Natural selection and genetic modification

Lesson sequence

1. Human evolution
2. The theory of evolution
3. Resistance
4. Classification
5. Modifying life
6. Problems with modifying life

1. Human evolution	
Binomial naming	Two-part names, first part = genus, second part = species, written in italics.
Homo sapiens	Our species. Evolved about 200,000 years ago. Skull volume 1450 cm^3.
Ardipithecus ramidus	Aka 'Ardi'. 4.4 million years ago, walked upright and climbed trees, 350 cm^3 skull volume.
Australopithecus afarensis	Aka Lucy. 3.2 million years ago, walked upright, skull volume 400 cm^3.
Homo habilis	2.4-1.4 million years ago, walked upright, skull volume 5-600 cm^3.
Homo erectus	1.8 to 0.5 million years ago, walked upright, skull volume 850 cm^3.
Fossil evidence	Many fossils have been found showing a gradual transition from 'ape-like' to 'human-like'.
Stone tool evidence	Older stone tools are simpler requiring less intelligence to make, younger stone tools are more complex requiring more intelligence to make.
The Leakeys	Mary and Louis discovered *Homo habilis*, their son Richard worked on *Homo erectus*.

2. The theory of evolution	
Charles Darwin	Develop the theory of evolution.
Evolution	The way that species develop by gradual changes over many generations due to natural selection.
Variation	Natural differences between members of a species that affect the chance of survival.
Mutations	Changes in DNA that cause variation.
Environmental change	Change to factors such as food supply, climate or predators.
Competition	The fight to eat, survive and breed.
Natural selection	Organisms with the best genes and characteristics are more likely to survive, breed and pass on their better genes.
Inheritance	Gaining your genes from your parents.
Well adapted	An organism has features that make it better able to survive and breed.
Evolution and the individual	An individual does not evolve during its lifetime, populations of organisms evolve over many lifetimes.
Human evolution	Humans did not evolve from chimpanzees, we both evolved from a common ancestor.

3. Resistance	
Resistance	The natural ability of some members of a species to survive poisons that would kill the other members.
Evolution of resistance	Evolution of organisms that stops them from being affected by poisons.
Rats and warfarin resistance	Warfarin is used to kill rats. Some rats were naturally resistant, survived the warfarin, bred and passed on their resistance genes.
Antibiotic resistance	Antibiotics are used to kill bacteria. Some bacteria were naturally resistant, survived the antibiotics, bred and passed on their resistance genes.
The problems of resistance	Antibiotic resistance means that many infections that used to be simple to treat may become too resistant to treat, causing major health problems.

4. Classification	
Carl Linnaeus	Developed the modern system of classification.
How to classify	Based on similarities, group things into smaller and smaller groups with fewer and fewer similarities.
Linnaeus' classification system	Kingdom → phylum → class → order → family → genus → species
Problems with classification	Sometimes organisms that look similar are not actually related.
Carl Woese	Developed the modern system of classification with three domains.
Domains	The three main groups of life: bacteria, Archae, Eukarya.
Bacteria	Single-celled organisms with no nucleus and no unused sections of DNA.
Archae	Single-celled organisms with no nucleus but with unused sections of DNA.
Eukarya	Often multi-cellular organisms with a nucleus and unused sections of DNA. Includes plants, animals, fungi and protists.

5. Modifying Life	
Artificial selection	When humans (normally farmers) select the animals/plants to breed with the best characteristics.
Selective breeding	Developing new breeds of plants or animals with better characteristics by selective breeding over many generations.
Selective breeding in practice	Choose parents with the best characteristics, breed them together, choose from their offspring with the best characteristics, breed them together, repeat for many generations.
Genetic engineering	Changing the characteristics of organisms by giving them genes from another organism.
GMO	Genetically modified organism: an organism that has had its genes changed.
Bt corn	Corn containing a gene from *Bacillus thuringiensis* that makes it produce a substance called Bt which kills insects.
Medical GMOs	GM bacteria are used to make insulin (for diabetes) and some antibiotics.
Pros and cons of GM	Quicker than selective breeding and can introduce more different characteristics, but is expensive.

6. Problems with modifying life	
Over-selection	Farmers focussing too much on breeding for one characteristic (such as chicken breast size), don't spot problems with other characteristics (such as weak leg bones) causing suffering.
Gene leakage	The concern GMOs could breed with wild relatives, enabling the modified genes to escape into the wild. This could have ecological impacts.
Resistance	The concern that in areas growing Bt corn, insects simply evolve resistance to Bt.
Insulin	Insulin made by GM bacteria is not identical to human insulin, and some people suffer bad reactions to it.

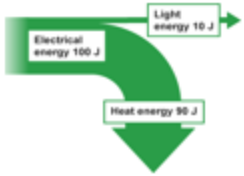
BROADOAK ACADEMY

P3: Energy

Lesson sequence

1. Storing and transferring energy
2. Energy efficiency
3. Insulation
4. Stored energy
5. Non-renewable energy resources
6. Renewable energy resources

1. Storing and transferring energy	
*Energy	The capacity to do work.
*Joules	The units of energy, symbol = J.
*Kilojoules	1000 J, symbol = kJ.
*Thermal energy	Energy stored on hot objects.
*Kinetic energy	Energy stored in moving objects.
*Chemical energy	Energy stored in chemicals such as fuels.
*Nuclear energy	Aka atomic energy. Energy stored in the nucleus of atoms.
**Gravitational potential energy	Energy stored in objects based on how high they are.
**Elastic potential energy	Aka strain energy. Energy stored in bent or stretched objects.
**Other forms of energy	Light, sound, electrical.
**First law of thermodynamics	Energy cannot be created or destroyed, just transferred from one form to another.
**Energy transfers	Say what form the energy starts as *and* what it becomes.
**Sankey diagram	Shows energy transfers. The thickness of the arrow relates to the amount of energy.



2. Energy efficiency	
**Dissipation	The way energy spreads out, becoming less useful as it does.
*Wasted energy	Energy that is transferred into forms that can't be used.
*Friction	Causes energy loss as heat when two surfaces rub together.
**Lubrication	Allows surfaces to move smoothly, reduces energy loss from friction.
**Electrical resistance	Causes wires to heat up, wasting electrical energy.
*Calculating efficiency	$Efficiency = \frac{useful\ energy\ transferred}{total\ energy\ transferred}$
**Energy efficiency numbers	Efficiency is between 0 and 1. 1 = no energy wasted, 0 = all energy wasted.

3. Insulation	
*Convection	Heat transfer caused when hot fluids (gas or liquid) rise because they are less dense.
*Conduction	Heat transfer through solids caused by vibrating particles bumping into each other.
*Radiation	Heat transfer by infrared radiation which heats objects up when they absorb it.
**Insulation	Materials that contain lots of tiny air pockets that prevent heat loss by conduction.
**Thermal conductivity	A measure of how well a material conducts heat.
**Draught-proofing	Sealing gaps around doors and windows to prevent heat loss by convection.

4. Stored energy	
*Calculating kinetic energy	$KE = \frac{1}{2}mv^2$ Where 'KE' is kinetic energy in J, 'm' is mass in kg, 'v' is velocity in m/s.
**Calculating v from KE	$v = \sqrt{\frac{2KE}{m}}$

**Gravitational field strength	The strength of gravity. Different on different planets. On earth: 10 N/kg.
**Calculating gravitational potential energy	$GPE = mgh$ Where 'GPE' is gravitational potential energy in J, 'm' is mass in kg, 'g' is gravitational field strength in N/kg, 'h' is height change in m.

5. Non-renewable energy resources	
*Fossil fuels	Coal, oil, natural gas. All are non-renewable.
*Non-renewable resource	A resource that will one day run out because it is being used faster than it is being made.
**Harm from burning fossil fuels	Carbon dioxide gas is released which causes global warming. Sulfur dioxide is released which causes acid rain.
*Renewable resource	A resource will not run out.
*Nuclear power	Electricity generated from nuclear fuels such as uranium.
**Nuclear power pros and cons	🙂 Lasts a long time, releases no carbon dioxide ☹ Produces very harmful waste, expensive to decommission, although rare, accidents are very dangerous.

6. Renewable energy resources	
*Wind power	Large turbines spun by the wind. 🙂 No CO_2 ☹ Lots needed, ugly?, no wind no power
*Solar power	Solar cells turn sunlight to electricity. 🙂 No CO_2 ☹ No sun no power, need lots of space, not suitable for all countries
**Tidal power	Uses water movement from tides to spin turbines
**Tidal barrage	A damn built across an estuary that fills up when tide goes in. 🙂 Huge amounts of energy, no CO_2 ☹ Destroys important mudflat habitats
**Hydroelectricity	A damn is built across a river valley, water released from the damn spins turbines. 🙂 Lots of energy, no CO_2 ☹ Destroys habitat by flooding
*Biofuels	Fuels made from recently plant or animal matter, often waste. 🙂 Carbon neutral ☹ Needs a lot of land, increases food prices
**Carbon neutral	When burning a fuel releases the same CO_2 it absorbed when it was growing, so there is no CO_2 increase.

The Holocaust - Key Events

1933 30 January	Hitler appointed Chancellor of Germany.
1933 1 April	**Official national boycott** of Jewish shops and businesses. Lasted one day but was poorly supported.
1935 September	**Nuremburg Laws** - Jews lost their citizenship and were no longer allowed to marry Germans.
1936 August	**Berlin Olympics** led to temporary suspension of the persecution of Jewish people in Germany.
1938 9-10 Nov	**Kristallnacht** - the 'night of broken glass', thousands of Jewish business and shops were attacked and synagogues burnt by Nazi Stormtroopers. 100 killed.
1939 September	**Jewish ghettos built** in around 200 cities in Poland following German invasion of the East.
1941 June	**Einsatzgruppen killing squads** – following the German invasion of the Soviet Union thousands of Jewish people were rounded up and murdered.
1942 January	**Wannsee Conference** – leading Nazi officials meet to discuss the 'Final Solution' and formal agreement given to speed up the use of death camps.
1945 May	**End of WWII in Europe** and end of the Holocaust.

BROADOAK ACADEMY History – Year 9

How and why was the Holocaust possible?

Key Skills

Interpretation	Analyse and evaluate different historian's views about the same topic.
Source Analysis Use NOP Content	**Nature**: What is the type of source? **Origin**: Who wrote it? When? Where? **Purpose**: Why was the source made? **Content**: What does it tell us?

Key People

Heinrich Himmler – Head of the SS which oversaw the death camps. Key figure behind the Holocaust.

Reinhard Heydrich – Chaired the infamous Wannsee Conference which led to the 'Final Solution'.

Key Terms

Antisemitism	Prejudice, discrimination and/or persecution against Jewish people.
Collaborator	Someone who cooperates or works together on a project to help those in charge achieve a certain aim.
Discrimination	Different treatment of people because of their ethnicity, gender, political or religious beliefs, sexuality.
SS Einsatzgruppen	'operational groups' of German SS mobile units which swept through Russia behind the German army rounding up and murdering Jewish people.
Final Solution	Nazi government term to describe the decision made to murder Jewish people using the gas chambers.
Genocide	Deliberate and planned attempt to exterminate people from a certain ethnic group in order to destroy that group.
Ghetto	Segregated area of a city where Jews were forced to live in overcrowded and unhygienic conditions.
Holocaust	Systematic mass murder of Jewish people by the Nazi government and collaborators during WWII.
Persecution	Unfair and cruel treatment of individuals or groups based on ethnicity, gender, political or religious beliefs, sexuality.

Why was the Holocaust possible?

There was a long history of **antisemitism** that the Nazis were able to build upon

The Nazi government used **propaganda** to indoctrinate citizens to justify mass murder

The **Second World War** provided the context and the opportunity for mass murder

Mass murder of Jews was **state driven** - The Nazi government passed laws, used money and resources in order to achieve their priority

Complicity of others – ordinary people carried out orders or were willing to take part

The Holocaust **evolved over time** – and allowed for more radical action to occur

Two key interpretations about the role of Germans in the Holocaust

Daniel Goldhagen

Goldhagen argues that most German soldiers involved in the Holocaust were **'willing executioners'.**

Goldhagen argues that the vast majority of people in Germany had come to believe it was necessary to eliminate Jewish people long before Hitler came to power. Goldhagen studied a group of men in the SS Einsatzgruppen and found they participated enthusiastically in the killings. According to Goldhagen, **because these men were ordinary Germans, this shows that the majority of Germans would have agreed with the murder of the Jewish people.**

Christopher Browning

Browing challenges Goldhagen's view and states that many of the German soldiers were **'ordinary men'** who did not necessarily agree to the killings nor want to be involved.

Browning studied the same group of men in the SS Einsatzgruppen and did not dispute they were involved in the killings. However, he points out that although some of the men may have been motivated by extreme racist beliefs, many had other reasons for acting the way they did. **The fact that they took part in the killings, however wrong, does not necessarily mean that they took part willingly.** This means it is not correct for Goldhagen to draw conclusions about the German people as a whole from how these men acted.

BROADOAK ACADEMY

History

How and why was the Holocaust possible?

Resistance Jewish people were not all passive victims of the holocaust. Despite the huge difficulties they found many ways to resist from armed resistance to maintaining their culture and traditions.

The Nuremburg Laws

The Reich Citizenship Law
This law defined a citizen as a person who is "of German or related blood." This meant that Jews, defined as a separate race, could not be full citizens of Germany. They had no political rights.

The Law for the Protection of German Blood and German Honor
A law against race-mixing or "race defilement. It banned future intermarriages and sexual relations between Jews and people "of German or related blood."

Kristallnacht

On November 9-10, 1938, Nazi leaders unleashed a series of vandalism and destruction of Jewish-owned businesses, synagogues, and homes.

- Nazi officials disguised the organized nature of events. They blamed the outrage of the German population to the assassination of a German diplomatic official, Ernst vom Rath, in Paris.
- During the pogrom, some 30,000 Jewish males were rounded up and taken to concentration camps. This was the first time Nazi officials made massive arrests of Jews because they were Jewish, without any other reason.
- Afterwards, the Nazi regime ordered the Jewish community to pay a 1 billion Reichsmark fine and further measures against them.

Ghettos

There were around 460,000 inhabitants of the Warsaw Ghetto.

Jews were allowed to bring only the absolute minimum - personal belongings and bedclothes. That meant instant poverty.

Only a very small percentage of the ghetto population had any kind of regular employment Street trading became a necessity.

Food supplies were limited which caused starvation. Malnutrition, overpopulation and lack of medical care brought disease e.g. typhus.

Many Jewish residents died of starvation, diseases and cold, nearly 20% of the population. These dreadful conditions forced many to escape.

Jews who leave without permission are liable to the death penalty. The same penalty awaits those who give shelter to Jews.

The*Einsatzgruppen*

Units of the Security Police and SD (the SS intelligence service) followed the German army as it invaded and occupied countries in Europe. Referred to as "mobile killing squads."

1. Special units of the Security Police and SD assigned to security measures immediately behind German lines.
2. Waffen SS worked with police units, the army and local collaborators, the Einsatzgruppen conducted mass shootings in the Soviet Union. Targeted Jews, Roma (Gypsies), Communists, and Soviet civilians.
3. 1/3 of all Jewish Holocaust victims died as a result of this. The Einsatzgruppen were key perpetrators of mass shootings.

Mass shootings required many shooters, guns, ammunition, and transport. Shootings were seen as inefficient and the phycological impact led to development of special vans that killed people with carbon monoxide gas. It took time to kill victims with gas vans and Einsatzgruppen needed to remove bodies and clean the compartments. Mass shootings continued to be the preferred method of murder.

Death camps

Death camps were different to the concentration camps previously established by the nazis. These were designed with the purpose of killing as many people as possible.

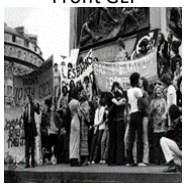
The most famous death camp is Auschwitz but there were many others throughout Nazi occupied Europe and they were all different.

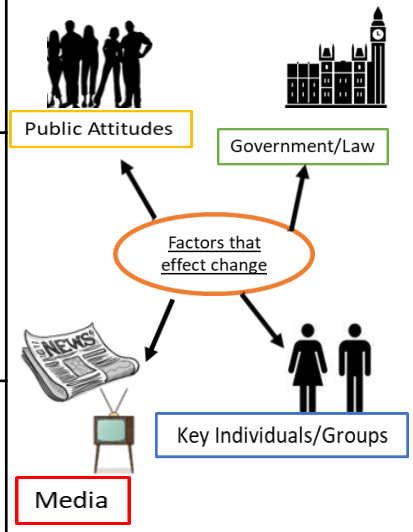
On arrival people would be sorted into those who were fit for work and those who were not. Those who were not were sent to the gas chambers immediately where they died. Those who lived suffered horrendous conditions and violence on a daily basis.

BROADOAK ACADEMY History – Year 9

1960s: A decade of revolution?

Key individuals/groups

1968 - British Black Panthers BBP 	1970 - Gay Liberation Front GLF 	c.1960's – Women's Liberation 
1978 - Organisation of Women of Asian and African Descent OWAAD 	Darcus Howe *BBP* 	Roy Hackett *Bristol Bus Boycott* 
Paul Stephenson *Bristol Bus Boycott* 	Aubrey Walter *GLF* 	Stella Dadzie *OWAAD* 



Key Terms

Boycott	Refusal to have dealings with (a person, a store, an organization, etc.) usually to express disapproval or to force acceptance of certain conditions
Civil Rights	Set of rights that are designed to protect individuals from unfair treatment; they are the rights of individuals to receive equal treatment.
Colony	A country or area under the full or partial political control of another country and occupied by settlers from that country.
Colour bar	A social system in which black and other non-white people are given access to the same rights and opportunities as white people
Discrimination	Different treatment of people because of their ethnicity, gender, political or religious beliefs, sexuality.
Equality	The state of being equal, especially in status, rights, or opportunities.
Legalisation	To make something that was previously illegal allowed by law.
Liberation	To set someone or something free. For example from oppression.
Migrants	Person who moves from one place to another, especially in order to find work or better living conditions.
Revolution	A fundamental and sudden change that results in significant transformation in a government, system or set of ideas.

1960s: A decade of revolution - Key Events

1961: **Contraceptive pill** available to married women on the NHS for the first time.

1962: **Cuban Missile Crisis** USA and Russia on the brink of nuclear warfare over the discovery of nuclear warheads in Cuba.

1963: **Bristol Bus boycott** challenged the colour bar on working on the Bristol Omnibus Company.

1965: **Race Relations Act** banned racial discrimination in public places and made it a criminal offence to promote racial hatred.

1967: **Abortion Act** legalised abortion if the mother was at risk or the child would have serious disabilities.

1967: **Sexual Offences Act** decriminalised private homosexual offences between men over 21.

1967: **Family Planning Act** enabled local health authorities to provide contraceptives for all women

1968: **Race Relations Act** made it illegal to refuse housing, jobs or public services on the basis of race.

1968: **Dagenham Ford Strike** at the Ford Motor Company factory where female sewing machinists protested for equal pay.

1968: **St. Paul's Carnival** organised in Bristol for the first time by the West Indian Development Council.

1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1970

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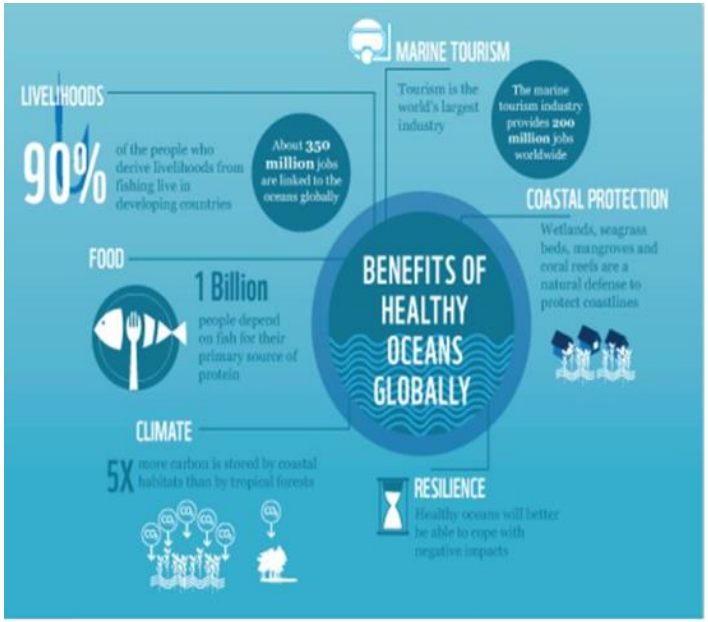
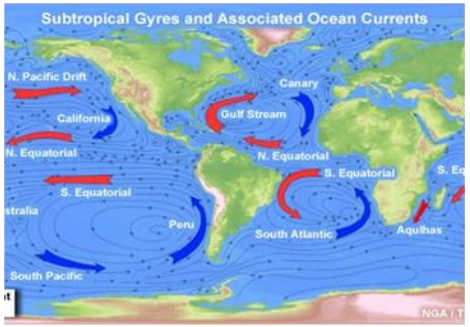
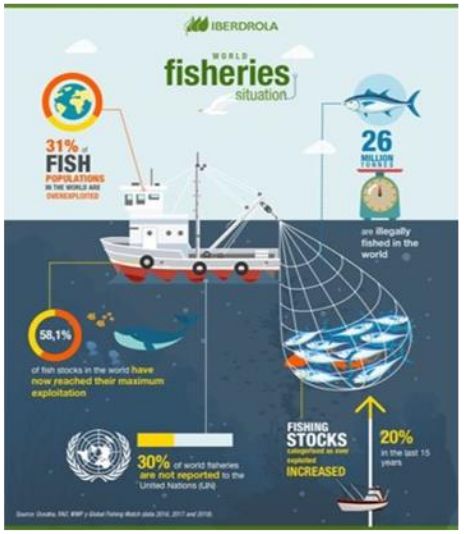
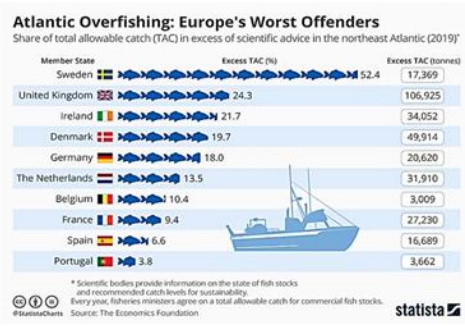
Geography

Why should we care about the ocean?









Keyword	Definition
Biodiversity	The variety of plant and animal life in a particular habitat
Great Pacific Garbage Patch	Largest of five offshore plastic accumulation zones containing plastic pollution. It is located between California and Hawaii.
Microplastics	When larger bits of plastic break down into tiny particles
Gyre	A large circular ocean current
Deep ocean currents	Currents driven by density
Surface ocean currents	Currents driven by surface winds
Overfishing	Catching more fish than the natural system can replace leading to a reduction in fish number
TAC – Total Allowable Catch	The number of fish you are allowed to catch in a particular area
Food Security	Having enough food to supply demand
Sustainable Fishing	Respecting habitats and leaving enough fish in the ocean so that fish numbers can be regulated

Year 9 Term 5: How can we be sustainable citizens?

Keyword	Definition
Sustainability	When materials and resources are used in a way that will **balance the needs of the present without compromising the future**
Sustainable development goals	Economic sustainability 17 interlinked global goals designed to be a "blueprint to achieve a better and more sustainable future for all"
Economic sustainability	Practices that support long-term economic growth without negatively impacting social, environmental, and cultural aspects of the community
Social sustainability	A measure of welfare where people can flourish and have the best lifestyle for
Environmental sustainability	The practice of interacting with the planet responsibly
Grey water recycling	Uses existing plumbing in your home to recycle old water for new uses
Circular economy	A system which maximises the value of resources by recycling and repurposing them as much as possible
Linear economy	A system where waste as a side result of the production, process, is discarded into the environment
Incineration	The burning of waste
Food Miles	How far your food has travelled
Carbon Footprint	The amount of carbon dioxide released into the atmosphere by a person or organisation
Fast Fashion	Cheap and speedy production of low-quality clothing
Ethical fashion	Where the garment design, production and distribution of clothing focuses on reducing harm to people and the planet.

Case study: Masdar city

Masdar is a city that was designed and built to be sustainable.

It included:

Using grey water for plants and water features

- The PRT system (electric shuttle buses)
- UV paint and buildings facing north to reduce need for air conditioning
- However, Masdar has been nicknamed a 'ghost town' due to lack of residents.

Religion and World Views

How do beliefs inspire change?

Keyword	Definition
Activism	The practice of taking direct action to achieve political or social goals
Belief	An acceptance that something exists or is true, especially one without proof
Conviction	A formal declaration by the verdict of a jury or the decision of a judge in a court of law that someone is guilty of a criminal offence
Equality	The state of being equal, especially in status, rights, or opportunities
Freedom	The power or right to act, speak, or think as one wants
Racism	When a person is treated worse, excluded, disadvantaged, harassed, bullied, humiliated or degraded because of their race or ethnicity
Civil Disobedience	The refusal to comply with certain laws considered unjust, as a peaceful form of political protest
Prejudice	A preconceived opinion that is not based on reason or actual experience
Social Justice	Justice is the concept of fairness. Social justice is fairness as it manifests in society. That includes fairness in healthcare, employment, housing, and more.

Malala Yousafzai (born July 12, 1997) is a Pakistani student and education activist. She is known for her activism for girls' and women's rights, especially for their right to go to school.

On 9 October 2012, Yousafzai was shot in the head and neck in an assassination attempt by a Taliban gunman. She was on her school bus at the time of the shooting.

Martin Luther King (born January 15th, 1929) was the leader of the Civil Rights Movement in the USA in the 1960s.

In 1963, Martin gave his famous "I Have a Dream" speech. Over 250,000 people gathered in the country's capital to hear Martin and other activists speak about the importance of civil rights. It has become one of the most famous speeches in history and focuses on Martin's dream of a society where black people and white people live together in harmony.

Harriet Tubman (born in 1820) was an born into slavery in the USA. After escaping enslavement, she helped others gain their freedom as a "conductor" of the Underground Railroad. Tubman also served as a scout, spy, guerrilla soldier, and nurse for the Union Army during the Civil War. She is considered the first African American woman to serve in the military.

Marsha P. Johnson (born August 24th 1945) was one of the most prominent figures of the gay rights movement of the 1960s and 1970s in New York City. Johnson was an important advocate for homeless LGBTQ+ youth, those effected by H.I.V. and AIDS, and gay and transgender rights. Johnson's life changed when she found herself engaging with the resistance at The Stonewall Inn on June 28, 1969.

BROADOAK ACADEMY **Languages**

9.3 My school – Spanish Vocab List

¿Cuál es tu asignatura favorita?	What is your favourite subject?
El inglés	English
El español	Spanish
El francés	French
El teatro	Drama
El dibujo	Art
El deporte	P.E.
La informática	I.C.T. (Computer Studies)
La música	Music
La tecnología	D.T.
La geografía	Geography
La historía	History
La religion	R.S. (Religious Studies)
La educación personal y social	P.S.H.E (Health and Wellbeing)
Las matemáticas	Maths
Las ciencias	Science

¿Cuáles son las reglas?	What are the rules?
Se debe / no se debe	You must / You must not
Se puede / no se puede	You can / You can not
Hay que	You must
Está prohibido	It is forbidden to
Escuchar en clase	(to) listen in class
Usar el móvil en clase	(to) use your phone in class
Llevar joyas	(to) wear jewellery
Llevar maquillaje	(to) wear make-up
Llevar zapatillas de deporte	(to) wear trainers
Dañar las instalaciones	(to) damage the facilities
Ser punctual	(to) be on time
Comer chicle	(to) chew chewing-gum
Hacer los deberes	(to) do homework

¿Cuál es tu opinión?	What is your opinión?
Es / no es	It is/It is not
interesante	Interesting
Práctico	Practical
Útil / Ínutil	Useful/not useful
Fácil / Difícil	Easy/difficult
Aburrido	Boring
Emocionante	Exciting
Creativo	Creative
Importante	Important
demasiado	Too
muy	Very
bastante	Quite
Un poco	A bit (a little)

¿Qué quieres hacer en el futuro?	What do you want to do in the future?
Voy a	I am going
Me gustaría / Quiero	I would like / I want
Aprobar mis exámenes	To pass my exams
Sacar buenas notas	To get good results
Hacer un aprendizaje	To do an apprenticeship
Buscar trabajo	To search for a job
Trabajar como voluntario	To do voluntary work
Viajar por el mundo	To travel the world
Tener hijos	To have children
Casarme	To marry
Aprender a conducir	To learn to drive
Médico/a Veterinario	A doctor/a vet
Profesor(a) Abogado/a	A teacher/a lawyer
Mecánico Fontanero	A mechanic/a plumber
Bombero	A firefighter
Peluquero	A hairdresser

¿Qué llevas?	What do you wear?
LLevo	I wear
Se debe llevar	You must wear
Una chaqueta	A blazer/jacket
Un jersey	A jumper
Una camisa	A shirt
Una camiseta	A t-shirt
Una corbata	A tie
Una falda	A skirt
Unos calcetines	Socks
Unos pantalones	Trousers
Unos zapatos	Shoes
Unas medias	Tights
Un hiyab	Hijab
feo	Ugly
bonito	Beautiful
(In)cómodo	(un)comfortable
caro	Expensive
barato	cheap
De moda	Fashionable
Pasado de moda	Old-fashioned

La jornada escolar	The school day
Salgo de casa	I leave the house
Voy al insti	I go to school
Las clases empiezan...	Lessons start ...
Las clases terminan...	Lessons end ...
Dura	It lasts
El recreo	Breaktime
La hora de comer	Lunchtime
Por la mañana	The morning
Por la tarde	The afternoon

BROADOAK ACADEMY **Languages**

9.3 My school – Spanish Knowledge Organiser

School – Subjects, uniform and time
Future plans & jobs

The present tense	AR verb	ER verb	IR verb
yo (I)	-o	-o	-o
tu (you)	-as	-es	-es
él/ella (he/she)	-a	-e	-e
nosotros/as (we)	-amos	-emos	-imos
vosotros/as (you all)	-áis	-éis	- ís
ellos/ellas (they)	-an	-en	-en

The future tense in Spanish

You can talk about the future by using the **near future** tense.
Use part of the verb IR + a + the infinitive to say what you are **going** to do.

Este tarde **voy a jugar** al tenis. *This evening I am going to play tennis.*
Mañana Paul **va a hacer** un pastel. *Tomorrow Paul is going to make a cake.*

You can also use the following phrases with an infinitive to refer to the future.
Quiero = I want
Me gustaría = I would like
Quisiera = I would like
Espero = I hope

Adjectives describe nouns e.g. a **black** blazer.

In Spanish, adjectives normally go after the words they are describing e.g. una camisa azul (a blue shirt) and they have to agree with the noun they are describing.

Adjectives must agree with the noun (or pronoun) they describe in gender and in number.

This means that if the noun an adjective describes is feminine, the adjective must be feminine e.g. una chaqueta negr**a** (a black blazer).

If that same noun is also plural, the adjective will be feminine AND plural as well e.g. las medias negras (black tights).

Comparatives – to express more or less than

… es más…adjective…que - is more…adjective…than
… es menos …adjective ….que - is less…adjective… than
… es tan…adjective….como – is as…adjective…as

For example:
El inglés es **más** *interesante* ***que*** *la geografía. (English is more interesting than Geography)*
La historia es ***menos*** *activa* ***que*** *la educación física. (History is less active than PE)*
El francés es ***tan*** *difíil* ***como*** *las matemáticas. (French is as difficult as maths).*

Languages

9.4 Festivals – Spanish Vocab List

¿Cuál es tu festival favorito?	What is your favourite festival
Mi festival favorito es...	**My favourite festival is..**
La Navidad	Christmas
La Nochebuena	Christmas Eve
La Nochevieja	New Year's Eve
El día de año nuevo	New Year's Day
El día de los Reyes Magos	Three Wise Men Day
La Semana Santa	Easter / Holy Week
Las hogueras	The bonfires
La feria de abril	The April fair
Día de muertos	The day of deaths
El cumpleaños	Birthday
El carnaval	Carnival
La feria	Fair
El día de la madre	Mother's day
El día del padre	Father's day
El día festivo	Bank Holiday
El encierro	The bull running
Las fallas	Fallas
Els castells	Human towers
La Tomatina	Tomato festival

¿Qué hacemos para celebrar?	What do we do to celebrate?
Me levanto	I get up
Me ducho	I shower
Me visto	I get dressed
Recibo regalos	I receive presents
Soplo velas	I blow candles
Monto el árbol de Navidad	I put up the Christmas tree
Compro ropa nueva	I buy new clothes
Voy a la iglesia	I go to church
Voy a la mezquita	I go to the mosque
Voy a la plaza	I go to the square
Voy a casa de...	I go to ...'s house
... llega	... arrives
Comemos...	We eat...
Ayunamos	We fast
Jugamos a juegos de mesa	We play table games
Celebramos	We celebrate
Lo paso muy bien	I have a good time
Me acuesto	I go to bed
Voy a dormir	I go to sleep

¿Cómo es?	How is it like?
Emocionante	Exciting
Conmovedor	Moving
Divertido	Fun
Insoportable	Unbearable
Impactante	Striking

¿Qué pasa en los encierros / las corridas de toros ?	What happens in the bull running / bull fighting?
San Fermín	A bull running festival held in Pamplona every July
Los toros	The bulls
Las calles	The streets
Correr	To run
Las corridas de toros	Bullfighting
Los encierros	Bull running
La plaza de toros	The bullring

¿Qué pasa en las Fallas?	What happens in Fallas?
Fallas	A festival held in Valencia every March
La hoguera	The bonfire
El cartón	Cardboard
Las fallas	Sculptures made of cardboard
Los fuegos artificiales	Fireworks
Los petardos	Firecrackers
Las bandas de música	Music bands

¿Qué pasa en la Tomatina?	What happens in the tomato festival?
La gente	People
Lanza tomates	Throw tomatoes
Aplasta tomates	Squish tomatoes
Se ensucia	Gets dirty
Tiene lugar en Buñol	Takes place in Buñol
La batalla	The battle
El caos	Chaos

BROADOAK ACADEMY **Languages**

9.4 Geography and History – Spanish Vocab List

La geografía	Geography
El país	The country
La región / la comunidad	The region
La ciudad	The city
El pueblo	The town/ village
La costa	The coast
Las islas	The islands
El interior	The inland regions

La historia	History
Castellano / Español	Spanish language
La Reconquista	Period of time when the Christian kingdoms "reconquered" the península from the Muslims (Moors).
Moros	Moors – Muslim inhabitants of modern-day Spain in
Conquistadores	Conquerors of American territories in the 16th century
La Colonización	Colonisation of the Americas
La Guerra Civil Española	The Spanish Civil war between 1936 and 1939
La Dictadura fascista	The fascist dictatorship in Spain between 1939 and 1975
La Transición	Transition into democracy after the dictatorship
La monarquía parlamentaria	The current political system in Spain: a parliamentary monarchy, like in the UK

El lenguaje de todos los días	Everyday language
¡Hola!	Hello
Buenos días	Good morning
Buenas tardes	Good afternoon
Buenas noches	Good night
¿Cómo te llamas?	What's your name?
Me llamo…	My name is…
¡Adiós!	Goodbye
Hasta luego / hasta la vista	See you later
Por favor	Please
Gracias	Thank you
Muchas gracias	Thanks a lot
De nada	You are welcome
Perdone / Perdón	Excuse me / Apologies
Lo siento	I'm sorry
¿Habla inglés?	Do you speak English?
Hablo un poco de español	I speak a bit of Spanish
No entiendo	I do not understand
¿Dónde hay un buen restaurante?	Where is a good restaurant?
¿Dónde está el centro / la playa?	Where is the centre / the beach?
Me he perdido	I am lost
Busco un hotel / un hospital / un banco	I am looking for a hotel / hospital / bank
Busco la estación / el aeropuerto / la parada de bus	I am looking for the station / airport/ bus stop
¿Me podría sacar una foto?	Could you take a picture?
¡Cuidado!	Be careful!
¡Vamos!	Let's go!

BROADOAK ACADEMY **Languages**

9.4 Festivals, Geography and History– Spanish Knowledge Organiser

3 Time frames

The preterite tense of **regular verbs** is formed on an infinitive stem with the following endings:

Infinitive:	hablar	comer	vivir
Stem:	habl-	com-	viv-
Yo (I)	hablé	comí	viví
Tú (you)	hablaste	comiste	viviste
él/ella/usted (he/she/you)	habló	comió	vivió
Nosotros (We)	hablamos	comimos	vivimos
Vosotros (You all)	hablasteis	comisteis	vivisteis
ellos/ustedes (They/ you all)	hablaron	comieron	vivieron

Ser / Ir (To be /to go)

fui (I was / I went)
Fuiste (You were / You went)
Fue (he/she was // he /she went)
Fuimos (we were / we went)
Fuisteis (you all were / you all went)
Fueron (they were / they went)

The future tense of **regular verbs** is formed adding the endings **e,as,a emos, eis, an** to the infinitive.

FUTURE SIMPLE			
Person	Verbs		
	Hablar	Comer	Vivir
Yo	hablar - é	comer - é	vivir - é
Tú	hablar - ás	comer - ás	vivir - ás
Usted, él, ella	hablar - á	comer - á	vivir - á
Nosotros-as	hablar - emos	comer - emos	vivir - emos
Vosotros-as	hablar - éis	comer - éis	vivir - éis
Ustedes, ellos, ellas	hablar - án	comer - án	vivir - án

Regular verbs – present tense endings			
	AR verbs	ER verbs	IR verbs
I	o	o	o
you	as	es	es
he/she/it	a	e	e
we	amos	emos	imos
you(pl)	áis	éis	ís
they	an	en	en

Languages

9.3 My school – French Vocab List

Quelle est ta matière préférée?	What is your favourite subject?
L'anglais	English
L'espagnol	Spanish
Le français / les langues	French / languages
Le théâtre	Drama
Le dessin	Art
Le sport (L'EPS)	P.E.
L'informatique	I.C.T. (Computer Studies)
La musique	Music
La technologie	D.T.
La géographie	Geography
L'histoire	History
La religion	R.S. (Religious Studies)
L'éducation civique	P.S.H.E (Health and Wellbeing)
Les mathématiques	Maths
Les sciences	Science

Quelles sont les règles?	What are the rules?
On doit / On ne doit pas	You must / You must not
On peut / On ne peut pas	You can / You can not
Il faut	You must
Il est interdit de/d'	It is forbidden to
Écouter en classe	(to) listen in class
Utiliser son portable en classe	(to) use your phone in class
Porter des bijoux	(to) wear jewellery
Porter du maquillage	(to) wear make-up
Porter des baskets	(to) wear trainers
Manquer les cours	(to) miss lessons
Être à l'heure	(to) be on time
Mâcher du chewing-gum	(to) chew chewing-gum
Faire ses devoirs	(to) do homework

Qu'est-ce que tu en penses?	What do you think of it?
C'est/Ce n'est pas	It is/It is not
Intéressant (e)	Interesting
Pratique	Practical
Utile/inutile	Useful/not useful
Facile/Difficile	Easy/difficult
Ennuyeux (se) /barbant (e)	Boring
Passionnant (e)	Exciting
Créatif (ve)	Creative
Important (e)	Important
Trop	Too
Très	Very
Assez	Quite
Un peu	A bit (a little)
du tout	At all

Qu'est-ce que tu voudrais faire dans le futur?	What would you like to do in the future?
Je vais	I am going
Je voudrais/J'aimerais	I would like
Réussir mes examens	To pass my exams
Recevoir des bonnes notes	To get good results
Faire un apprentissage	To do an apprenticeship
Chercher du travail	To search for a job
Faire du bénévolat	To do voluntary work
Voyager autour du monde	To travel the world
Avoir des enfants	To have children
me marier	To marry
Apprendre à conduire	To learn to drive
Devenir	To become
Médecin/Veterinaire	A doctor/a vet
Professeur/Avocat(e)	A teacher/a lawyer
Mécanicien(ne)/Plombier(ière)	A mechanic/a plumber
Pompier (ière)	A firefighter
Coiffeur(euse)	A hairdresser

Comment est ton uniforme scolaire?	What is your school uniform like?
Je porte	I wear
Il faut porter	You must wear
Une veste/ un blazer	A blazer/jacket
Un pull	A jumper
Une chemise	A shirt
Un t-shirt	A t-shirt
Une cravate	A tie
Une jupe	A skirt
Des chaussettes	Socks
Un pantalon	Trousers
Des chaussures	Shoes
Un collant	Tights
Un hijab	Hijab
Moche	Ugly
Beau/belle	Beautiful
(In)confortable	(un)comfortable
Cher	Expensive
Pas cher/bon marché	Not expensive/cheap
À la mode	Fashionable
Démodé(e)	Old-fashioned

La journée scolaire	The school day
Je quitte la maison	I leave the house
Je vais au collège	I go to school
Les cours commencent à	Lessons start at
Les cours terminent à	Lessons end at
Ça dure	It lasts
La récréation	Breaktime
L'heure du déjeuner	Lunchtime
Le matin	The morning
L'après-midi	The afternoon
Le soir	The evening
Un élève	A pupil

BROADOAK ACADEMY **Languages**

9.3 My school – French Knowledge Organiser

School – Subjects, uniform and time
Future plans & jobs

The present tense	ER verb	IR verb	RE verb
Je (I)	-e	-is	-s
tu (you)	-es	-is	-s
Il/Elle/On (he/she/one)	e	-it	-
Nous (we)	-ons	-issons	-ons
Vous (you all)	-ez	-issez	- ez
Ils /Elles (they)	-ent	-issent	-ent

The future tense in French

You can talk about the future by using the **near future** tense.
Use part of the verb ALLER and the infinitive to say what you are **going** to do.

Ce soir, je vais jouer au tennis. This evening I am going to play tennis.
Demain, Paul va faire un gâteau. Tomorrow Paul is going to make a cake.

You can also use the following phrases with an infinitive to refer to the future.
Je veux= I want
Je voudrais = I would like
J'aimerais = I would like
J'espère = I hope

Adjectives describe nouns e.g., a **black** blazer.

In French, adjectives normally go after the words they are describing e.g., une chemise bleue (a blue shirt) and they must agree with the noun they are describing.

Adjectives must agree with the noun (or pronoun) they describe in gender and in number.

This means that if the noun an adjective describes is feminine, the adjective must be feminine e.g., une veste noire (a black blazer).

If that same noun is also plural, the adjective will be feminine **AND** plural as well e.g., les chaussettes noires (black socks).

Comparatives – to express more or less than

… est plus + adjective + que - is more…adjective…than
… est moins + adjective + que - is less…adjective… than
… est aussi + adjective + que – is as…adjective…as

For example:
L'anglais est plus intéressant que la géographie. (English is more interesting than Geography)
L'histoire est moins active que l'E.P.S. (History is less active than PE)
Le français est aussi difficile que les maths. (French is as difficult as maths).

Languages

9.4 Culture, History and Geography– French Vocab List

Cabot Learning Federation

Year 9 Term 6 – Culture, History and Geography

Les pays francophones	French Speaking Countries
La France	France
Le Cameroun	Cameroon
Le Sénégal	Senegal
La Corse	Corsica
La Guadeloupe	Guadeloupe
La Suisse	Switzerland
La Belgique	Belgium
L'Algérie	Algeria
La Tunisie	Tunisia
La Guinée	Guinea
La Guyane	French Guiana
La Côte d'Ivoire	Ivory Coast
La Polynésie Française	French Polynesia
Le Bénin	Benin
Le Burkina Faso	Burkina Faso
Le Burundi	Burundi
Le Canada	Canada
Le Tchad	Chad
Le Congo	Congo
Le Djibouti	Djibouti
Le Haïti	Haiti
Le Luxembourg	Luxembourg
Le Madagascar	Madagascar
La République du Mali	Mali
Le Monaco	Monaco
Le Niger	Niger
Le Rwanda	Rwanda
Les Seychelles	Seychelles
Le Togo	Togo
Le Vanuatu	Vanuatu
Les Antilles	French speaking Caribbean Islands

Les directions	Directions
nord	north
nord-est	northeast
est	east
sud-est	southeast
sud	south
sud-ouest	southwest
ouest	west
nord-ouest	northwest

La géographie	Geography
Je suis francophone	I speak French
Une langue maternelle	Mother tongue
L'Hexagone	France (slang)
Les DOM TOM	French overseas territories
L'outre-mer	Overseas
Le métropole	Mainland France
Un territoire	Area
Un département	Department
Une région	Region

L'histoire	History
La révolution française	The French Revolution
La colonisation	Colonisation
La civilisation	Civilisation
Le conflit	Conflict
La culture	Culture
Le cinquième république	The 5th Republic
L 'indépendance	Independence
La liberté	Freedom
La Renaissance	The Rennaissance
Un siècle	A century
Contemporain	Contemporary
Moderne	Modern
Laïque	Secular

La langue de tous les jours	Everyday language
Bonjour!	Good morning, hello
Bienvenue.	Welcome
Pardon, excusez-moi.	Pardon, excuse me.
Parlez-vous anglais?	Do you speak English?
Je ne parle pas français.	I do not speak French.
À tout à l'heure!	See you later!
Merci/Merci beaucoup.	Thank you/Thank you very much.
Au revoir!	Goodbye!
De rien.	You're welcome.
Je ne comprends pas.	I do not understand.
Où est un bon restaurant/un bon café?	Where is a good restaurant/a good café?
Où est la plage/le centre-ville?	Where is the beach/city center?
Je cherche le métro/le gare/l'aéroport.	I am searching for the metro/train station/airport
Je cherche l'hôtel/l'hôpital/la banque.	I am searching for the hotel/hospital/bank.
Pourriez-vous prendre ma photo/notre photo?	Can you take my/our photo?
Il n'y a pas de quoi	It's nothing/don't mention it
Vas-y, Allez-y	Go on, go ahead
Bonne soirée!	Good evening!
À demain!	See you tomorrow!
Je suis desolé(e)	I'm sorry
Tu t'appelles comment?	What's your name?
Je suis perdu	I'm lost
Attention! Fais/faites attention!	Careful! Be Carefull!
Bien sûr	Of course
C'est n'importe quoi!	That's nonsense!
Laisse tomber...	Forget it...
Ça te dit?/Ça vous dit?	You up for it?
Tiens-moi au courant!	Keep me up to date!
Bref	all in all
T'sais?	Ya know?
Ça te changera les idées...	It'll take your mind off things...

BROADOAK ACADEMY **Languages**

9.4 Tenses and Festivals – French Vocab List

Cabot Learning Federation

French Year 9 .4 Tenses and Festivals

Les phrases du passé	Past Tense Time Phrases
L'année dernière	Last year
Le mois dernier	Last month
Avant hier	The day before yesterday
La semaine dernière	Last week
Hier	Yesterday
Dans le passé	In the past
Quand j'avais…ans	When I was…. years old
L'été dernier	Last summer
L'hiver dernier	Last winter
Il y a …. (deux ans)	… ago (two years ago)
Le weekend dernier	Last weekend

Les verbes au passé	Past Tense Verbs
Je suis allé(e)	I went
J'ai célébré	I celebrated
J'ai mangé	I ate
J'ai bu	I drank
J'ai ouvert	I opened
C'était	It was

Les phrase du futur	Future Tense Time Phrases
L'année prochaine	Next year
Le mois prochain	Next month
Après demain	The day after tomorrow
Demain	Tomorrow
La semaine prochaine	Next week
Dans le futur	In the future
Quand j'aurais … ans	When I will be…. years old
L'été prochain	Next summer
L'hiver prochain	Next winter
Le weekend prochain	Next weekend

Les verbes clés	French Festivals
Ma fête préférée est…	My favourite festival is
Noël	Christmas
La veille de Noël	Christmas Eve
Le Pâques	Easter
Le Dipavali	Divali
Le Hanoukka	Hanukkah
L'Aïd	Eid
Le premier avril	April Fool's Day
La Chandeleur	Candelmas
Le Nouvel An	New Year
La Saint-Sylvestre	New Year's Eve
La Saint-Valentin	Valentine's Day
La fête des Mères	Mother's Day
Le 14 juillet	Bastille Day
Un jour férié	A bank holiday
Le premier mai	May Day/Labour Day
La fête de la musique	Music festival
L'anniversaire	Birthday
Le mariage	Marriage
Un fête	Party
Les invités	Guests
Les cadeaux	Presents
Le muguet	Lily of the valley
Les blagues	Joke
Un repas spécial	A special meal
Un cadeau	A cake
Les feux d'artifices	Fireworks
Religieux/religieuse	Religious
Traditionnel/traditionnelle	Traditional
En famille	Family

Les verbes clés	Key Verbs
Célébrer	To celebrate
Boire	To drink
Décorer	to decorate
Donner les cadeaux	To give presents
Chanter	To sing
Danser	To dance
Allumer les bougies	To light candles
Manger	To eat
Préparer	To prepare
S'amuser	To have fun
Inviter	To invite
Regarder	To watch
S'habiller	To dress up
Se rencontrer	To meet up with family
Apporter	To bring
Se relaxer	To relax
Passer	To spend
Réunir	To gather
Ouvrir	To open
Voir	To see
Je célèbre avec	I celebrate it with
Nous allons nous souhaiter	We wish each other

Les verbes au futur	Future Tense Verbs
Je vais aller	I will go
Je vais célébrer	I will celebrate
Je vais manger	I will eat
Je vais boire	I will drink
Je vais ouvrir	I will open
Ça va être	It will be

BROADOAK ACADEMY **Languages**

9.4 Tenses and Festivals – French Knowledge Organiser

Verbs and the present tense in French

The infinitive

When you look up a verb in the dictionary, you find its original, unchanged form which is called the ***infinitive*** (regarder, manger, boire, finir, jouer, avoir, être, etc.). The infinitive ends in **–er**, **-ir** or **–re.**

Forming the present tense in French

Take off the last 2 letters of the infinitive (**–er**, **-ir** or **–re)** and add the following endings depending on the pronoun:

	ER verb	IR verb	RE verb
je	-e	-is	-s
tu	-es	-is	-s
il / elle/ on	-e	-it	/
nous	-ons	-issons	-ons
vous	-ez	-issez	-ez
ils/elles	-ent	-issent	-ent

Verbs and the near future tense in French

You can talk about the future by using the **near future** tense (*le future proche*). Use part of the verb ALLER followed by the infinitive to say what you are **going** to do.

Ce soir je **vais jouer** au tennis. *Tonight I am going to play tennis.*
Demain Paul **va faire** un gateau. *Tomorrow Paul is going to make a cake.*

ALLER	
Je vais	I am going
Tu vas	You are going
Il /elle /on va	He /she/one is going
Nous allons	We are going
Vous allez	You (lot) are going
Ils /elles vont	They are going

Verbs and the past tense in French

You can talk about the past by using the **perfect** tense (*le passé composé*).

The perfect tense has 2 parts:

- The auxiliary (***avoir*** or ***être***) – use ***être*** *with* ***Mrs Vandertramp*** *verbs*
- The past participle (must agree in number and gender for ***Mrs Vandertramp*** *verbs)*

To form the past participle, take off the infinitive endings (**–er**, **-ir** or **–re)** and add **–é, -i** or **–u**.

J'**ai** achet**é** des baskets au centre commercial. *I* ***have*** ***bought*** *trainers at the shopping mall.*

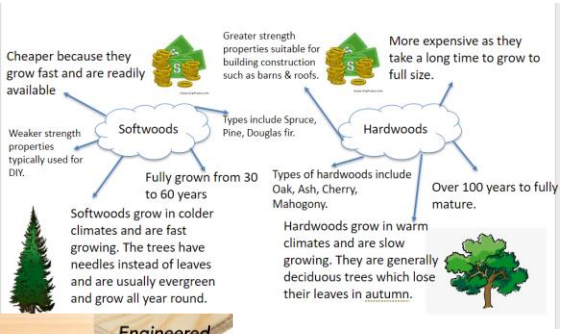
Hier il **a** jou**é** au foot dans le parc. *Yesterday he play****ed*** *football in the park.*

Hier elle est all**ée** au cinema - *Yesterday she went to the cinema*

AVOIR auxiliary ÊTRE	
Avoir	Être
J'ai	Je suis
Tu as	Tu es
Il /elle a	Il /elle est
Nous avons	Nous sommes
Vous avez	Vous êtes
Ils /elles ont	Ils /elles sont

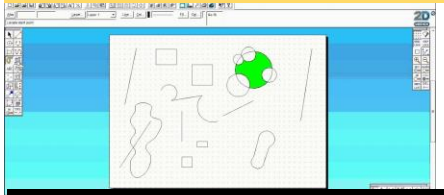
BROADOAK ACADEMY **DT**

Resistant Materials



	Hardwood	Softwood	Engineered wood
Origin	Deciduous trees that have leaves and seeds	Conifer trees that have needles and cones	Real timber, waste wood or a combination
Examples	Ash, beech, birch, cherry, oak, maple, and walnut	Cedar, fir, pine, spruce and redwood	Plywood, MDF, chipboard and veneered boards
General Characteristics	Slower growth rate and often higher density	Faster growth rate and often lower density	Large standard sized panels of varying density
Uses	High quality furniture, decorative woodwork, decks, flooring…	Building components, furniture, exterior cladding…	Furniture (shelves and cupboards), walls, counters…
Cost	Typically, higher cost	Typically, lower cost	Lower cost

Computer Aided Design- 2D design-



Solder iron

Laser cutter

Vacuum former

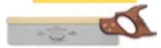
Advantages of CAD

- Increased accuracy of design compared to hand drawings.
- Designs can be saved & edited for mistakes/ changes easily.
- Can be exported to different formats for manufacture e.g DXF & STL.
- Designs can be tested virtually instead of physically modelled.

File

Coping Saw

Tri-Square

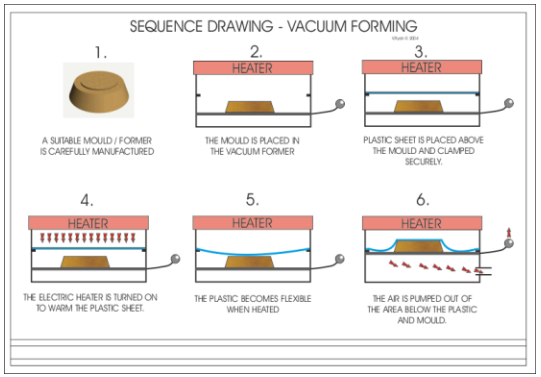


Tenon Saw

Bench Hook

Pillar Drill

Vertical Sander



Polymers (plastics) Plastics

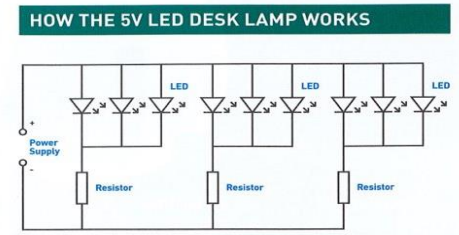
- During this project you will use plastics. Its important you know the difference between the 2 main groups of plastics; **thermosetting plastic** & **thermoforming plastic**.

Thermoforming plastic Are plastics which don't resist heat and can be easily formed into shapes by heating and remoulding.

Thermoforming Plastic	Properties & Uses
Acrylic	Hard and shiny, resist weather well. Can be used to make baths, motorbike helmet visors and shop display signs.

Thermosetting Plastic	Properties & Uses
Melamine Formadehyde	Strong and scratch proof. Used to laminate chipboard to form kitchen worksurfaces.

Thermosetting plastic Resist heat and fire. They undergo a chemical change when heated and moulded and permanently become hard and rigid.



The circuit diagram for the 5V LED Desk Lamp is shown above. It is a very simple circuit. The board contains nine LEDs, these are grouped in to threes, with each group of three sharing a current limit resistor.

LEDs can be damaged if too much current goes through them so a 33 Ω resistor is on each 'branch'. This allows around 20mA to each LED or 60mA per branch.

BROADOAK ACADEMY **DT**

Food Tech

Food Employability Skills – What do you need to get a job in the Food Industry?

- Listening
- Speaking
- Problem Solving
- Creativity
- Staying Positive
- Aiming High
- Leadership
- Teamwork

Carbohydrates

Carbohydrates fall into 3 categories:

- **Starchy**
- **Sugars**
- **Fibre (non-starch)**

Starchy Carbs Include

- Bread
- Pasta
- Rice
- Cereals
- Oats
- Grains

Sugary Carbs Include:

- Fruits
- Soft drinks
- Sweets
- Desserts
- Sweet potatoes
- Some cereals

Fibrous Carbs Include:

- Vegetables
- Beans
- Whole grains

Allergy	What this means	Foods to avoid	Alternatives
Coeliac	Allergy to wheat/gluten. This means that eating gluten triggers an immune reaction which damages the lining of the small intestine.	Foods made with flour cannot be eaten Including cakes, biscuits, pasta and bread.	Gluten free flour or flours made from other ingredients like rice, soya etc.
Nut allergy	Can cause anaphylactic shock where the throat swells until a person cannot breathe. They need to be treated with adrenalin.	Any nut-based products - Some people are allergic to some nuts but not others.	You need to check packets to ensure all ingredients are free from traces of nuts.
Fish and seafood	Can cause an increase in severe asthma. Itching of the mouth, skin reactions, and anaphylaxis causing swelling and possible death.	Any sea food, some everyday fish, and fish supplements	Use other meats and avoid any oils that may contain fish.
Egg allergy	Eggs have two allergenic parts, the yolk and the white. They can cause anaphylactic shock, skin reactions and upset stomach.	Any foods containing eggs including; ice cream, cakes, battered foods etc.	Egg replacer.
Lactose intolerance	The body is unable to digest lactose, a type of sugar mainly found in milk and dairy products. Symptoms commonly include skin reactions, Allergic conjunctivitis, nausea, abdominal pain, vomiting, or diarrhoea.	Any dairy products containing lactose Including cheeses, creams, butter, milks etc.	Lactose free milks and dairy products.

BROADOAK ACADEMY **DT**

Food Tech

Being Healthy

Staying healthy isn't just about maintaining the correct weight.

It is therefore possible to be the correct weight and unhealthy.
Why? Because to be healthy we need the right combination of nutrients.

The easiest way to do this is to eat a wide variety of different foods from the Eatwell Guide and to understand which foods supply which nutrients and why we need them.

When choosing dishes and planning healthy foods the cooking method is important as it can turn a healthy food into a less healthy food.

Adding fat to help to cook food adds calories and excessive calories can lead to weight gain. If a saturated fat (butter, lard, ghee, goose fat) is used then this can lead to high cholesterol which is linked to coronary heart disease. If an unsaturated fat (olive oil, rapeseed, vegetable or sunflower oil) is used this is better for our health but still high in calories.

Potatoes are a good choice of food to consider when understanding how the method of cooking can affect health as they can be cooked in so many ways.

For example:
Boiled potatoes = 83 kcals per 100g
Baked potatoes = 87 Kcals per 100g
Chips = 255 Kcals per 100g (more if they are fries)
Crisps = 532 Kcals per 100g

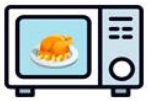
HEALTHIEST COOKING METHODS

STEAMING

-No direct heat
-Retains nutrients
-Adds flavour

GRILLING

-Minimal oil
-Seal in flavour
-Reduce fat content



MICROWAVING

-No oil required
-Quick cooking
-Nutrients intact

STIR-FRYING

-Minimal oil
-Nutrients intact
-Great texture

POACHING

-Enhance nutrients
-Add flavours
-Reuse nutrient stock

NO COOKING

-No oil
-Nutrients not lost
-Taste enhanced in partial cooking