Hartford
Church of England
High School

CARITAS ET VERITAS

Year 10

Knowledge Organiser

Contents

Maths

Maths - Foundation

STRAIGHT LINE GRAPHS AND EQUATION OF A LINE

Key Words

Intercept: Where two graphs cross.
Gradient: This describes the steepness of the line.
y-intercept: Where the graph crosses the y-axis.
Linear: A linear graph is a straight line.
Quadratic: A quadratic graph is curved, u or n shape.

Key Concepts

Coordinates in 2D are written as follows:

x is the value that is to the left/right

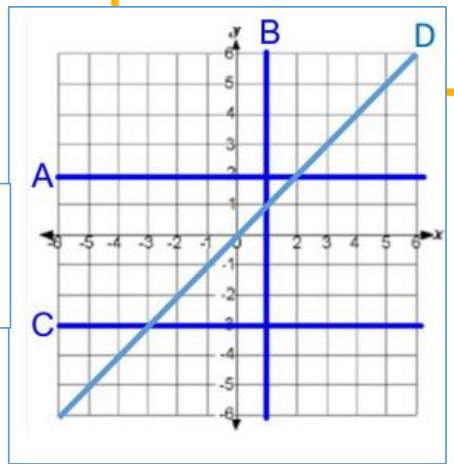
(x, y)

y is the value that is to up/down

Straight line graphs always have the equation:

$$y = mx + c$$

m is the **gradient** i.e. the steepness of the graph.
c is the **y intercept** i.e. where the graph cuts the y axis.



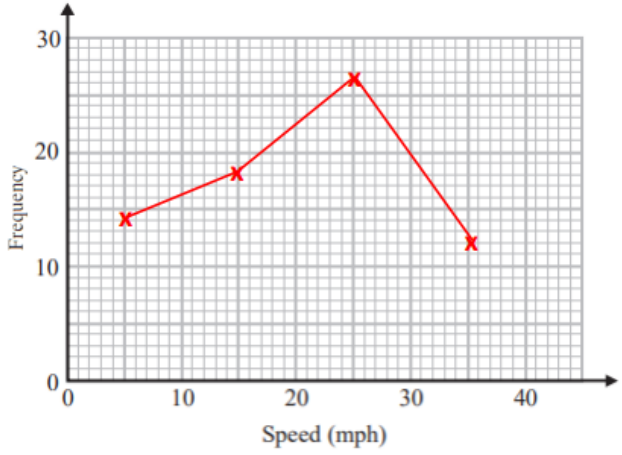
A: y = 2 B: x = 1
C: y = -3 D: y = x

Drawing Frequency Polygons

This table gives information about the speeds of 70 cars.

Speed (s mph)	Frequency (f)	Midpoint
$0 < L \leq 10$	14	5
$10 < L \leq 20$	18	15
$20 < L \leq 30$	26	25
$30 < L \leq 40$	12	35

a) Draw a frequency polygon for this information.



Step 1 – Find the midpoint of each class interval
Step 2 – Label your axes and choose an appropriate scale
Step 3 – Plot each point at the midpoint for that interval
Step 4 – Connect each point with a straight line

Do not extend the line beyond the points you have

Y10 F – Half Term 5 Maths KO

SEQUENCES

Key Concepts

Arithmetic sequences increase or decrease by a common amount each time.

Quadratic sequences have a common 2nd difference.

Fibonacci sequences Add the two previous terms to get the next term

Geometric series has a common multiple between each term

Below are some of the most common sequences.

Even numbers 2, 4, 6, 8, 10, … **nth term = 2n**

Odd Numbers 1, 3, 5, 7, 9, … **nth term = 2n - 1**

Square Numbers 1, 4, 9, 16, 25, … **nth term = n^2**

Cube Numbers **1, 8, 27, 64, 125, … nth term = n^3**

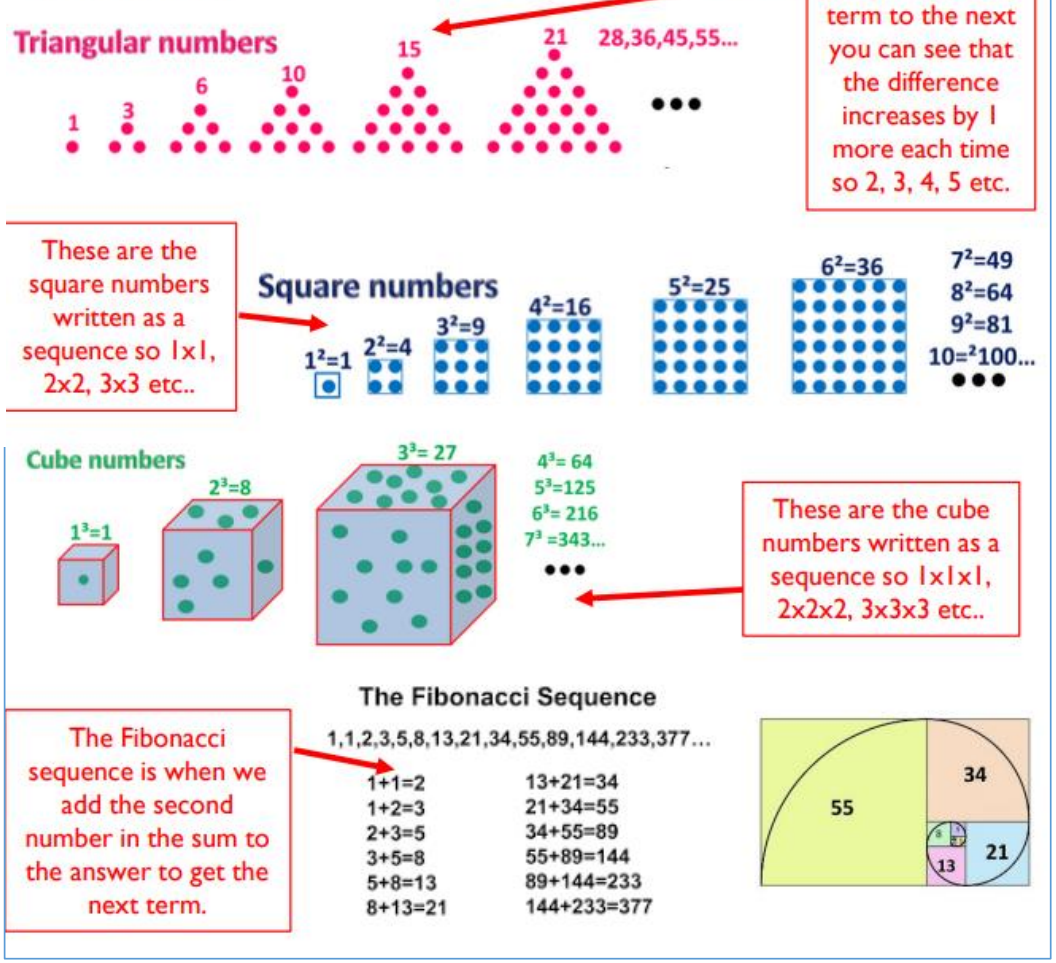
Triangle Numbers **1, 3, 6, 10, 15, … nth term = ½ n (n + 1)**

Prime Numbers **2, 3, 5, 7, 11, 13, etc. No known formula!**

Fibonacci Numbers **1, 1, 2, 3, 5, 8, 13, … Formula not needed for GCSE. Each term is found by adding the previous term!**

Special sequences

Sometimes sequences do not increase or decrease by a consistent number. These can be quadratic sequences which include an n^2 term or they can be other special sequences some of which are shown below,



Maths - Higher

Sketching Quadratics	
x *intercept*	Set $y = 0$ and solve the quadratic equation.
y *intercept*	Set $x = 0$ and solve to find the y coordinate.
Turning Point	Write the equation in completed square form i.e. $(x + p)^2 + q$. The coordinates of the turning point are $(-p, q)$.

Drawing Frequency Polygons

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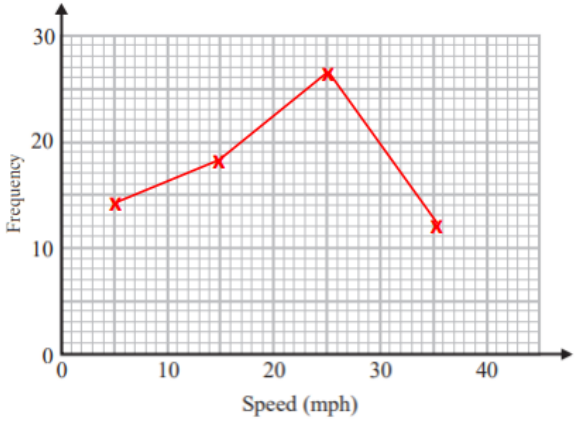

Step 1 – Find the midpoint of each class interval
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Do not extend the line beyond the points you have

Straight Line Graphs	
Equation of a line	$y = mx + c$
m	Gradient
c	y-intercept
Calculating Gradient	$\frac{change\ in\ y}{change\ in\ x}$
Parallel lines…	… have the same gradient
Perpendicular lines…	… have gradients that are the negative reciprocal of each other

Scatter Graphs

Positive correlation
As one variable increases so does the other variable.

Negative correlation
As one variable increases the other variable decreases.

No correlation
There is no relationship between the two variables.

Key Terms:

Discrete data: countable data that can be categorised e.g. *Shoe size, eye colour*

Continuous data: data that is measured and can take any value e.g. *Height, time, temperature*

Qualitative data: text-based data that describes something *e.g. colours, race*

Quantitative data: numerical data *e.g. age, height, temperature*

Frequency: the number of occurrences of an event

Extrapolate: to predict values from outside the range of data

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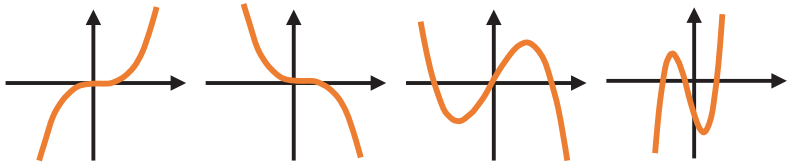
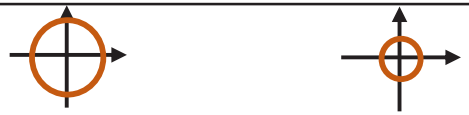
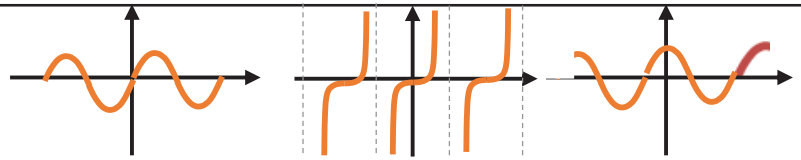
Maths - Higher

Type	Equation types	Key features	Possible shapes
Linear	$y = mx + c$	▪ straight line shape ▪ m is the gradient ▪ c is the y-intercept	
Quadratic	$y = ax^2 + bx + c$	▪ u shape if **a** is +ve ▪ n shape if **a** is -ve ▪ can have up to 2 roots	
Cubic	$y = x^3$ $y = ax^3 + bx^2 + cx + d$	▪ goes up first if **a** is +ve ▪ goes down first if **a** is –ve ▪ can have up to 3 roots ▪ can have up to 2 turning points	
Reciprocal	$y = \frac{a}{x}$	▪ has 2 asymptotes has curves in the … ▪ 1st and 3rd quadrant if a is +ve ▪ 2nd and 4th quadrant if a is -ve	
Circular	$x^2 + y^2 = r^2$	▪ has a centre at (0, 0) ▪ has a radius of **r** units	
Exponential	$y = a^x$	▪ increasing when x is +ve ▪ decreasing when x is -ve ▪ passes through (0 , 1) ▪ asymptote at the x axis	
Trig	$y = \sin x$ $y = \cos x$ $y = \tan x$	▪ sin starts at (0, 0) ▪ cos starts at (0, 1) ▪ both repeat every 360° ▪ tan has asymptotes	

English

English - Power and Conflict Poetry

Poem	Content and Meaning
Ozymandias 1819	A traveler tells the poet that two huge stone legs stand in the desert. Near them on the sand lies a damaged stone head. The face is distinguished by a frown and a sneer which the sculptor carved on the features. On the pedestal are inscribed the words "My name is Ozymandias, king of kings: / Look on my works, ye Mighty, and despair!" Around the huge fragments stretches the empty desert.
London 1792	The speaker wanders through the streets of London and comments on his observations. He sees despair in the faces of the people he meets and hears fears and repression in their voices. The woeful cry of the chimney-sweeper stands as a criticism to the Church, and the blood of a soldier is seen to be staining the walls of a palace. The night time is just as harrowing; the cursing of prostitutes corrupts the babies and tarnishes marriage and death.
The Prelude 1799	The poet describes how as a youth he stole a boat and rowed one night across a lake. At the climax of this experience, he imagined that a mountain peak beyond the lake became a presence which reared up and menaced him because of his misdeed in taking the boat. He confides that for some time thereafter he struggled with the idea that nature has the capacity to torment mankind in such a way. The experience gives him a new respect for nature.
My Last Duchess 1842	The poem is based on Alfonso, the Duke of Ferrara, from the 16th century. The Duke is the speaker of the poem and tells us he is entertaining a messenger who has come to negotiate the Duke's marriage to the daughter of another powerful family (he has recently been widowed). As he shows the visitor through his palace, he stops before a portrait of his late Duchess. The Duke begins reminiscing about the painting sessions and then about the Duchess herself. He then talks about her disgraceful behaviour as he claims she flirted with everyone and did not appreciate him. As the monologue continues, the Duke reveals that he is the one responsible for the Duchess' death, after this, he returns to the business of arranging another marriage.
Charge of the Light Brigade 1854	The poem tells the story of the failed charge of the British cavalry in the Battle of Balaklava in October 1854. Britain was fighting against Russian forces in the Crimean War. A cavalry group (soldiers on horses) , the Light Brigade, was ordered to charge down a narrow valley straight into the fire of Russian cannons. It was a huge catastrophe and 150 soldiers died. The men were respected for following orders, even though they knew they may be wrong but the disaster caused public outrage as the British public began to question the politicians and generals who led them.
Exposure 1917	The poem focuses on the misery felt by World War One soldiers waiting overnight in the trenches. Although nothing is happening and there is no fighting, there is still danger because they are exposed to the extreme cold and their wait through the night is terrifying. The speaker describes the trauma of living and struggling in such poor conditions; there is a sense of despair and of lost hope. If being 'exposed' to gunfire does not kill them, then exposure to the brutal weather conditions might do. Alongside the more obvious meanings of the title, there is also the idea that Owen has set out to expose the conditions the soldiers have experienced to the world and in doing so expose the government's negligence of the soldiers' situation.
Storm on the Island	Storm On The Island is a poem that can be taken literally, as a dramatic monologue on the life and attitude of island people facing a storm, or it can be understood as an extended metaphor of political struggle on the island of Ireland.
Bayonet Charge 1957	The poem depicts the thoughts and feelings of an inexperienced soldier as he makes his way across no-man's land in pursuit of attacking the enemy. On his journey, he sees how not only is humanity destroyed by war, but also nature – suggesting that the effects of war are universal and impacts both far and wide.
Remains 2008	The poem focuses on a soldier who is haunted by a violent memory of being at war. He tells how he and his comrades opened fire on a looter who may or may not have been armed, and they shot him dead. Later the soldier thinks about the shooting every time he walks down the street. Then later again, when he returns home he is still haunted by the thought of what he has done. He tries drink and drugs to drown out the memory, but they do not work. The final lines show that the memory was not left behind in the place of war in a distant land, but is with the speaker all the time.
Poppies 2009	The poem is about the grief a mother experiences, particularly when her son goes to fight at war. The mother expresses her feelings at different moments of her son's life: when he is young, when the son leaves to go to war and finally the death of her son.
War Photographer 1985	Duffy's poem is about how we deal with the suffering of others, who might be faraway. It takes the character of a war photographer to represent someone more involved and committed than we in the western world are. The photographer finds it difficult to have to record the harrowing events of war, without actually being able to help those who he takes the photograph of.Duffy provokes us to consider our own response when confronted with the photographs that we regularly see in our newspaper supplements, and why so many of us have become desensitised to these images.
Tissue 2006	The poem explores the conflicts and troubles of the modern world; destruction, religion, war and politics, money and wealth. The poem remarks on how nothing is meant to last, that it would be better not to hold too tightly to ideas/ buildings/ societal structures that have not been questioned for a long time, and instead we should be willing to let go and pass things on in their time to be remade.
The Emigree	A displaced person pictures the country and the city where he or she was born. However, Rumens suggests it may now be war-torn, or under the control of a dictatorial government that has banned the language the speaker once knew. Despite this, nothing shakes the light-filled impression of a perfect place that the their childhood memories have left. This shows the power that places can have, even over people who have left them long ago and who have never revisited since.
Checking Out Me History	This poem is an expression of the anger and the frustration that Agard feels about the British education system and the way he feels as though he has not been taught nor exposed to the history of his own culture. He suggests that he feels ignorant of his own background and identity as white history is prioritised in the history teaching of schools.
Kamikaze	The poem is set around the events of a kamikaze pilot flying to war and then turning back before it was too late. Kamikaze pilots were expected to use up all their weapons and then suicide by flying into their targets as a final act of destruction. It was considered a great honour in Japan to die for your country.

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English

Poem	Context
Ozymandias 1819	The poem was inspired by the unearthing of part of a large statue of the Egyptian Pharoah, Ramesses II. The Egyptian Pharaohs like Ramesses believed themselves to be gods in mortal form and that their legacy would last forever. Shelley was critical of the monarchy and government in England and sympathised with the ideas behind the French Revolution (rebelling against those who were born into positions of authority). 'Ozymandias' can be read as a criticism of undemocratic or tyrannical governments, reflecting Shelley's socialist views.
London 1792	The poem is set during the Georgian era in England where there was a huge disparity between the rich and poor and child labour was common. Women had few rights, death rates from disease and malnutrition were high and the industrial revolution has resulted in many oppressive factories in which poorer members of society were desperate to work (in order to escape poverty) but the conditions were terrible and they were not paid adequately. During the late eighteenth century the French Revolution (a rebellion against those who were born into positions of authority) was taking place, and a sense of uprising against authority was spreading. Blake openly supported this.
The Prelude 1799	Wordsworth was part of the Romantic movement which means that he believed that nature ought to be respected above all else and that man's curiosity should be discouraged as it risked ruining the purity and beauty of nature. Wordsworth believed that, upon being born, human beings move from a perfect, idealised state into the imperfect, un-ideal earth. He believed that humans should connect to their natural surroundings in order to discover their true, uncorrupted selves.
My Last Duchess 1842	This poem is based on historical events. Duke Alfonso II of Modena and Ferrara (1559–1597) married Lucrezia de'Medici in June 1558. She was the first of his three wives and is believed to be 'the last duchess' of the poem. She died four years after her wedding. During the Victorian era, the idea was that upper and middle class women had to stay dependent on a man: first as a daughter and later as a wife. Once married, it was extremely difficult for a woman to obtain a divorce. Men the right to divorce their wives on the grounds of adultery. However, married women were not able to obtain a divorce if they discovered that their husbands had been unfaithful. Although institutions were set up during the Victorian era to help victims of domestic violence, physical force between husbands and wives was worryingly common during this period.
Charge of the Light Brigade 1854	The poem tells the story of the failed charge of the British cavalry in the Battle of Balaklava in October 1854. Britain was fighting against Russian forces in the Crimean War. A cavalry group (soldiers on horses) , the Light Brigade, was ordered to charge down a narrow valley straight into the fire of Russian cannons. It was a huge catastrophe and 150 soldiers died. The men were respected for following orders, even though they knew they may be wrong but the disaster caused public outrage as the British public began to question the politicians and generals who led them.
Exposure 1917	Wilfred Owen was a soldier and officer in World War 1. He died just a week before the end of the war but during his time he saw the full horror of conditions on the front line and he felt angry at the way that young men had been deceived into fighting in such terrible conditions. World War One began in 1914 and at first it was predicted that it would end swiftly. However, the war went on for much longer and during the winter of 1917 both sides had sustained massive losses and extreme cold weather made the misery even worse. It was said to be the coldest winter in living memory. As a result ofliving in the trenches, soldiers suffered from hypothermia and frostbite and many developed trench foot (a crippling disease caused by feet being wet and cold and confined in boots for days on end).
Storm on the Island	Seamus Heaney was a poet in Ireland, he grew up in a farming community and he uses a large number of agricultural and natural images in his work as metaphors for human nature. The poem is set around a story of a small isolated cottage near the sea in a storm and the exposure to the elements. The violence of the storm in the poem could also be a metaphor for the Troubles which was a series of conflicts between Ireland and Britain.
Bayonet Charge 1957	This poem was heavily influenced by the fact that Hughes' father was a veteran of the First World War. The poem outlines the horrific conditions that soldiers experienced on the battle field in WW1. Particularly at the start of the war when a consistent training programme had yet to be put in place, some soldiers were sent to battle with very limited training. Hughes also explores the idea that many soldiers were conscripted (they were legally obliged to go) to fight in WW1 and therefore did not always understand or support what they were fighting for.
Remains 2008	Armitage made a film and a collection of poems called 'The Not Dead'. In preparation for this work, he interviewed veteran soldiers of different wars, including the Gulf War. The reference to 'desert sand' in this poem suggests that it reflects the experiences of soldiers in the Gulf War. Armitage made the series to highlight the plight of soldiers suffering from Post Traumatic Stress Disorder. Today, veterans of any nation still have the highest rate of suicide among the general populace and Armitage wanted to highlight that soldiers suffer long after their service ends.
Poppies 2009	Weir's poem 'Poppies' was commissioned as part of a collection of modern war poems which were published in the Guardian in 2009, as part of a response to the escalating conflict in Afghanistan and the Iraq inquiry. Weir commented, 'I wrote the piece from a woman's perspective, which is quite rare, as most poets who write about war have been men. As the mother of two teenage boys, I tried to put across how I might feel if they were fighting in a war zone.'
War Photographer 1985	Duffy was inspired to write this poem by her friendship with a war photographer. She was especially intrigued by the strange challenge faced by these people whose job requires them to record terrible events without being able to directly help their subjects. Throughout the poem, Duffy encourages the reader to consider our own response when confronted with the photographs that we regularly see in our newspaper supplements, and why so many of us have become desensitised to these images. The 'children running in a nightmare heat' is based on an iconic image of a girl running away from a napalm attack on her village.
Tissue 2006	The poem explores the conflicts and troubles of the modern world; destruction, religion, war and politics, money and wealth. The poem remarks on how nothing is meant to last, that it would be better not to hold too tightly to ideas/ buildings/ societal structures that have not been questioned for a long time, and instead we should be willing to let go and pass things on in their time to be remade.
The Emigree	Emigrants are people who have left the country of their birth to settle elsewhere in the world. Neither the city nor the country left behind is ever named in the poem and this lack of specific detail seems intentional- Rumens wants her poem to be relevant to as many people who have left their homelands as possible. Rumens suggests the city and country may now be war-torn, or under the control of a **dictatorial** government that has banned the language the speaker once knew.
Checking Out Me History	Agard suggests that that because black history and experience is often ignored and forgotten in British history, what is taught in schools is very limited. Agard highlights the importance of recognising the social and historical achievements of black people in order to develop a personal identity that reflects his cultural and racial roots. Agard explores colonialist attitudes towards the way in which history is taught.
Kamikaze	The poem is set around the events of a kamikaze pilot flying to war and then turning back before it was too late. Kamikaze pilots were expected to use up all their weapons and then suicide by flying into their targets as a final act of destruction. It was considered a great honour in Japan to die for your country.

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English

Language Techniques	Definition	Example
Symbolism	When an object represents an idea that is much deeper and more significant.	'Later a single dove flew from the pear tree'
Personification	Describing an inanimate object as having human feelings.	'My city takes me dancing through the city of walls'
Metaphor	A descriptive technique that names a person, thing or action as something else.	'The mind-forged manacles I hear'
Simile	A descriptive technique that compares one thing with another, usually using 'as' or 'like'.	'my boat Went heaving through the water like a swan'
Superlative	An adjective/ adverb that indicates the most of something.	'But most thro' midnight streets I hear'
Intensifier	A word, especially an adverb or adjective, that has little meaning itself but is used to add emphasis to another adjective, verb, or adverb.	'In every cry of every Man'
Minimiser	A word that is used to make another adjective, verb or adverb sound lesser.	'he's there on the ground, sort of inside out'
Imperative	A sentence that is a command.	'Honour the charge they made!'
Exclamatory	A sentence that expresses a heightened emotion. They end with an exclamation mark	'She thanked men—good!'
Listing	When the writer includes several words/ phrases/ ideas, one after the other.	'All my words flattened, rolled, turned into felt'
Repetition	When a word/ phrase is noticeably repeated throughout a sentence/ paragraph/ whole text.	'His bloody life in my bloody hands'
Imagery	A technique in which the author appeals to the senses i.e. seeing, hearing, touching.	'Stumbling across a field of clods towards a green hedge That dazzled with rifle fire'
Oxymoron	A phrase in which contradictory/ opposing terms appear in conjunction with one another.	'the black'ning church appals'
Semantic field	A group of words which are related in theme.	'pummels…exploding…flung…spits …dives…bombarded'

Themes	Ideas
Identity	Identity is something that is heavily shaped by painful experiences. Identity can be determined by others. Identity is influenced by your place of birth and cultural underpinnings.
Memory	Memory is something that is deeply unreliable. Memories can cause tremendous suffering. The memory of an event can become more painful that the event itself. Memories encourage regret.
Nature	Nature is all powerful and should be respected. The power of nature transcends the power of humans. Nature is destructive and vengeful.
Impact of war	War favours the collective over the individual. War encourages erratic behaviour. As wars develop, patriotism is replaced with fear and a need to survive.
Power	Power can be used by individuals to manipulate and control others. Power can be used to limit the opportunities of groups within society. The power of humans is always fleeting.

Word class	Definition	Example
Verb	A **verb** is a word or set of words that shows action (*runs, is going, has been painting*); feeling (*loves, envies*); or state of being (*am, are, is, have been, was, seem*)..	'We <u>are</u> prepared: we <u>build</u> our houses squat, <u>Sink</u> walls in rock and <u>roof</u> them with good slate.'
Adverb	An adverb labels how, when or where something happens (and they often end in '–ly').	'<u>Suddenly,</u> he awoke and was running.'
Noun	Nouns are names, places and things; they also signify imagined things like 'a ghost'; and ideas or concepts, such as 'love', 'guilt' or 'fate'.	'How the youthful <u>harlots</u> curse'
Pronoun	Words used instead of a noun i.e. 'he', 'she', 'they', 'it'.	'<u>She</u> looked on and <u>her</u> looks went everywhere.'
Adjective	An adjective is a describing word or phrase that adds qualities to a noun. It normally comes before a noun, or after verbs like 'am', 'is', 'was', 'appears' or 'seems'.	'The bough of cherries some <u>officious</u> fool broke.'
Preposition	Prepositions are short words and phrases that give information about place, time and manner	'Eyeballs prick with tears <u>between</u> the bath and pre-lunch beers.'

Structural Features	Definition
Opening	The first mood/ image of the poem.
Cyclical	When end of the poem repeats an idea/character/setting from the opening.
Stanza	A 'paragraph'/verse in a poem.
Enjambment	A sentence or phrase that runs onto the next line.
Anaphora	When the first word of a stanza is the same across different stanzas.
Volta	A turning point in a poem.
Juxtaposition	Two ideas/ images placed together for contrasting effect.
Foreshadowing	A warning/ hint about what is going to happen next.
Iambic pentameter	A rhythm in a poem containing 10 syllables per line.
Speaker	The narrator, or person in the poem.
Change of mood/ tone	When the writer alters the overall feeling of the poem.
Refrain	A phrase, line or group of lines which is repeated throughout a poem.
Ending	The final mood/image of the poem.

Poetry

Hartford Church of England High School

English

Creative Writing

Language Techniques	Definition	Example
Metaphor	A descriptive technique that names a person, thing or action as something else.	The mesmerising circus was a magnet for the children.
Simile	A descriptive technique that compares one thing with another, usually using 'as' or 'like'.	The horse's majestic mane was like fire.
Personification	Describing an inanimate object as having human feelings.	The carpet lamented the demise of his beloved hoover.
Zoomorphism	A technique in which animal attributes are imposed upon non-animal objects, humans, and events.	The maid had a brusque manner; she snarled at anyone who dared to approach her.
Imagery	A technique in which the author appeals to the senses i.e. seeing, hearing, touching.	The earthy, unmistakable aroma of coffee weaved through the air.
Listing	When the writer includes several words/ phrases/ ideas, one after the other.	The familiar tapping, scratching, tearing and shouting echoed down the street.
Oxymoron	A phrase combining two or more contradictory terms.	There was a deafening silence.
Pathetic fallacy	A type of personification where emotions are given to a setting, an object or the weather.	The clouds crowded together suspiciously overhead as the sky darkened forebodingly.
Semantic field	Words from a the semantic field are part of a common category.	The writer includes a series of words from the semantic field of nature, 'Seedling…hedge…..plant'.

Sentences connecting paragraphs

The sound of….cut into his thoughts…….
She regarded her surroundings…..
As the figure came closer, her appearance sharpened….
They ambled towards….
The words radiated around him and….
The familiar words echoed…..
The surprising view of…..nudged into her vision…..
Her mind was transported back to….

Paper 1 Sentence Types

Begin with a verb:
Regarding the inside of the cave, they knew they had gone too far.

Begin with an adverb:
Hastily, she gripped the handle.

Begin with an emotion:
Desperate, they contemplated leaving her behind.

Use a hyphen to add extra information at the end:
They saw several icicles - the majority looming down at them from the ceiling.

Use hyphens to add extra information in the middle of a sentence:
She took a tentative step further in - then two or three steps - always expecting to feel woodwork against the tips of her fingers.

Use a semi colon to add more detail to a description:
His sleep had been fitful; his eyes burned and his body ached.

Use a semi colon to show the difference between the 'inside' and 'outside':
To the crowd, she appeared content; inside, she was reeling.

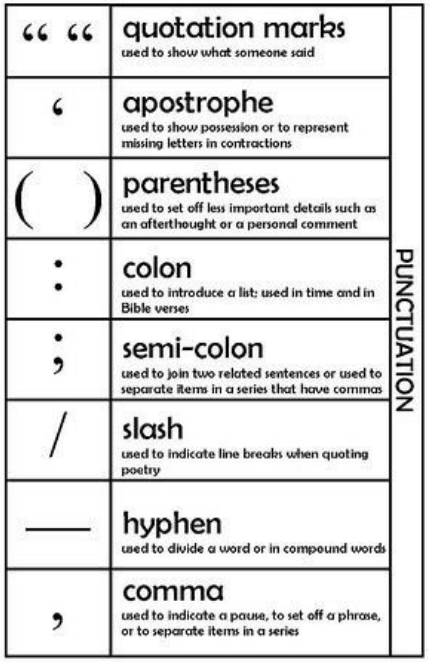
Use a colon to introduce a list:
The beach was a hive of activity: parents wrestling with umbrellas, children squealing delightedly and crabs dodging the clatter of human feet.

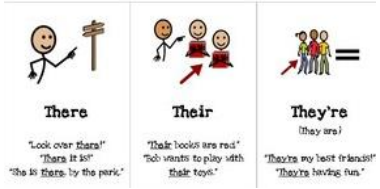
Use a colon to expand on the first part of the sentence:
His mood was notoriously difficult to predict: he regularly jolted between pleasant and peevish, without any warning.

Begin with a time connective:
Now, there was nothing to do but wait in terrified silence.

List a series of actions:
She immediately stepped into the wardrobe and immersed herself among the coats, rubbing her face against them, breathing in the musty scent and believing herself to be utterly safe.

Structural Techniques	Definition
Cyclical structure	When the conditions at the end are in the some way the same as they are at the beginning
One sentence paragraph	Using a one sentence paragraph to create emphasis, meaning or a turning point/change in tone.
Flashback	a scene in a novel, etc. set in a time earlier than the main story
Cliff-hanger	a story or event with a strong element of suspense/ unanswered questions
Climax	the most intense, exciting, or important point; the culmination of the story.





where - is an adverb relating to place/position.
I know where you left it.

were - is the plural past tense of the verb 'are'.
We were playing outside?

we're - is a contraction of 'we are'.
We're going to the park.

wear - is used when talking about clothing.
I don't know what to wear.

Science

Science - Health & Disease

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Health

The World Health Organisation (WHO) describes health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

The presence of one disease can lead to a higher susceptibility to other diseases.

Damage to immune system	Makes it easier for other pathogens to cause disease.
Damage to body defences	Barriers and defences are damages. Pathogens can enter the body.
Damage to organ systems	Organ systems don't work as effectively leading to other diseases.

Communicable and non communicable diseases

Communicable	*Non-communicable*
Caused by pathogens. They can be passed from person to person.	Caused by a fault in genes or by the way we live (lifestyle)

EDEXCEL GCSE HEALTH DISEASE AND MEDICINE part 1

Detection and identification of plant diseases (bio HT only)

Detection	Identification
Stunted growth	Reference using gardening manual or website, laboratory test for pathogens, diagnostic testing.
Spots on leaves	
Area of decay	
growths	
Malformed stem/leaves	
Discolouration	
Presence of pests	

Plants have several ways of defending themselves from pathogens and animals (Biology only)

Physical	*Mechanical*
Thick waxy layers, cell walls stop pathogen entry	Thorns, curling up leaves to prevent being eaten
Chemical	
Antibacterial and toxins made by plant	

Pathogens may infect plants or animals and can be spread by direct contact, water or air

Pathogen	*Disease*	Symptoms	Method of transmission	Control of spread
Bacteria	*cholera*	Causes diarrhoea.	Contaminated water	Vaccination, water treatment to remove bacteria.
Bacteria	*tuberculosis*	Causes lung damage.	Air borne water droplets from couching.	Isolation of infected person, vaccination.
Fungi	*Chalara ash dieback*	Leaf loss and bark lesions.	Spores in the air.	Remove/destroy infected trees.
Protists	*Malaria*	Recurrent fever. Damage to blood and liver.	By an animal vector (mosquitoes).	Prevent breeding of mosquitoes. Use of nets to prevent bites.
Bacteria	*Stomach ulcers (Bio only)*	Pain in abdomen, damage to stomach lining.	Oral transmission.	60% already carry the bacteria.
Virus	*Ebola (Bio only)*	Internal bleeding and fever.	Contact with bodily fluids of an infected person.	Isolation of infected person. Vaccination.
Virus	*HIV*	Initially flu like systems, serious damage to immune system.	Sexual contact and exchange of body fluids.	Anti-retroviral drugs and use of condoms.
Bacteria	*Chlamydia*	Unusual discharge from genitals or anus, pain when urinating.	Unprotected sex.	Using condoms during sex.

Pathogens

Pathogens are microorganisms that cause infectious disease

Communicable diseases

Bacteria may produce toxins that damage tissues and make us fell ill

Viruses	Bacteria (prokaryotes)	Protists (eukaryotes)	Fungi (eukaryotes)
e.g. cold, influenza, measles, HIV, tobacco mosaic virus	*e.g. tuberculosis (TB), Salmonella, Gonorrhoea*	*e.g. dysentery, sleeping sickness, malaria*	*e.g. athlete's foot, thrush, rose black spot*
DNA or RNA surrounded by a protein coat	No membrane bound organelles (no chloroplasts, mitochondria or nucleus). Cell wall. Single celled organisms	Membrane bound organelles. Usually single celled.	Membrane bound organelles, cell wall made of chitin. Single celled or multi-cellular

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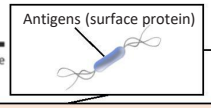
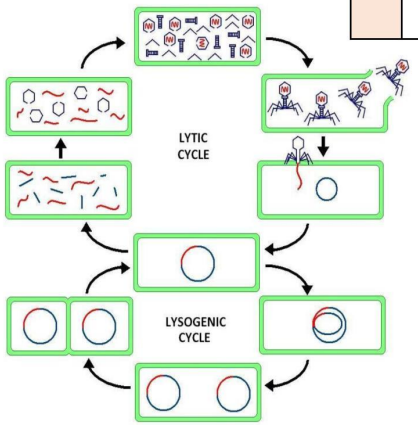


Life cycle of a virus

Lysogenic pathway	*Lytic pathway*
Virus attaches to cell and inserts genetic material	Viral genetic material can spilt off from bacterial chromosome.
Viral genetic material forms a circle.	
The viral genetic material uses to cell to produce new proteins and genetic material to make new viruses	Viral genetic material is inserted into the bacterial chromosome.
Cell breaks apart (lyse) to release new viruses.	Bacterium reproduces normally replicating both types of genetic material.



Immune system

Specific immune system

a. Exposure to pathogen	Pathogens are identified by white blood cells by the different proteins on their surfaces **ANTIGENS.**
b. Antigens trigger an immune response	Trigger causes the production of antibodies.
c. Production of memory lymphocytes	Antigens also trigger the production of memory lymphocytes (a type of white blood cell). These cells can produce the specific antibody for a pathogen.
d. Secondary response	Memory lymphocytes can produce specific antibodies much more quickly if the same pathogen returns.

Antibiotics

e.g. penicillin	Used to treat bacterial infection by inhibiting cells processes in the bacterium but not the host organism (human) cells. They do not work on viruses.

EDEXCEL GCSE HEALTH DISEASE AND MEDICINE part 2

Immunisation

Vaccines are used to immunise a large proportion of the population (herd immunity) to prevent the spread of a pathogen

Vaccination

Small amount of dead or inactive form of the pathogen	*1st infection by pathogen*	White blood cells detect pathogens in the vaccine. Antibodies are released into the blood.
	Re-infection by the same pathogen	White blood cells detect pathogens. Antibodies are made much faster and in larger amounts.

Vaccination (Biology only)

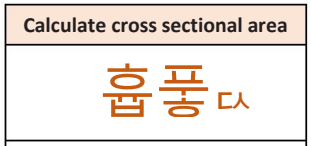
Disadvantages	A very small number of people (eg 1 in 900000 for MMR) a person may have a bad reaction to a vaccine and therefore cannot be immunised.
Advantages	Almost everyone can be immunised (herd immunity) which protects those people who cannot have vaccines. Spread of a pathogen in a population is prevented.

Non-specific immune systems

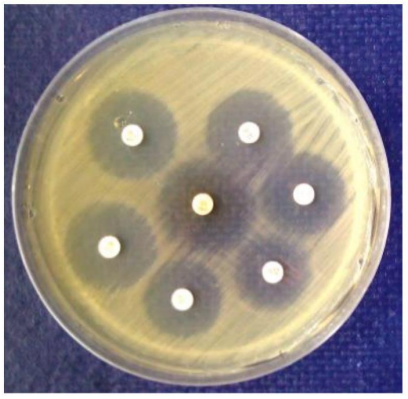
The human body has several chemical and physical ways of providing protection from pathogens

	*Nose*	Nasal hairs, sticky mucus and cilia prevent pathogens entering through the nostrils.
	*Trachea and bronchus (respiratory system)*	Lined with mucus to trap dust and pathogens. Cilia move the mucus upwards to be swallowed.
	*Stomach acid*	Stomach acid (pH1) kills most ingested pathogens.
	*Skin*	Hard to penetrate waterproof barrier. Glands secrete oil which kill microbes.
	*Lysozymes in tears*	Breaks down the cell wall of some bacteria.

Calculate cross sectional area



Measure the diameter of the clear area where bacteria has not grown. Half the diameter of the clear area to find the radius.



Aseptic technique

Autoclave	*Sterile inoculating loops*	*Covered petri dishes and culture vials*
Sterile growth medium and agar plates are sterilized by subjecting them to high pressure steam.	Sterilized before transferring microorganisms so that sample isn't contaminated.	Covered to avoid contamination by other microorganisms in the air.

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Healthy weight can be calculate using waist:hip ratio and the equation for BMI.

$$\text{ratio} = \frac{\text{Waist}}{\text{Hip}} \qquad \text{BMI} = \frac{\text{MASS}}{(\text{HEIGHT})^2}$$

Lifestyle factors and their effects on non-communicable disease

Disease	lifestyle factors
Obesity and malnutrition	Lack of exercise and consuming too many/too few calories through an unbalanced diet. Schools meals are balanced to combat this in young people.
Liver disease	Large amounts of alcohol taken over a long period of time can lead to liver disease e.g. cirrhosis. The NHS spends over £500 million a year treating liver disease.
Cardiovascular disease	Smoking leads to damage and blocking of arteries supplying the heart with oxygenated blood. WHO estimates that 6 million people die globally as a result of smoking related illnesses.

Non-communicable diseases are caused by the interaction of a number of factors

Disease	Interacting factors
Cardiovascular disease	Diet, obesity, smoking, drinking alcohol, lack of exercise, genetics.
Cancer	
Lung disease	
Liver disease	
Malnutrition	

Non-communicable diseases

EDEXCEL GCSE HEALTH DISEASE AND MEDICINE part 3

Discovery of new drugs

Drugs (including antibiotics) have to be tested and trialled before to check they are safe and effective

New drugs are extensively tested for:

Efficacy	Make sure the drug works
Toxicity	Check that the drug is not poisonous
Dose	The most suitable amount to take

Preclinical trials - using cells, tissues and live animals - must be carried out before the drug can be tested on humans.

Clinical trials use healthy volunteers and patients

Stage 1	*Stage 2*	*Stage 3*	*Stage 4*
Healthy volunteers try small dose of the drug to check it is safe record any side effects	A small number of patients try the drug at a low dose to see if it works	A larger number of patients; different doses are trialled to find the optimum dose	A double blind trial will occur. The patients are divided into groups. Some will be given the drug and some a placebo.

Double blind trial: patients and scientists do not know who receives the new drug or placebo until the end of the trial. This avoids bias.

A placebo can look identical to the new drug but contain no active ingredients

Monoclonal antibodies (Biology only HT)

Monoclonal antibodies — *Identical copies of one types of antibody produced in laboratory*

1. A mouse is injected with pathogen.
2. Lymphocytes produce antibodies (but do not divide).
3. Lymphocytes are removed from the mouse and fused with rapidly dividing mouse tumour cells.
4. The new cells are called hybridomas.
5. The hybridomas divide rapidly and release lots of antibodies which are then collected.

Monoclonal antibodies can be used in a variety of ways

Testing	*Diagnosis*
e.g. pregnancy test – measure the level of hormones	Can detect very small quantities of chemicals in the blood

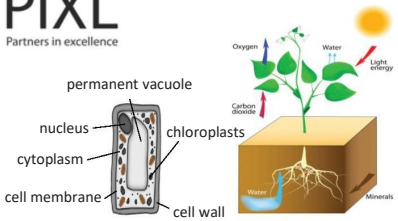
Specific to one binding site on the antigen. Can target specific chemicals or cells in the body unlike drug and radiotherapy treatments.

Treating CVD

Evaluating different treatments for cardiovascular disease (CVD)

Life long medication	*Surgical procedures*	*Lifestyle changes*
Medicines to reduce blood pressure and cholesterol. Statins for lowering cholesterol carry a small risk of developing diabetes.	A stent can be surgically inserted into blocked blood vessel. Blocked blood vessels can be bypassed with inserted blood vessels. This treatment requires life long medication.	Giving up smoking, drinking excess alcohol and taking more exercise can reduce the risk of CVD. Some patients may not stick to lifestyle changes.

Science - SB6 - Photosynthesis



Respiration, stored as insoluble starch, fats or oils for storage, cellulose for cell walls, combine with nitrates from the soil to form amino acids for protein synthesis

Describe photosynthetic organisms as the main producers of food and therefore biomass

Plants use the glucose produced in photosynthesis in a variety of ways

EDEXCEL GCSE Plant Structures and Functions part 1

Photosynthetic reaction

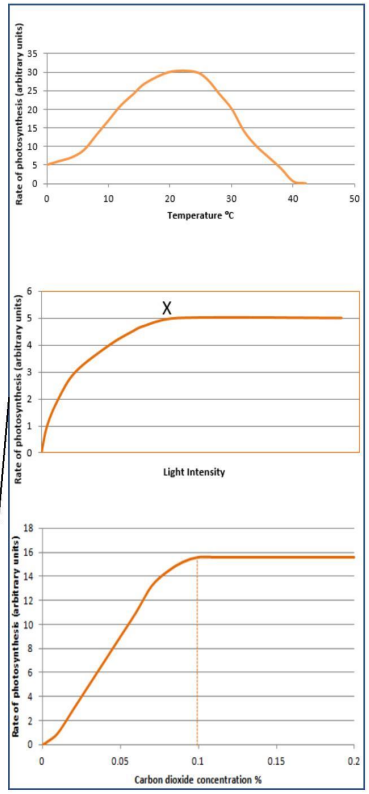
The plant manufactures glucose from carbon dioxide and water using energy transferred from the environment to the chloroplasts by light

Photosynthesis	***Plants make use of light energy from the environment (ENDOTHERMIC) to make food (glucose)***	Carbon dioxide + Water $\xrightarrow{\text{light}}$ Oxygen + Glucose
		$CO_2 + H_2O \xrightarrow{\text{light}} O_2 + C_6H_{12}O_6$

Rate of photosynthesis

The rate of photosynthesis is affected by temperature, light intensity, carbon dioxide concentration.

Factors affecting the rate of photosynthesis	Factor	How the rate is affected	Limiting factors (why the rate stops going up)
	Temperature	***As the temperature of the environment the plant is in increases rate of photosynthesis increases (up to a point) as there is more energy for the chemical reaction.***	Photosynthesis is an enzyme controlled reaction. If the temperature increases too much, then the enzymes become denatured and the rate of reaction will decrease and stop
	Light intensity	***Light intensity increases as the distance between the plant and the light sources increases. As light intensity increases so does the rate of photosynthesis (up to a point) as more energy is available for the chemical reaction.***	At point X another factor is limiting the rate of photosynthesis. This could be carbon dioxide concentration, temperature or the amount of chlorophyll
	Carbon dioxide concentration	***Carbon dioxide is needed for plants to make glucose. The rate of photosynthesis will increase when a plant is given higher concentrations of carbon dioxide (up to a point).***	At point X another factor is limiting the rate of photosynthesis. This could be light intensity, temperature or the amount of chlorophyll



Rate of photosynthesis HT Only

The rate of photosynthesis is proportional to light intensity. Light intensity obeys the inverse square law. This means that if you double the distance between the plant and the light source you quarter the light intensity

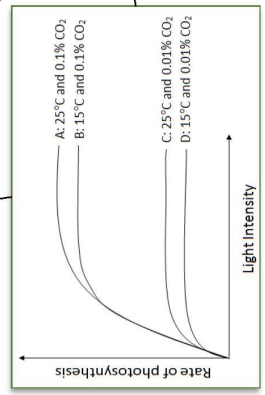
Graph lines C and D: If temperature is increased by 10°C then a slight increase in rate of photosynthesis occurs.

Graph lines A and D: If carbon dioxide concentration and temperature are increased the rate of photosynthesis increases significantly up to a point.

Graph line A: Rate could be limited by temperature and/or amount of chlorophyll. Plant tissue can be damaged when carbon dioxide concentrations exceed 0.1%

Explain the interactions of temperature, light intensity and carbon dioxide concentration in limiting the rate of photosynthesis.

Graph Lines A and B: If carbon dioxide concentration is increased from 0.01% to 0.1% then a large increase in rate occurs up to a point.



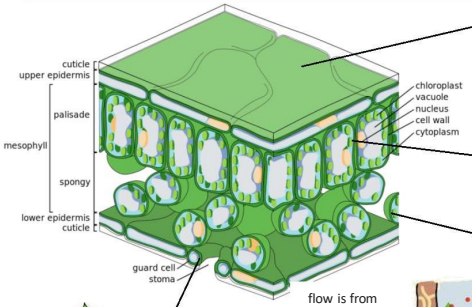
Science - SB6 - Photosynthesis

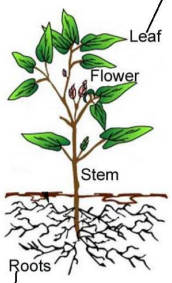
EDEXCEL GCSE PLANT STRUCTURES AND FUNCTION part 2

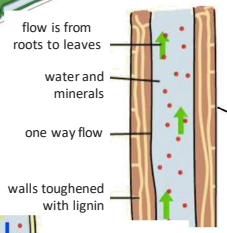
Plant organ systems

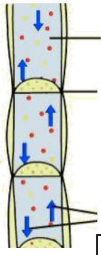
The roots, stem and leaves form a plant organ system for transport of substances around the plant

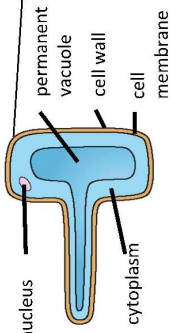
In extreme conditions (high temperature, low water) plants have adapted by reducing the size of the leaf to reduce surface area and have fewer stomata to reduce water loss

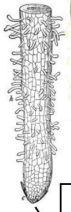












Root hair cells have an increased surface area for absorbing water and mineral ions.

Plant tissues

Epidermal tissues	***Waxy cuticle (top layer of the leaf)***	Reduces water loss from the leaf
	Guard cells and stomata	Guard cells open and close the stomata to control water loss and allow for gas exchange (oxygen and carbon dioxide).
Palisade mesophyll	***Palisade cells***	Cells near the top surface of the leaf that are packed with chloroplasts that contain chlorophyll. Both adaptations maximize photosynthesis.
Spongy mesophyll	***Air spaces in the leaf between cells***	Increased surface area for gas exchange so that carbon dioxide can diffuse into photosynthesising cells.
xylem	***Hollow tubes strengthened by lignified dead cells adapted for the transportation of water and mineral ions through the plant in the transpiration stream***	Allows transport of water and mineral ions from the roots to the stem and the leaves.
phloem	***Cell sap moves from one phloem cell to the next through pores in the end walls***	Transports dissolved sugars from the leaves to the rest of the plant for immediate use or storage (translocation).
Meristem tissue	***New cells (roots and shoot tips) are made here including root hair cells***	Root hair cells have an increased surface area for the uptake of water by osmosis, and mineral ions by active transport.

Plant hormones

Plant responses using hormones (auxins)

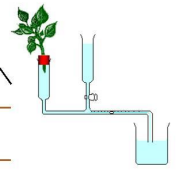
Light (phototropism)	Light breaks down auxins and they become unequally distributed in the shoot. The side with the highest concentration of auxins has the highest growth rate and the shoot grows toward the light.
Gravity (geotropism or gravitropism)	Gravity causes an unequal distribution of auxins. In roots the side with the lowest concentration has the highest growth rate and the root grows in the direction of gravity.
	In new shoots from a seedling the unequal distribution of auxins causes the shoot to grow away from gravity.

Plant growth hormones have commercial uses (HT only)

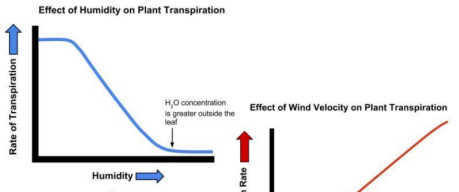
Auxins	Weed killers, rooting powders, promoting growth in tissue culture.
Ethene	Control ripening of fruit during storage and transport.
Gibberellins	End seed dormancy, promote flowering, increase fruit size.

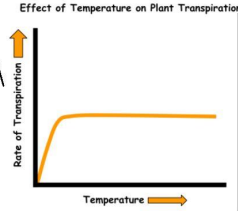
Transpiration

A potometer is used to measure the amount of water lost over time (rate of transpiration)



Transpiration	***The rate at which water is lost from the leaves of a plant. The transpiration stream is the column of water moving through the roots, stem and leaves***	Temperature, humidity, air movement and light intensity affect the rate of transpiration.





The shape of the graph for light intensity is the same for temperature (energy)

Science - SC10-13 - Electrolytic Processes

EDEXCEL TOPIC SC10-13: Electrolytic Processes

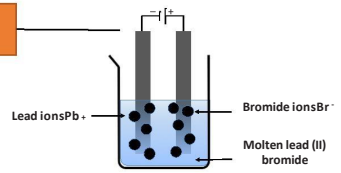
Electrolytic processes

The ions discharged when an aqueous solution is electrolysed using inert electrodes depend on the relative reactivity of the elements involved.

At the negative electrode	Metal will be produced on the electrode if it is less reactive than hydrogen. Hydrogen will be produced if the metal is more reactive than hydrogen.
At the positive electrode	Oxygen is formed at positive electrode. If you have a halide ion (Cl^-, I^-, Br^-) then you will get chlorine, bromine or iodine formed at that electrode.

Electrolysis of aqueous solutions

Process of electrolysis	***Splitting up using electricity***	When an ionic compound is melted or dissolved in water, the ions are free to move. These are then able to conduct electricity and are called electrolytes. Passing an electric current though electrolytes causes the ions to move to the electrodes.
Electrode	***Anode Cathode***	The positive electrode is called the anode. The negative electrode is called the cathode.
Where do the ions go?	***Cations Anions***	Cations are positive ions and they move to the negative cathode. Anions are negative ions and they move to the positive anode.



Oxidation Is Loss, Reduction Is Gain

Extracting metals using electrolysis

- ***Metals can be extracted from molten compounds using electrolysis.***
- ***This process is used when the metal is too reactive to be extracted by reduction with carbon.***
- ***The process is expensive due to large amounts of energy needed to produce the electrical current. Example: aluminium is extracted in this way.***

Higher tier: You can display what is happening at each electrode using half-equations:

At the cathode: $Pb^{2+} + 2e^- \rightarrow Pb$

At the anode: $2Br^- \rightarrow Br_2 + 2e^-$

Acids

Making pure, dry insoluble salts

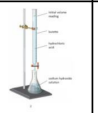
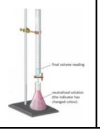
Step 1	***Add insoluble reactant (e.g. metal oxide) to acid***	Add until there is an excess of insoluble reactant.
Step 2	***Filter the solution***	Collect the filtrate in a conical flask and dispose of the residue.
Step 3	***Crystallisation***	Heat the filtrate using a Bunsen burner to evaporate the water from the solution.
Step 4	***Evaporation***	Leave the evaporating basin with the heated filtrate to evaporate any remaining water and make pure, dry insoluble salts.

Solubility

Sodium, potassium and ammonium	All common sodium, potassium and ammonium salts are soluble e.g. sodium chloride and potassium fluoride.
Nitrates	All nitrates are soluble e.g. potassium nitrate.
Sulfates	Common chlorides (e.g. sodium chloride) are soluble, expect those of silver and lead.
Carbonates and hydroxides	Common carbonates and hydroxides are insoluble except those of sodium, potassium and ammonium.

Titrations

Titrations are used to work out the precise volumes of acid and alkali solutions that react with each other.

	1. Use the pipette to add 25 cm^3 of alkali to a conical flask and add a few drops of indicator.
	2. Fill the burette with acid and note the starting volume. Slowly add the acid from the burette to the alkali in the conical flask, swirling to mix.
	3. Stop adding the acid when the end-point is reached (the appropriate colour change in the indicator happens). Note the final volume reading. Repeat steps 1 to 3 until you get consistent readings.

Using copper

Using copper	***Copper is a very good electrical conductor***	Much of the copper available isn't pure enough for this use so it is purified using electrolysis.
Copper sulfate solution	***The anode is made of impure copper and the cathode is made of pure copper***	Both electrodes are placed in copper sulfate sultion. Copper ions (Cu2+) leave the anode and are attracted to the cathode.
Electrodes	***The cathode of pure copper builds up***	The anode decreases in size. The impurities left behind form a sludge.

Science - SC10-13 - Obtaining & Using Metals and Equilibria

Oxidation Is Loss (of electrons) Reduction Is Gain (of electrons)

EDEXCEL TOPIC SC10-13

Obtaining and using metals

Oxidation and reduction in terms of electrons (HT ONLY)

Ionic half equations (HT only)		
For displacement reactions	*Ionic half equations show what happens to each of the reactants during reactions*	For example: The ionic equation for the reaction between iron and copper (II) ions is: $Fe + Cu^{2+} \rightarrow Fe^{2+} + Cu$ The half-equation for iron (II) is: $Fe \rightarrow Fe^{2+} + 2e^-$ The half-equation for copper (II) ions is: $Cu^{2+} + 2e^- \rightarrow Cu$

Reactions of acids and metals

HT ONLY: Reactions between metals and acids are redox reactions as the metal donates electrons to the hydrogen ions. This displaces hydrogen as a gas while the metal ions are left in the solution.

Reactions with acids	*metal + acid → metal salt + hydrogen*	magnesium + hydrochloric acid → magnesium chloride + hydrogen zinc + sulfuric acid → zinc sulfate + hydrogen

Acids react with some metals to produce salts and hydrogen.

Extraction of metals and reduction

Unreactive metals, such as gold, are found in the Earth as the metal itself. They can be mined from the ground. More reactive metals are obtained by displacement or electrolysis.

Extraction using carbon	
Metals less reactive than carbon can be extracted from their oxides by reduction.	For example: zinc oxide + carbon → zinc + carbon dioxide

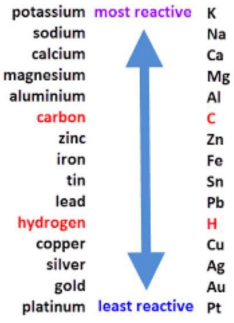
Obtaining and using metals

Metals ores	*These resources are limited*	Copper ores especially are becoming sparse. New ways of extracting copper from low-grade ores are being developed.
Phytomining	*Plants absorb metal compounds*	These plants are then harvested and burned; their ash contains the metal compounds.
Bioleaching	*Bacteria is used to produce leachate solutions that contain metal compounds*	The metal compounds can be processed to obtain the metal from it e.g. copper can be obtained from its compounds by displacement or electrolysis.

The reactivity series

	Reactions with water	Reactions with acid
Group 1 metals	*Reactions get more vigorous as you go down the group*	*Reactions get more vigorous as you go down the group*
Group 2 metals	*Do not react with water*	*Observable reactions include fizzing and temperature increases*
Zinc, iron and copper	*Do not react with water*	*Zinc and iron react slowly with acid. Copper does not react with acid.*

Metals form positive ions when they react	*The reactivity of a metal is related to its tendency to form positive ions*	The reactivity series arranges metals in order of their reactivity (their tendency to form positive ions).
Carbon and hydrogen	*Carbon and hydrogen are non-metals but are included in the reactivity series*	These two non-metals are included in the reactivity series as they can be used to extract some metals from their ores, depending on their reactivity.
Displacement	*A more reactive metal can displace a less reactive metal from a compound.*	Silver nitrate + Sodium chloride → Sodium nitrate + Silver chloride



Metal oxides

Metals and oxygen	*Metals react with oxygen to form metal oxides*	magnesium + oxygen → magnesium oxide $2Mg + O_2 \rightarrow 2MgO$
Reduction	*This is when oxygen is removed from a compound during a reaction*	e.g. metal oxides reacting with hydrogen, extracting low reactivity metals
Oxidation	*This is when oxygen is gained by a compound during a reaction*	e.g. metals reacting with oxygen, rusting of iron

Science - SC10-13 - Obtaining Metals & Life Cycle Assessment

EDEXCEL TOPIC SC10-13 Extracting metals

Reversible reactions and equilibria

Energy changes and reversible reactions

If one direction of a reversible reaction is exothermic, the opposite direction is endothermic. The same amount of energy is transferred in each case.

For example: Hydrated copper sulfate $\underset{\text{exother}}{\overset{\text{endothermic}}{\rightleftharpoons}}$ Anhydrous copper + Water sulfate

Reversible reactions

Reversible reactions	In some chemical reactions, the products can react again to re-form the reactants.
Representing reversible reactions	$A + B \rightleftharpoons C + D$
The direction	The direction of reversible reactions can be changed by changing conditions: $A + B \overset{\text{heat}}{\underset{\text{cool}}{\rightleftharpoons}} C + D$

Equilibria

Equilibrium in reversible reactions	When a reversible reaction occurs in apparatus which prevents the escape of reactants and products, equilibrium is reached when the forward and reverse reactions occur exactly at the same rate.

Changing conditions and equilibrium (HT)

The relative amounts of reactants and products at equilibrium depend on the conditions of the reaction.

Le Chatelier's Principles	States that when a system experiences a disturbance (change in condition), it will respond to restore a new equilibrium state.
Changing concentration	If the concentration of a reactant is increased, more products will be formed . If the concentration of a product is decreased, more reactants will react.
Changing temperature	If the temperature of a system at equilibrium is increased: - Exothermic reaction = products decrease - Endothermic reaction = products increase
Changing pressure (gaseous reactions)	For a gaseous system at equilibrium: - Pressure increase = equilibrium position shifts to side of equation with smaller number of molecules. - Pressure decrease = equilibrium position shifts to side of equation with larger number of molecules.

Life cycle assessment and recycling

Life cycle assessment

LCAS	*Life cycle assessments are carried out to assess the environmental impact of products*	They are assessed at these stages: - Extraction and processing raw materials - Manufacturing and packaging - Use and operation during lifetime - Disposal
Values	*Allocating numerical values to pollutant effects is difficult*	Value judgments are allocated to the effects of pollutants so LCA is not a purely objective process.

Ways of reducing the use of resources

Reduce, reuse and recycle	*This strategy reduces the use of limited resources*	This, therefore, reduces energy sources being used, reduces waste (landfill) and reduces environmental impacts.
Limited raw materials	*Used for metals, glass, building materials, plastics and clay ceramics*	Most of the energy required for these processes comes from limited resources. Obtaining raw materials from the Earth by quarrying and mining causes environmental impacts.
Reusing and recycling	*Metals can be recycled by melting and recasting/reforming*	Glass bottles can be reused. They are crushed and melted to make different glass products. Products that cannot be reused are recycled.

The Haber process

The Haber process	This process uses nitrogen from the air and hydrogen from natural gas to form ammonia. The reaction is reversible and uses optimum conditions and a catalyst in order to reach dynamic equilibrium.
Optimum temperature	The optimum temperature for the Haber process is 450°C.
Optimum pressure	The optimum pressure for the Haber process is 200 atmospheres.
The use of a catalyst	The Haber process uses an iron catalyst. This does not alter the position of the equilibrium but it does increase the rate of the reaction.

Science - SC10-13 - Transition Metals

Changing concentration	If the concentration of a reactant is increased, more products will be formed . If the concentration of a product is decreased, more reactants will react.
Changing temperature	If the temperature of a system at equilibrium is increased: - Exothermic reaction = products decrease - Endothermic reaction = products increase
Changing pressure (gaseous reactions)	For a gaseous system at equilibrium: - Pressure increase = equilibrium position shifts to side of equation with smaller number of molecules. - Pressure decrease = equilibrium position shifts to side of equation with larger number of molecules.

The Haber process	This process uses nitrogen from the air and hydrogen from natural gas to form ammonia. The reaction is reversible and uses optimum conditions and a catalyst in order to reach dynamic equilibrium.
Optimum conditions	The optimum temperature for the Haber process is 450°C and optimum pressure is 200 atmospheres. These are economically viable conditions as they produce the best yield to cost ratio.

The Haber process

Fertilisers

NPK fertilisers	*These contain nitrogen, phosphorous and potassium*	Formulations of various salts containing appropriate percentages of the elements.
Fertiliser examples	*Potassium chloride, potassium sulfate and phosphate rock are obtained by mining*	Phosphate rock needs to be treated with an acid to produce a soluble salt which is then used as a fertiliser. Ammonia can be used to manufacture ammonium salts and nitric acid.

Dynamic equilibria

EDEXCEL TOPIC SC10-13:

Transition metals, alloys and corrosion

Oxidation

Properties and uses of metals

Metal	*Properties*	Uses
Aluminium	*Low density (lightweight), layer of oxides at surface (corrosion resistant)*	Aluminium cans, cooking foil, saucepans.
Copper	*Good electrical and thermal conductor, flexible*	Saucepans, electrical wiring.
Gold	*Unreactive*	Jewellery, coins.

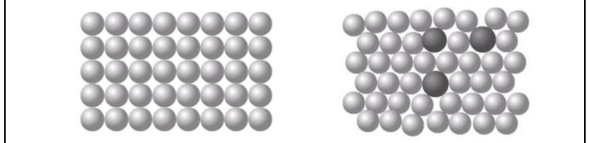
Magnalium (Aluminium and magnesium alloy)	Aircraft and car parts.
Brass (copper and zinc alloy)	Used in electrical fittings.

Corrosion	*The destruction of materials by chemical reactions with substances in the environment*	An example of this is iron rusting; iron reacts with oxygen from the air to form iron oxide (rust) water needs to be present for iron to rust.
Preventing corrosion	*Coatings can be added to metals to act as a barrier*	Examples of this are greasing, painting and electroplating. Aluminium has an oxide coating that protects the metal from further corrosion.
Sacrificial corrosion	*When a more reactive metal is used to coat a less reactive metal*	This means that the coating will react with the air and not the underlying metal. An example of this is zinc used to galvanise iron.
Electroplating	*Used to improve the appearance and/or resistance to corrosion*	Electrolysis is used to reduce metal cations so they form a thin layer at the cathode.

Properties of metals and alloys

High melting and boiling points	This is due to the strong metallic bonds.
Pure metals can be bent and shaped	Atoms are arranged in layers that can slide over each other.

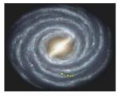
Alloys	*Mixture of two or more elements at least one of which is a metal*	Harder than pure metals because atoms of different sizes disrupt the layers so they cannot slide over each other.



Transition metals

Transition metals	*Most metals are transition metals*	• High melting points • High density • They form coloured compounds • They can be used as catalysts (without being used up)

Science - SP7 - Astronomy

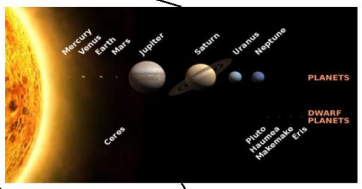


Distance increases further away from the Sun.

Milky Way our galaxy.

Solar System	*The Sun, 8 planets, moons, dwarf planets, asteroids and comets*	Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune.

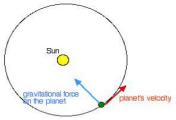
Planet	*A large body orbiting the Sun*
Moon	*A natural satellite orbiting a planet*
Dwarf planet	*A body large enough to have its own gravity which caused a spherical shape*
Solar system	*Any object orbiting the Sun due to gravity*
Galaxy	*Collection of billions of stars*
Universe	*Collection of galaxies*



Solar system

Geocentric Aristotle (ancient Greek)	*Earth at centre, everything orbits Earth in circles*	Greeks used visual observations with naked eye. Saw Sun, moon, stars move across the sky in the same direction.
Heliocentric Copernicus (1473 - 1543)	*Sun at centre, everything orbits Sun in circles*	Galilei (1610) used a telescope to discover 4 moons going around Jupiter. Supported Copernicus's heliocentric idea.
Modern	*Everything orbits Sun in elliptical orbits*	Newer technology has refined our information and view.

EDEXCEL TOPIC 7 ASTRONOMY (PHYSICS ONLY).



Planets further away from the Sun, gravity pull is weaker. So speed of planet is slower.

Planets close to the Sun, gravity pull is strong. Planets move quickly.

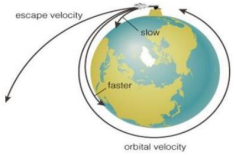
Due to the Sun's gravity, planets accelerate towards the Sun and so changes direction.

A planet's velocity changes but speed remains constant.

Changing orbits	*If the direction changes, velocity will change. (As velocity is a vector).*	Moving objects go in a straight line unless a force acts on it.
		An object in orbit, the gravitational force is at right angles to the direction of movement, so force changes direction not speed.

Circular motion	*Velocity constantly changes.*	Velocity is both speed and direction..
		An object travelling in a circle at a constant speed, is accelerating . (It is constantly changing direction so changing velocity).

Centripetal force	*Force acting towards the centre of a circle.*	Resultant force acts upon an object moving in a circular motion.



Too fast = disappears into Space.

Correct speed = steady orbit around Earth.

Too slow = falls to Earth.

Gravity and orbits

Each Kg has a gravitational pull of 9.8N.

Gravitational field strength	*Gravity exerted around an object.*	Earth's gfs = 9.8N/kg.

Weight	*Force acting upon an object due to gravity*	Newton (N).

Mass	*How much matter an object has*	Kilograms (Kg).

The Earth is larger than the moon, so an object weighs more on Earth than the moon.

Gravitational field strength	*Depends on the mass of the body creating the field*	The larger the mass, the stronger the gravitational force.
	Depends on the distance from the body creating the field	Closer to the body, the stronger the gravitational force.

Stable orbits	*If the orbital speed changes, the radius will change.*	Faster moving objects in a stable orbit have a smaller radius than a slower moving object.

Effect of gravity	*Gravity causes moons to orbit planets, planets to orbit the Sun, stars to orbit galaxy centres.*	Force of gravity changes the moon's direction not its speed.
		Due to the Sun's gravity, planets accelerate towards the Sun and so changes direction.

Orbit descriptions		
	Moon	Circular orbit.
	Planets	Mostly circular orbit.
	Comets	Highly elliptical orbit.
	Artificial satellites	Geostationary satellite - circular orbit.
		Polar satellite - elliptical orbit.

Science - SP7 - Astronomy

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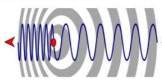
EDEXCEL TOPIC 7 ASTRONOMY (PHYSICS ONLY).

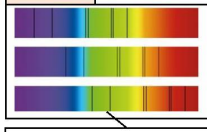
Redshift



Frequency of sound wave decreases, wavelength increases.

When a wave source moves relative to an observer, the frequency and wavelength changes.

Red-shift	*The observed increase in wavelength of light from most distance galaxies. Light moves towards the red end of the spectrum.*
Hubble (1929)	*He studied light from distant galaxies; found as frequency decreases, wavelength increases.*



Light from star in our galaxy.

Light from star in nearby galaxy.

Light from star in distant galaxy.

Provides evidence for expansion.

Galaxies are moving away from us in all directions.

Greater the red-shift, the further away a galaxy is so the faster it is moving.

Light from distant galaxies is red-shifted, so galaxy is moving away from us.

Origin of Universe

More evidence supports The Big Bang theory so it is the current accepted model for the origin of the Universe.

Steady State theory	*Universe has always existed and is expanding. New matter continuously created as expansion occurs.*
Big Bang theory	*The whole Universe and all matter started out as s tiny point of energy. Universe expanded from this point and is still expanding.*

Evidence supporting	
Steady State theory.	Red-shift.
Big Bang theory.	Red-shift and CMBR.

CMBR
Cosmic Microwave Background radiation
Huge amounts of radiation released at Big Bang. As universe expands, wavelength of radiation has increased. Detected now as microwave radiation.

Looking into space

Reflecting telescope.

Refracting telescope.

Optical telescope	*Uses light to help to see distant objects clearly.*	For clearer images use a higher quality of objective lens and increase the aperture (increase the diameter of objective lens to allow more light in).

On Earth	Earth's atmosphere reflects and absorbs light coming from space. Light pollution makes it hard to see dim objects.
In space	Avoids atmosphere, so better images obtained.

Using EM waves	*Allows us to 'see' parts of the Universe not emitting light.*	Telescopes using all parts of EMS have been developed (1940s).

X-ray telescopes detect high temperature events ie: exploding stars.

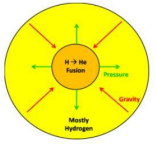
Modern telescopes often connected to computers for sharper, clearer images.

Bigger telescopes provide better resolution, and gathers more light.

See fainter objects, further in space.

Life cycle of stars

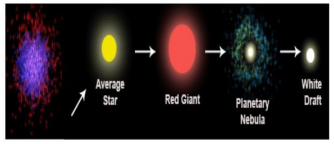
Nebula	*A cloud of hydrogen gas and dust*	Particles pulled together by own gravity. Cloud contracts becoming denser. Hydrogen becomes hotter as it spirals inwards, starts to glow.
Protostar	*The large ball of gas contracts to form a star*	More mass is attracted, clouds gravitational pull gets stronger and temperature rises. A star is 'born'.
Main sequence	*Stable period of star*	Temperature and pressure become high enough forcing Hydrogen nuclei to fuse to form Helium.



Outward pressure from hot gases balances compression due to gravity.

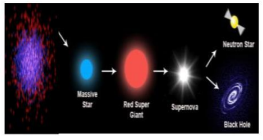
Stars the same size as our Sun.

Red giant	*Most of Hydrogen has been fuse, outer layers expand, star swells*	Core is not hot enough to withstand gravity and it collapses.
White dwarf	*Star pulled inwards by gravity and collapses*	Nuclear fuel runs out, fusion stops, dense very hot core which cools to become a black dwarf.



Stars larger than our Sun.

Red super giant	*Fuel used faster, undergo more fusion making heavier elements.*	Expand and contract more times, as balance between gravity and thermal expansion shifts.
Supernova	*Gigantic explosion due to run away fusion reactions*	Outer layers of dust and gas flung into space. Large gravitational forces collapse the core into a tiny space.
Neutron star	*Very dense star*	Matter pulled back in due to gravity.



Huge Stars.

Black hole	*Gravity pulls remains in.*	Gravitational pull so strong not even light escapes.

Science - SP8 - Energy - Forces Doing Work

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EDEXCEL Topic 8 ENERGY – FORCES DOING WORK

Work

Work done | *Energy transferred by a force* | Energy is transferred when things happen

Work done = force X distance moved in the direction of the force

E = F X d

Energy transfer = Work done

Dissipation | *Thermal energy is transferred to the surroundings* | The transfer of thermal energy into the thermal energy store of the surroundings causes the temperature to rise.

Non-useful energy stores | *Energy stored in a way that is not useful* | Most 'wasted' energy is transferred into the thermal energy stores of the surroundings.

Mechanical process | *An object moving due to a force acting upon it* | EG: push, pull, stretch, squash.

Pushing an object along a rough surface and work is done against frictional forces.

Energy is transferred to the kinetic energy store of the object as it starts to move.

Some energy is also transferred to the thermal energy store of the object, the surface and the surroundings due to friction.

The temperature of the object and surroundings increases.

Gravitational force doing work | *Objects dropping from a height* | Energy transfers mechanically from the object's GPE energy store to the object's KE store.

ΔGPE = m X g X Δh

Change in Gravitational Potential Energy = mass X gravitational field strength X change in height.

A force doing work | *Objects thrown upwards* | Energy transfers mechanically from the initial force exerted by the person, to the KE store of the object to the object's GPE store.

Kinetic Energy = ½ X mass X velocity^2

KE = ½ X m X v^2

Energy transfer involves the way energy is stored when systems change

Energy in a system can be changed | By:
- Work done by forces
- In electrical devices
- In heating

System	*A group of objects*
Closed	*Energy cannot enter or leave the system*
Open	*Energy can enter or leave the system*

Total energy remains the same (No net change).

Energy transfer diagrams | An easy way to see the energy transfers between different energy stores.

Energy transfer diagram for apple falling from a tree.

GPE store of apple | *Mechanically – work done by gravity* → Apple's KE store. | *Mechanically – work done against air resistance* → Thermal energy store of apple and surroundings.

Power

One Watt | *One joule per second*

Power | *The rate at which energy is transferred*

A more powerful crane will lift a box up a certain height, quicker than a less powerful crane.

Power = Work done ÷ time

P = E ÷ t

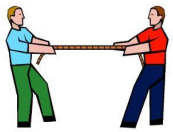
Efficiency = useful energy transferred by the device ÷ total energy used by the device.

Efficiency | *How well (or uselessly) a device transfers energy*

High efficiency	*An energy transfer process that wastes less energy*
Low efficiency	*An energy transfer process that wastes a lot of energy*

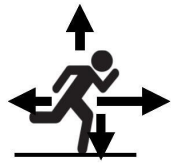
Energy transferred	*Joule (J)*
Force	*Newton (N)*
Distance	*Meter (m)*
Gravitational Potential Energy (GPE)	*Joule (J)*
Mass	*Kilogram (Kg)*
Gravitational field strength (gfs)	*Newton per kilogram (N/Kg)*
Height	*Meter (m)*
Kinetic Energy (KE)	*Joule (J)*
Velocity	*Meter per second (m/s)*
Power	*Watt (W)*
Work done	*Joules (J)*
Time	*Seconds (s)*

Science - SP9 - Forces & Their Effects

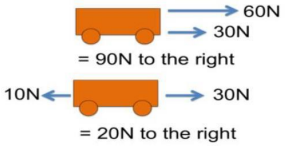


Scalar	*Has a magnitude (size)*	Temperature, speed, mass, time.
Vector	*Has a magnitude (size) and a direction*	Velocity, gravity, momentum.

Vectors	*Pairs of arrows are used*	Length or arrow shows magnitude, direction of arrow shows the direction of the force



Force	*A vector quantity*	. A push or a pull on an object.
Contact forces	*Two objects have to touch for the force to act. Interact at zero distance.*	Caused by objects interacting. E.G. Friction, man pushing a wall, a book on a table, Upthrust of water on a boat.
Non-contact forces	*Two objects do not have to touch for the force to act. Can interact at a distance.*	Caused by interacting fields. E.G. Magnetic forces, electrostatic forces, gravitational forces.



Free body force diagrams	*A diagram showing all the forces acting on an isolated object or a system*	The size and direction of the pairs of forces acting upon an object or system.
Resultant force	*Forces acting along the same line*	Add together the forces acting in the same direction. Subtract the forces acting in opposite directions.
Vector diagrams	*A diagram where forces do not act in the same line. Use scale diagrams to find the resultant force*	Draw all the forces acting upon an object. Make sure they are to scale and in the right directions. Draw a joining line rom the start of the first force and the end of the last force.

HIGHER ONLY

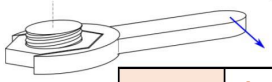
Objects affecting each other

Vector diagrams

EDEXCEL TOPIC 9 - FORCES AND THEIR EFFECTS

The sum of clockwise moments = The sum of anti-clockwise moments .

Principle of moments	*Rotational forces are in equilibrium*



Moment	*A turning effect of a force*	When a force causes an object to rotate. EG: Spanner on a nut.

Rotational forces

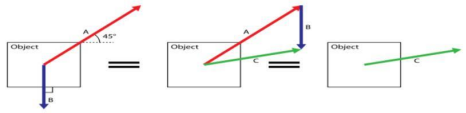
Moment of a force = force X distance normal to the direction of the force.

Moment of a force	*Newton metre (Nm)*
Force	*Newton (N)*
Distance normal to direction of force	*Metre (m)*

PHYSICS HIGHER ONLY

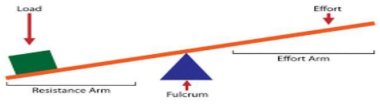
Equilibrium	Pairs of forces are balanced, the resultant force is zero	On a scale diagram, the tip of the last force drawn should end where the tail of the first force was drawn

Resolving forces	Not all forces act horizontally or vertically	If make the *'awkward'* angle easier to work with, split it into two components - drawn at right angles the two forces act together to have the same effect as the single force.

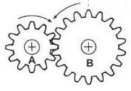


Lubrication	*Using a liquid to reduce friction between moving parts*	Reduces unwanted thermal energy transfer.

Lever	*A bar pivots about a point and transfer a force.*	Using a long lever the force applied by a man at one end can be multiplied at the load end to lift a large force.



Gears	*Two interlocking round circles with 'teeth'*	Gear A moves and affects gear B by interlocking the teeth and passing on the rotation motion.



Gear A has 12 teeth and gear B has 18 teeth.

The wheel with more teeth turns slower but the moment of the turning force will be bigger.

Ratio of moments = ratio of teeth = ratio of radii.

History

History - Poverty

Why did Poverty levels increase?

Debasement:

- Debasement means mixing more of a common metal with the precious metal (usually gold or silver)
- More coins could therefore be made which meant more money. However, the side effect was inflation and rising prices
- This also meant an increase in poor people unable to pay for the rising cost of food

Bad Harvests:

- England was hit by bad harvests between 159 and 1598 which led to food shortages and some people died of starvation.
- More landowners started to enclose their land with hedges for sheep and cattle farming
- This meant less land was used for arable crops which also meant fewer workers were needed.
- This left people jobless and homeless.

Dissolution of the Monasteries:

- Henry closed all the monasteries in England and many people who had worked for the Church lost their jobs.
- Furthermore the poor had been looked after by the monks and nuns. They now had nowhere to go.

Rising Population:

- The population in Elizabethan England grew from 2.8 million to 4 million. Limited places to live gave landlords more power who unfairly increased rents.
- Bad harvests, inflation, less food and a terrible outbreak of flu in 1556 killed around 200,000 workers who produced food.
- All of these factors create a very poor group of people at the bottom of Elizabethan society.

Types of Vagabond:

Counterfiet Crank: Bite on soap to froth at the mouth and pretend to have a fit. People would hopefully feel sorry for him and give him money.
Baretop Trickster: A woman who would trick men into following them by removing items of clothing. The man would then be beaten and robbed by the woman's accomplices.
Clapper Dudgeon: Cut himself and tie dirty bandages around the wound. People would feel sympathy and give him money.
Tom O'Bedlam: Pretend to be mad to get money. Bark like a dog for hours, follow people around or stick a chicken's head in his ear.

The Poor Laws

Poverty was mostly considered to be your own fault in Elizabethan times, but attitudes started to change towards the end of Elizabeth's reign and the government decided to take action. This was because of:

- fears that the 'social order' might be threatened if the growing number of poor people ganged together and started a rebellion
- the risk that **vagabonds** and beggars might turn to crime
- fears that the poor might spread disease

What actions were taken?

Local level

Justices of the Peace were made responsible for poverty in their parish. They collected taxes in order to help the poor. Authorities grouped people into either the 'impotent poor' or the able-bodied poor':

Impotent poor – Unable to work due to age, disability or other infirmity. Limited relief was provided by the community.

Able-bodied poor - physically able to work and were forced to, to prevent them from becoming beggar. It was thought many able-bodied poor were lazy and idle. The 1572 Vagabonds Act introduced severe action against vagrants who could now be whipped, bored through the ear and put to death if they were repeatedly caught begging.

1601 Poor Law:

- Brought in a compulsory Poor Rate system.
- Everyone had to contribute and those who refused would go to jail.
- Begging was banned and anyone caught was whipped and sent back to their place of birth.
- Alms-houses were established to look after the impotent poor.

History - Explores

Sir Francis Drake

He grew up as a **Puritan** who hated Catholics and he was very anti-Spanish. His first voyage in 1566 was as a slave trader. He was attacked in 1568 by the Spanish at San Juan de Ulua in Mexico, losing four ships and over 300 men. He sought to take revenge on the Spanish after this.

Notable expeditions

Drake was the first Englishman to sail around the world, **circumnavigating** the globe between 1577 and 1580. He went on to play a role in the Spanish Armada by attacking Cadiz in 1587 and delaying preparations. He was also vice-admiral during the Armada.

Impact

Launched successful attacks on the Spanish empire, bringing back gold, silver and jewels, making a huge profit.
Claimed new lands for England and made valuable trading contacts with the Spice Islands.
Knighted by Elizabeth and made an admiral.

John Hawkins

He was a navigator and slave trader who was Sir Francis Drake's cousin.

Notable expeditions

He made three voyages during the 1560s, capturing Africans and selling them into slavery in Central America to Spanish settlers.
After this he returned to England and designed and built ships for the navy. Elizabeth appointed him as a vice-admiral fighting against the Spanish Armada.

Impact

Developed a new type of fighting galleon which was faster, lighter and better able to withstand harsh weather conditions than ships in the Spanish fleet.
His innovative designs were important in helping to lead England to victory.

Walter Raleigh

The queen invested in his privateering expeditions against the Spanish. He wanted to establish **colonies** for Elizabeth in North America. The area was thought to have an inexhaustible supply of wine, oil, sugar and flax.

Notable expeditions

In 1584 he obtained a royal **charter** to establish a colony on Roanoke Island off the coast of North Carolina. He organised two expeditions to take settlers to the colony. The first group came home after a year; the second were left there but later disappeared. The reasons for their disappearance are unclear and Roanoke is sometimes given the name 'The Lost Colony'.

Impact

Raleigh was imprisoned in the Tower of London in June 1592 for marrying one of Elizabeth's ladies-in-waiting, He was released in August 1592 to lead a very successful naval attack against the Spanish. Following the attack, Raleigh was sent back to the Tower but was released the following year and became a Member of Parliament.
Whilst imprisoned in the Tower, Raleigh wrote many poems and even wrote a history of the world.


Geography

Geography - Coastal Change

Types of Erosion
The break down and transport of rocks – smooth, round and sorted.
Attrition
Rocks that bash together to become smooth/smaller.
Solution
A chemical reaction that dissolves rocks.
Abrasion
Rocks hurled at the base of a cliff to break pieces apart.
Hydraulic Action
Water enters cracks in the cliff, air compresses, causing the crack to expand.

Mass Movement
A large movement of soil and rock debris that moves down slopes in response to the pull of gravity in a vertical direction.
Rain saturates the permeable rock above the impermeable rock making it heavy.
Waves or a river will erode the base of the slope making it unstable.
Eventually the weight of the permeable rock above the impermeable rock weakens and collapses.
The debris at the base of the cliff is then removed and transported by waves or river.

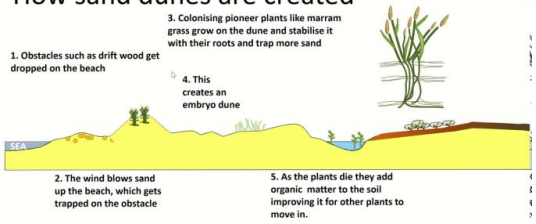
Beaches: Sandy beaches are found in sheltered bays and are created by constructive waves. Along high energy coasts sand is washed away to leave a pebble beach

Types of Transportation
A natural process by which eroded material is carried/transported.
Solution
Minerals dissolve in water and are carried along.
Suspension
Sediment is carried along in the flow of the water.
Saltation
Pebbles that bounce along the sea/river bed.
Traction
Boulders that roll along a river/sea bed by the force of the flowing water.

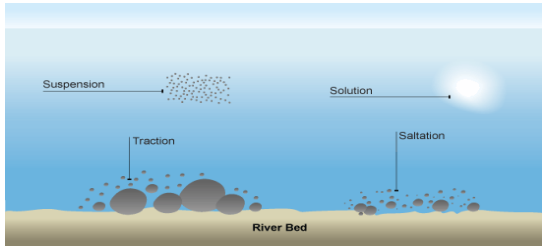
Types of Weathering
Weathering is the breakdown of rocks where they are.
Carbonation
Breakdown of rock by changing its chemical composition.
Mechanical
Breakdown of rock without changing its chemical composition.

How do waves form?
Waves are created by wind blowing over the surface of the sea. As the wind blows over the sea, friction is created - producing a swell in the water.

How sand dunes are created

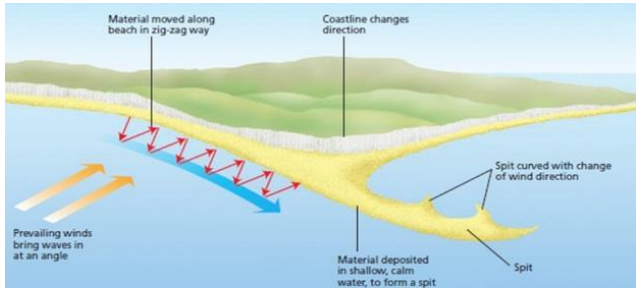


Types of Waves
Constructive Waves
This wave has a **swash that is stronger** than the backwash. This therefore builds up the coast.
Destructive Waves
This wave has a **backwash that is stronger** than the swash. This therefore erodes the coast.



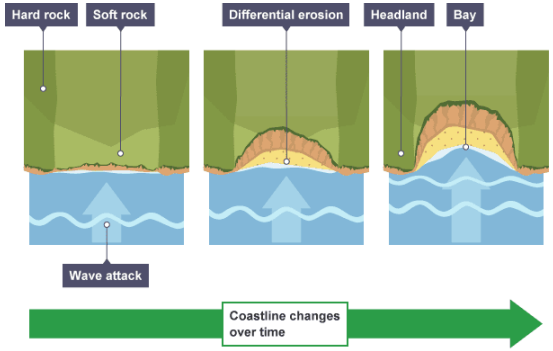
What is Deposition?
When the sea or river loses energy, it drops the sand, rock particles and pebbles it has been carrying. This is called deposition.

Formation of Coastal Spits - Deposition
Swash moves up the beach at the angle of the prevailing wind.
Backwash moves down the beach at 90° to coastline, due to gravity.
Zigzag movement (Longshore Drift) transports material along beach.
Deposition causes beach to extend, until reaching a river estuary.
Change in prevailing wind direction forms a hook.
Sheltered area behind spit encourages deposition, salt marsh forms.

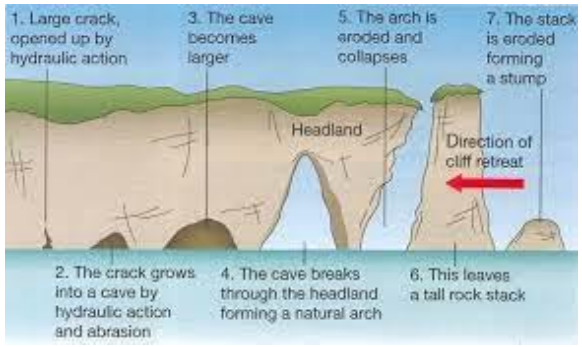


Geography - Restless Earth

Formation of Bays and Headlands
Waves attack the coastline.
Softer rock is eroded by the sea quicker forming a bay, calm area cases deposition.
More resistant rock is left jutting out into the sea. This is a headland and is now more vulnerable to erosion.



Formation of Coastal Stack
Hydraulic action widens cracks in the cliff face over time.
Abrasion forms a wave cut notch between HT and LT.
Further abrasion widens the wave cut notch to from a cave.
Caves from both sides of the headland break through to form an arch.
Weather above/erosion below –arch collapses leaving stack.
Further weathering and erosion eaves a stump.



Lyme Regis Coastal management: ***The issues*** are that the cliffs were unstable, erosion by powerful waves, sea walls breached.
Strategies: New sea wall and promenade, beach nourishment to create wide beach, extension of rock armour, cliffs stabilised. COST: £43 million
✓ new beaches have increased visitor numbers, new defences protect coast from increasing storms, harbour is better protected
✗ Increased visitors means more traffic, some defences soil the landscape, new sea wall could interfere with coastal processes

Coastal Defences
Hard Engineering Defences
Groynes
Wood barriers prevent longshore drift, so the beach can build up. ✓
Beach still accessible. ✓
No deposition further down coast = erodes faster. ✗
Sea Walls
Concrete walls break up the energy of the wave . Has a lip to stop waves going over. ✓
Long life span ✓
Protects from flooding ✓
Curved shape encourages erosion of beach deposits. ✗
Gabions or Rip Rap
Cages of rocks/boulders absorb the waves energy, protecting the cliff behind. ✓
Cheap ✓
Local material can be used to look less strange. ✓
Will need replacing. ✗
Soft Engineering Defences
Beach Nourishment
Beaches built up with sand, so waves have to travel further before eroding cliffs. ✓
Cheap ✓
Beach for tourists. ✓
Storms = need replacing. ✗
Offshore dredging damages seabed. ✗
Managed Retreat
Low value areas of the coast are left to flood & erode.
Reduce flood risk ✓
Creates wildlife habitats. ✓
Compensation for land. ✓

Religious Studies

Religious Studies - Theme A: Religion, Peace & Conflict

Key Words			
Forgiveness	Pardoning someone for wrongdoing	**Peace-making**	Working toward bringing about an end to war and a state of peace
Greed	Going to war to gain land or natural resources such as oil	**Protest**	A public expression of disapproval, often in a big group, can be peaceful or violent
Holy War	A war that is fought for religious reasons, usually backed by a religious leader	**Quakers**	A Christians denomination who worship in silence and are well known pacifists
Just War	A Christian theory that asks whether a war is fought justly	**Reconciliation**	Restoring friendly relationships after a war or conflict
Justice	Bringing about what is right and fair, according to the law or God's will	**Retaliation**	Deliberately harming someone as a response to them harming you
Nuclear Weapon	A weapon using a nuclear reaction to cause massive damage	**Self-Defence**	Protecting yourself or others from harm
Pacifism	A belief that all forms of violence are wrong, commonly held by Quakers	**Terrorism**	Using violence in order to further a political or religious message
Peace	A state of happiness and harmony, an absence of war	**WMD**	Weapons of mass destruction: chemical, nuclear or biological weapons

Key Ideas		
Protests and Terrorism 	**Protests** The right to gather together and protest is a fundamental democratic **freedom**. UK law allows for peaceful public protest but sometimes protects can turn violent and become a **riot**. Christians often **protest unjust laws** or for other forms of justice but would rarely advocate the use of violence in protest.	**Terrorism** Examples of terrorism include suicide bombing, mass shootings or using vehicles to injure pedestrians. The aim of terrorism is to make society aware of a cause or issue and to make people frightened to go about their business. Christians don't promote political violence + believe terrorism is wrong as it targets innocent people
Reasons for War 	**Greed** To gain more **land** or to control important **resources** such as oil or gas. e.g. The UK and US invading **Iraq** in order to control oil resources	**Self-Defence** To **defend** one's country against invasion or attack or to protect allies who are under attack e.g. UK threatened by Nazi invasion in **WWII**	**Retaliation** To fight against a country that has done something very wrong or to fight against a country that has attacked you e.g. US invading **Afghanistan** in retaliation for 9/11
Nuclear War and WMD 	Nuclear weapons work by a nuclear reaction and devastate huge areas and kill large numbers of people. They are a type of WMD (**weapons of mass destruction**) which also includes **chemical** and **biological** weapons. All these weapons are not allowed under the Christian Just War Theory and would therefore be rejected by most Christians. Nuclear weapons were used at the end of WWII in **Japan** to force the Japanese to surrender. Some people say their use was justified as it prevented more suffering even though 140,000 people died. Although some Christians justify war with 'an eye for an eye', this cannot be used to justify the use of weapons of mass destruction as they are not a **proportionate** response.	
Holy War 	A **Holy War** is a war which is fought for religious reasons, often with the backing of religious leaders. An example of this was the **Crusades** fought from the 11th-14th Century by Christians, backed by the Pope. Religion can still be a cause for war today such as in **Northern Ireland** where Protestant and Catholic Christians fought a civil war between 1968-98.	
Just War Theory 	Just War Theory is a Christian moral theory for working out if a war meets internationally accepted criteria for fairness. These are some of the conditions that must be met in order for a war to be just: • Just Cause – fought in self-defence or to protect others • Just Intention – fought to promote good and defeat wrongdoing • Last Resort – only going to war if all other methods have been tried first • Proportional – excessive force should not be used and innocent civilians must not be killed	
Pacifism and Christian Responses to War 	**Pacifism** is the idea that **all forms of violence are wrong**. Pacifists such as Quakers refuse to take part in war and often choose to be a **conscientious objector** (someone who doesn't go to war for moral reasons) or to assist in medical tasks like ambulance driving. Christians try to follow Jesus' teaching that "blessed are the peacemakers"	Christians try to show **mercy** and **agape** to victims of war and provide them with assistance. This can be through charity or through welcoming them into their churches. It can be victims in their own country or **refugees** such as people fleeing from Syria or Yemen. This is an example of 'love your neighbour' in action.


Spanish

Hartford Church of England High School

Spanish

Mi casa y donde vivo

Los verbos	
Vivir	To live
Visitar	To visit
Construir	To build
Compartir	To share
Tener	To have
Mudar **se**	To move

Los adjetivos	
Amueblado/a	Furnished
Adosado/a	Detatched
Lleno/a de	Full of …
Conocido/a por	Known for
Animado/a	Lively
Ruidoso/a	Noisy
Tranquilo/a	Quiet
Limpio/a	Clean
Sucio/a	Dirty
Feo/a	Ugly
Hermoso-a/ Precioso/a	Pretty
Antiguo-a/Viejo-a	Old
Moderno-a	Modern
(In)Cómodo/a	(Un)Comfortable
Grande	Big
Pequeño/a	Old

Los sustantivos (Donde vivo)	
Vivo en …/ Vivimos en …	I live in/ We live in …
un piso	an apartment
una casa adosada	semi-detached/terraced house
una finca/una granja	a farmhouse
una casa individual	a detached house
una residencia de ancianos	an old people's home
un barrio de la ciudad	a neighborhood in the city
está situado/a ***lejos*** de …	it is situated far from
está situado/a ***cerca*** de …	it is situated near to
está situado/a en	it is situated in
el norte / sur	the north/ south
el este/ oeste	the east/west
una ciudad	a city
un pueblo	A town
una calle	A street
las afueras	the outskirts
la costa	the coast
el campo	the countryside
la montaña / la sierra	the mountains

Los posesivos	
Mi (casa)	My (house)
Tu (casa)	Your (house)
Su (casa)	His/her (house)
Nuestra/o casa	Our (house

Sustantivos – Mi casa	
Mi casa (no) tiene.. En mi casa (no) hay…	Mi house has (not) ….. In my house there is (not)…
(dos) plantas	(two) floors
(cinco) habitaciones	(five) rooms
En la primera/segunda planta hay …	On the first/second floor there is/are
En la planta baja hay …	On the ground floor there is /are
Arriba / abajo hay …	Upstairs/downstairs there is/are
un dormitorio	a bedroom
una cocina	a kitchen
un estudio	a studio
un sótano	a basement
un cuarto de baño	a bathroom
un comedor	a dining room
un aseo	a toilet
un salón	a living room
un jardín con cesped /flores	a garden with grass/flowers
un garage	a garage

Mi casa ideal

Sería - It would be
Estaría - It would be
Tendría - It would have
Me gustaría que fuera - I would like it to be
Me gustaría que tuviera - I would like it to have

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Spanish

Knowledge organiser: Mi region

En la ciudad… In the city….			
Un ayuntamiento	A townhall	Una fabrica	A factory
Un castillo	A castle	Un cine	A cinema
Un mercado	A market	Un parque	A park
Un museo	A museum	Un polideportivo	A sports centre
Un puerto	A port	Un teatro	A theatre
Una bolera	A bowling alley	Una biblioteca	A library
Una iglesia	A church	Una mezquita	A mosque
Una piscina	A swimming pool	Una playa	A beach
Una plaza	A square	Un banco	A bank
Un estanco	A tobacconist's	Una cafetería	A café
Una estación de trenes	A train station	Una farmacia	A pharmacy
Una frutería	A grocery shop	Una librería	A book shop
Una panadería	A bakery	Una pastelería	A cake shop
Una peluquería	A hairdressers	Una tienda	A shop
Una agencia de viajes	A travel agency	Una zapatería	A shoe shop
Una centro comercial	A shopping center	Una tienda de regalos	A gift shop

Preposociones			
¿Dónde está?	Where is it?	Está…	It is …
Al lado de –	Next to	Aqui	Here
Delante de	In front of	Alli	There
Detrás de	Behind	Al final de la calle	At the end of the road
A la derecha	On the right	Cerca	Near
A la izquierda	On the left	Lejos	Far away
Debajo de	Underneath	Encima de	On top of

If Clause
Si hace siol, iré al centro comercial
If (it is sunny), I will go to the shopping center
Si. (weather) + full infinitve +é (I will….)

False Friends

las atracciones	entertainment facilities
la circulación	traffic
las distracciones	entertainment venues

Ventajas y desvantajas de vivir en la ciudad/pueblo			
Lo bueno es que	The good thing is that	La ventaja es que	The advantage is that
Lo malo es que	The bad thing is that	La desventaja es que	The disadvantage is that
Es más …. que	It is more …than	Es menos ….que	It is less …than
hay mucho/poco que hacer		there is a lot/little to do	
hay buena vida nocturna		there is good night live	
hay más posibilidades laborales		there is more job opportunities	
hay demasiada gente		there are too many people	
hay más contaminación		there is more pollution	
hay mejores vistas		there are better views	
hay más paros		there are more unemployment	
la gente está más relajada		people are more relaxed	
es demasiado industrial		it is too industrial	

Clues for Tenses		
Past	Present	Future
Hace un mes– a month ago	Ahora -now	En el futuro
Antes - before	Hoy en dia - Nowadays	Después - after
En el pasado	Actualmente	El año que viene
El año pasado	De momento	Dentro de..within…
Había/ Tenía/ Solia haber/ Solía tener/ Era/Fue	Hay/ Tiene/ Suele haber/ Suele tener/ Es	Habrá/ Tendrá/ Será Ojalá tuviera Espero que tenga

IT

IT - Understanding the different methods of processing data and presenting information

6.1 Selection and justification of the appropriate software tools and techniques to process data to meet the defined objectives in a given context.

When data has been collected, it needs to be processed. There are two main tools that can be used to process data. These are:

- Spread sheets- formula, worksheet, referencing, macros
- Databases- tables, records, queries, validation, reports

6.2 Selection and justification of the appropriate tools and techniques to present information, including the purpose and suitability and the advantages and disadvantages.

When data has been stored and processed, the results have to be presented. Which tool is used to present the information will depend on:

- What information is to be presented
- How it is to be presented
- The objectives defined in the project life cycle

Other methods to present data/ information are:

- Word processing
- Desktop publishing
- Power point presentation

Considerations also need to be made regarding:

- The target audience
- Content limitations
- The availability of information
- The impact of distributing the information
- The distribution channel- Messaging services, Websites, VoIP, Multimedia, Cloud-based and Mobile apps
- The presentation methods- Report, Presentation, Charts, Tables, Integrated document and End-user documentation

6.3 The resources required for presenting information

- Hardware requirements
- Software requirements
- Connectivity requirements
- Consideration of the user's requirements and your audience


Computer
Science

Computer Science

Programming Constructs

Sequence

Sequence is the first programming construct. In programming, statements are executed one after another. Sequence is the order in which the statements are executed. The sequence of a program is extremely important as carrying out instructions in the wrong order leads to a program performing incorrectly.

Selection

Selection is a programming construct where a section of code is run only if a condition is met. In programming, there are occasions when a decision needs to be made. Selection is the process of making a decision. The result of the decision determines which path the program will take next.

Iteration

Iteration in programming means repeating steps, or instructions , over and over again. This is often called a 'loop'. Algorithms consist of instructions that are carried out (performed) one after another.

Selection

```
switch entry:
    case "1":
        print ("You selected 1")
    case "2":
        print ("You selected 2")
    default:
        print ("This is not a valid choice")
end switch
```

```
if average >= 80 then
    print("Distinction")
else if average >= 60 then
    print ("Merit")
else
    print ("Fail")
endif
```

Iteration

- There are three types of iteration statement in most, but not all, imperative programming languages.
    - for … next
    - while … endwhile
    - do … until

Keywords

Keyword	Definition
Data type	The type of data that is being used by a program (Integer, string, float)
Variable	A stored value that is given an identifier.
Constant	A value that does not change and is stored and given an identifier.
Concatenation	The process of joining two or more strings together.
Parameter	A value given to a function or procedure and is used in the code.
Function	A block of code that can be called and reused when needed.
Casting	The process of changing the data type of a piece of data.
Debug	The process of finding mistakes and errors in code.

Arrays

```
names = [“Sam”, “Ron”, “Tom”, “Bob”, “Mo”]
print(names[0]) #this will return “Sam”
#Remember that arrays start indexing at 0


scores[0..2][0..4]
#You can store a 2d array that is an array that stores other, sub-arrays. Like the example below.
scores[[3,4,3,4,3],[2,4,3,5,6],[3,4,5,6,7]]
print(scores[0][0]) #this will return 3
```


Business

Business

Stakeholders

Stakeholders are people who are impacted by the activities of a business. This can be either positively or negatively. Each stakeholder has a different objective/want from a business .

Shareholders- these are owners and will want a successful business to gain rewards.
Employees- people who work within the business. They want a secure job and to be paid for their role
Customers- the purchasers of products. They want fair prices and a lot of choice/quality in products
Managers- people who control the activities day to day. They want responsibility and success
Suppliers- businesses who provide the raw materials for production. They want success to gain a steady and reliable contract, where payments are received on time.
Local community- people who live in the same location- they expect respect and want employment.
Pressure groups- a group wanting change. They often want business failure or change for the better
The government- party who run the country. They want business success as they gain tax and it aid with unemployment figures and growth in the economy.

External Influences

External resources- These are resources/factors that a business has no control over, but will be impacted by if there are any changes/developments.

- Technology

Development of technology means customers needs/wants are constantly changing, causing businesses to update their products and the way their products/services are made .

- Legislation

Changes in legislation means businesses has to alter factors so that they still adhere to standard law.

- Economic climate

As the economy and consumer income changes, businesses must react to ensure demand is still there.

Technology

Use of robotics and automation to complete tasks within a business.

Remember- Technology is very costly to invest into.

Types of technology used in business
Ecommerce- buying and selling online. Open 24/7 to worldwide target market
Social media- use of social media to promote. Free to use and most customers use.
Digital communication- internal and external to get messages across Efficient and can be accessed easily
Payment systems- use of EPOS and PayPal. allows more customers to pay, options for credit.

The Economy

Factor	Impact on Business
Unemployment- How many people in a country are not in work that are able to be.	If employment is high in a country, businesses have more choice in recruitment.
Consumer Income Amount someone is paid after deductions	If consumer income falls, spending will drop and sales in businesses will be cut/budgeted
Inflation- The increase in prices of products	Prices will increase leading to lower sales
Interest Rates- Amount charged for borrowing money	High interest rates mean higher costs and less disposable income, meaning less sales.
Government Taxes Charges put onto products and services	VAT and sugar taxes if increased lead to businesses having to increase prices.
Exchange Rates The amount you get for one currency to another.	If exchange rates are high it means that imports are cheaper but exports products is expensive.

Legislation

Legislation is a set of rules enforced by the government. If broken fine/sentences will be given.
Consumer law- this is legislation in place to protect customers when purchasing goods/services from a business. These include;
Consumer rights- an act ensuring the product is fit for purpose, causing no harm. This ensures businesses do no make any false promises and stops cost cutting through quality.
Sales description- legislation that ensures the item being sold is as described. This ensures businesses are truthful in what they sell, so customers know what to expect.

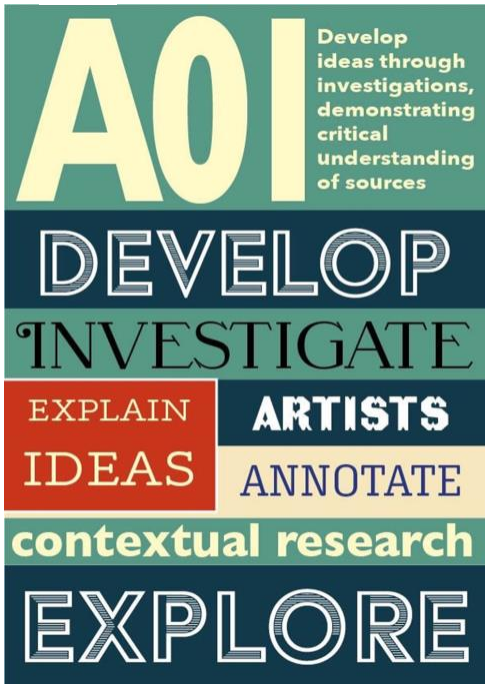
Employment law- this is legislation that protects employees within a business. These include;
Recruitment- ensuring workers are recruited in the correct way, where contracts are fair and basic human rights are met.
Pay- national minimum wage must be paid to all employees
Discrimination- all employees are treated fairly no matter what age, sex or race they are.
Health and Safety- basic training is provided where employees are not going to come to harm.

Art

Hartford Church of England High School

Art - GCSE Fine Art

Artist research



You need to be able to analyse and evaluate images, objects and artefacts showing understanding of context.

To fulfil this objective you need to be able to look at work, by both past and contemporary artists and assess it critically, with reference to the time and culture in which it was produced. To do this you will need to research the background of the piece and gain a good understanding of why and how the artists produced it. You could look at what his/her motives and influences were, whether the piece is exemplary of a particular movement or style, how the piece might have been received at the time etc.
The examiner will also be looking to see whether you can understand and use the specialist vocabulary used in Art and Design.

Introduce
Analyse
Annotate
Evaluate
Give opinions
Make Links
Describe

For every theme/project you will explore

- More than one relevant artist
- Copy the artist work
- Research why and how the work was made
- Give your own opinions through written annotations

Assessment

At the end of each project your work will be formally assessed by you and your teacher. However as your project progresses your teacher will assess your progress both with written and verbal feedback in lessons. This should give you a good indication of how well you have met the success criteria for each assessment objective and whether you are meeting your targets.
Please remember grades are not set in stone and any improvements you make to your work can be re assessed by your teacher.

Expectations:
•It is expected that you will complete quite a lot of work for this course through the homework programme, approximately two hours per week
•It is advisable to attend GCSE Art club sessions each week
•You will need to hand in a sketchbook as part of your portfolio component.

Design Technology

Hartford Church of England High School

Design Technology

Identifying & Investigating Design Possibilities

Mark band	Description
9 – 10	Design possibilities identified and thoroughly explored, directly linked to a contextual challenge demonstrating excellent understanding of the problems/opportunities. A user/client has been clearly identified and is entirely relevant in all aspects to the contextual challenge and student has undertaken a comprehensive investigation of their needs and wants, with a clear explanation and justification of all aspects of these. Comprehensive investigation into the work of others that clearly informs ideas. Excellent design focus and full understanding of the impact on society including; economic and social effects. Extensive evidence that investigation of design possibilities has taken place throughout the project with excellent justification and understanding of possibilities identified.
6 – 8	Design possibilities identified and explored, linked to a contextual challenge demonstrating a good understanding of the problems/opportunities. A user/client has been identified that is mostly relevant to the contextual challenge and student has undertaken an investigation of their needs and wants, with a good explanation and justification of most aspects of these. Detailed investigation into the work of others that has influenced ideas. Good design focus and understanding of the impact on society including; economic and social effects. Evidence of investigation of design possibilities at various stages in the project with good justification and understanding of possibilities identified.
3 – 5	Design possibilities identified and explored with some link to a contextual challenge demonstrating adequate understanding of the problems/ opportunities. A user/client has been identified that is partially relevant to the contextual

DO:

- Investigate the contexts thoroughly
- Identify and choose a client wisely
- Look at work of others
- Investigate the impact on society with social and economic effects
- Make sure the research helps your designs
- Explain where the sources have come from
- Address a NEED!

DO NOT:

- Investigate research that is irrelevant
- Chose a client that cannot provide feedback
- Ignore existing products
- Design with yourself in mind rather than the client
- Copy information without extraction and analysis
- Forget to tell a story and how the work has influenced your design thinking

Mood Board

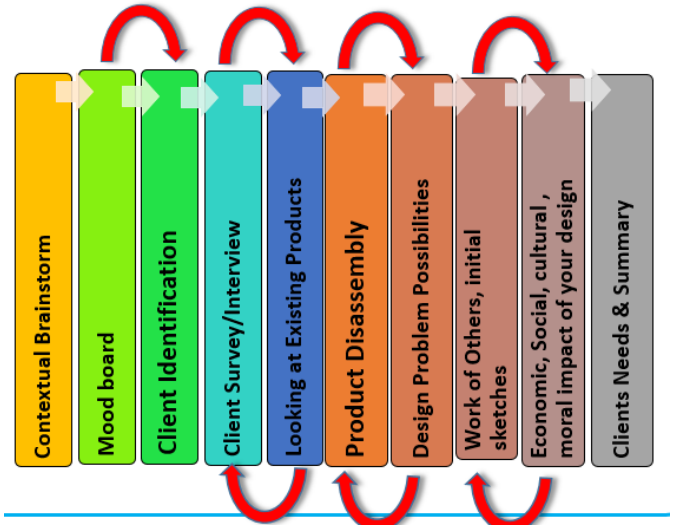
Just Remember!
Collect images that you think are relevant to the potential problem.
Collect images that you think are relevant to the contextual challenge theme. This may inspire you.
Highlight and comment on images that inspire you, you find interesting.
Pictures can also be products, work of other designers, lifestyle, colours, patterns, graphics, inspiration from nature etc.

Client Profile – Client Profile – Client Profile

- ***Who is your user?***
- ***Who is your target market?***
- ***What age are they?***
- ***What are their hobbies?***
- ***Who is your Client (Primary User)?***
- ***What is their likely budget?***

Just Remember!
This cannot be a member of your class or your DT Teacher.
Choose someone who can give you constant feedback and you can access/contact easily.
Choose someone who is of a relevant age for the product you have in mind.
Choose someone who can physically test the product at the end.

Section A Possible student Pathway



Client Survey

Just Remember!
Give these questions to your client or selected target market/Users.
What do you need to find out?
Ask a mixture of open and closed questions?
Make the questionnaire is user friendly, easy to follow , simple Q&A.

Existing Products

Just Remember! And
Use the internet and sites such as Google, Amazon and Google shopping.
What do you need to find out?
Use the table and find out the information shown.
Now you have looked at them what have you found out, style, cost, materials, negative and positive reviews?

SMSC

Just Remember!
Environmental issues regarding your product are important factors in today's society.
Social, cultural and moral issues regarding your product are important factors in today's society.
Inclusive design and Design for all regarding your product are important factors in today's society.


Creative
Media

LO1: Understand the purpose and properties of digital graphics		
MB1: 1–3 marks	**MB2: 4–6 marks**	**MB3: 7–9 marks**
Produces a summary of how and why digital graphics are used, demonstrating a **limited** understanding of the purpose of digital graphics. Identifies a **limited range** of file types and formats, only **some** of which are appropriate to digital graphics.	Produces a summary of how and why digital graphics are used, demonstrating a **sound** understanding of the purpose of digital graphics. Identifies a **range** of file types and formats, **most** of which are appropriate to digital graphics.	Produces a summary of how and why digital graphics are used, demonstrating a **thorough** understanding of the purpose of digital graphics. Identifies a **wide range** of file types and formats, which are **consistently** appropriate to digital graphics.
MB1: 1–4 marks	**MB2: 5–7 marks**	**MB3: 8–9 marks**
Demonstrates a **limited** understanding of the connection between the properties of digital graphics and their suitability for use. Demonstrates a **limited** understanding of how different purposes and audiences influence the design and layout of digital graphics.	Demonstrates a **sound** understanding of the connection between the properties of digital graphics and their suitability for use. Demonstrates a **sound** understanding of how different purposes and audiences influence the design and layout of digital graphics.	Demonstrates a **thorough** understanding of the connection between the properties of digital graphics and their suitability for use. Demonstrates a **thorough** understanding of how different purposes and audiences influence the design and layout of digital graphics.

LO2: Be able to plan the creation of a digital graphic		
MB1: 1–2 marks	**MB2: 3–4 marks**	**MB3: 5–6 marks**
Produces an interpretation from the client brief which meets **few** of the client requirements. Produces a **limited** identification of target audience requirements. Draws upon **limited** skills/ knowledge/understanding from other units in the specification.	Produces an interpretation from the client brief which meets **most** of the client requirements. Produces a **clear** identification of target audience requirements. Draws upon **some relevant** skills/knowledge/understanding from other units in the specification.	Produces an interpretation from the client brief which **fully** meets the client requirements. Produces a **clear** and **detailed** identification of target audience requirements. **Clearly** draws upon **relevant** skills/knowledge/understanding from other units in the specification.
MB1: 1–5 marks	**MB2: 6–9 marks**	**MB3: 10–12 marks**
Produces a work plan for the creation of the digital graphic, which has **some** capability in producing the intended final product. Produces a **simple** visualisation diagram for the intended final product. Identifies **a few** assets needed to create a digital graphic, demonstrating a **limited** understanding of their potential use. Identifies **a few** of the resources needed to create a digital graphic, demonstrating a **limited** understanding of their purpose. Demonstrates a **limited** understanding of legislation in relation to the use of images in digital graphics.	Produces a work plan for the creation of the digital graphic, which is **mostly** capable of producing the intended final product. Produces a **sound** visualisation diagram for the intended final product. Identifies **many** assets needed to create a digital graphic, demonstrating a **sound** understanding of their potential use. Identifies **many** of the resources needed to create a digital graphic, demonstrating a **sound** understanding of their purpose. Demonstrates a **sound** understanding of legislation in relation to the use of images in digital graphics.	Produces a **clear** and **detailed** work plan for the creation of the digital graphic, which is **fully** capable of producing the intended final product. Produces a **clear** and **detailed** visualisation diagram for the intended final product. Identifies **most** assets needed to create a digital graphic, demonstrating a **thorough** understanding of their potential use. Identifies **most** of the resources needed to create a digital graphic, demonstrating a **thorough** understanding of their purpose. Demonstrates a **thorough** understanding of legislation in relation to the use of images in digital graphics.

LO3: Be able to create and save a digital graphic		
MB1: 1–4 marks	**MB2: 5–7 marks**	**MB3: 8–9 marks**
Sources or creates a **limited range** of assets for use in the digital graphic. Prepares the assets for use in the digital graphic, **some** of which are technically **appropriate or compatible**.	Sources and creates a **range** of assets for use in the digital graphic. Prepares the assets for use in the digital graphic, **most** of which are **technically appropriate and compatible**.	Sources and creates a **wide range** of assets for use in the digital graphic. Prepares the assets for use in the digital graphic, **all** of which are **technically appropriate and compatible**.
MB1: 1–4 marks	**MB2: 5–7 marks**	**MB3: 8–9 marks**
Use of standard tools and techniques to create the digital graphic is **limited** and therefore creates a **simple** digital graphic which is appropriate to **some** aspects of the client brief. **Occasionally** saves and exports the digital graphic in formats which are **appropriate**. **Occasionally** saves electronic files using appropriate file and folder names and structures.	Use of standard tools and techniques to create the digital graphic is **effective** and therefore creates a digital graphic which shows **some** detail which is appropriate to **most** aspects of the client brief. **Mostly** saves and exports the digital graphic in formats and properties which are **appropriate**. **Mostly** saves electronic files using file and folder names and structures which are **consistent** and **appropriate**.	Use of a range of advanced tools and techniques to create the digital graphic is **effective** and therefore creates a **complex** digital graphic which is appropriate for the client brief. **Consistently** saves and exports the digital graphic in formats and properties, which are **appropriate**. **Consistently** saves electronic files using file and folder names and structures which are **consistent** and **appropriate**.

LO4: Be able to review the digital graphic		
MB1: 1–2 marks	**MB2: 3–4 marks**	**MB3: 5–6 marks**
Produces a review of the finished graphic which demonstrates a **limited** understanding of what worked and what did not, making **few** references back to the brief. Review identifies areas for improvement and further development of the final digital graphic, **some** of which are **appropriate** and sometimes **explained**.	Produces a review of the finished graphic which demonstrates a **reasonable** understanding of what worked and what did not, **mostly** referencing back to the brief. Review identifies areas for improvement and further development of the final digital graphic, which are **mostly appropriate** and **explained well**.	Produces a review of the finished graphic which demonstrates a **thorough** understanding of what worked and what did not, **fully** referencing back to the brief. Review identifies areas for improvement and further development of the final digital graphic, which are **wholly appropriate** and **justified**.

Music

Music - Component 2

PERSONAL MANAGEMENT
Independent practice Working on your own to learn your musical part.
Attendance Being on time and where you need to be.
Time management Adhering to rehearsal schedules and ensuring you have enough time to complete things to the best of your ability.
Readiness to work Bringing the correct equipment to rehearsals and ensuring you have something to rehearse.
Listening to instruction and direction Being prepared to take on feedback from others in your group and your teacher.
Observing safe working practice Ensuring that you are careful within the rehearsal/performance environment.
Willingness to try something out Having an open mind to do something different and try something new. This could be in genre, technique or stylistic interpretation.
Rehearsal discipline Being focused and on task when practicing.
Showing sensitivity towards others An awareness of the ability and capability of others and be thoughtful about this.

REHEARSAL
Warm-ups Preparing the body and instrument to perform to its best ability.
Physical preparation Ensuring your body is capable of achieving your best performance by stretching and breathing.
Musical interaction How you communicate with others whilst you are performing e.g. knowing when each of you start/stop.
Constructive feedback Pointers that can help each other, not negative comments that have no solution.
Modelling watching an educational video clip and learning from their technique
Chunking taking a small section and rehearsing it
Repetition repeating until accurate
Self assessment watching video footage and logging areas to improve

Music - Component 2

Performance Techniques, Interpretative Skills and Stylistic Qualities
Accuracy The right notes, the right timing and the right technique.
Rhythm and Timing The correct pattern of beats when playing as a soloist or with others.
Dynamics The volume of the music.
Musicality/sensitivity The quality or state of being musical and having a talent.
Technical exercises Scales, arpeggios, chord progressions – anything that prepares you for more difficult technical passages in your playing.
Expression The art of playing or singing with a personal response to the music. At a practical level, this means making appropriate use of dynamics, phrasing, timbre and articulation to bring the music to life.
Communication Speaking with others in rehearsal or in a performance.
Phrasing The manner in which a musician shapes a sequence of notes in a passage of music, in order to express an emotion or impression.
Range The lowest and highest note.
Sight reading Playing something from music for the first time.
Improvisation Playing a melody spontaneously from a set of chords.
Breath control Using your diaphragm to fill your lungs with air and then gradually release it.
Vibrato A musical effect consisting of a regular, pulsating change of pitch. It is used to add expression to vocal and instrumental music.

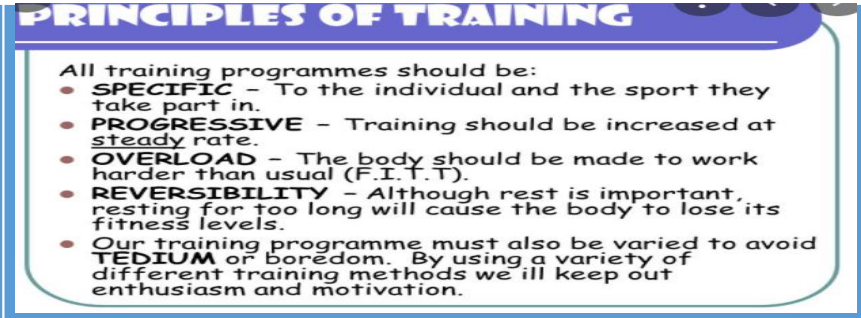
Tuning Ensuring that your note has the potential to be in tune so it is not sharp or flat.
Awareness of/Following an accompaniment Ensuring that you are aware of the importance of the accompaniment to the melody and how the two need to work together to make an effective performance.
Learning repertoire The process of learning different styles and genres of music to develop your performance skills.
Musical interaction Ensuring you communicate with your audience by engaging with them in your performance, as well as other musicians you are playing with.
Stage Presence The ability to command the attention of a theatre audience by the impressiveness of one's manner or appearance.
Emphasis Special importance, value, or prominence given to something. This could be on a note or on a word.
Musicality/sensitivity The quality or state of being musical and having a talent.
Intonation Accuracy of pitch in playing or singing.
Projection A great tool in assisting in bringing greater dynamics to the performance. Being able to successfully increase and decrease volume whilst performing can help enhance your performance and highlight the emotion in the song
Confidence The feeling or belief that one can have faith in or rely on someone or something.
Focus Being on task and fully committed.
Technical control Ensuring you have the correct technique to enable you to perform accurately.

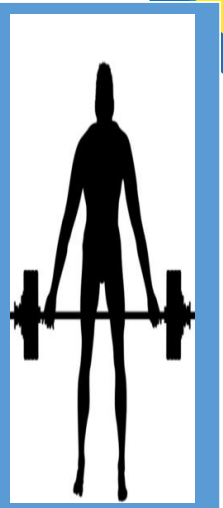
Sport

Sport - Btec Sport Component 1

COMPONENTS OF FITNESS

- AGILITY – To change direction quickly with control.
- BALANCE – Maintaining centre of gravity over a base of support.
- CO-ORDINATION – Flow of movements to perform motor task effectively.
- REACTION TIME – Responding to stimulus and initiation of response.
- AEROBIC ENDURANCE – Cardio-respiratory system working for long periods of time supplying oxygen and nutrients to working muscles.
- MUSCULAR ENDURANCE – Muscle is able to contract over periods of time against a light to moderate exercise rate.
- FLEXIBILITY – The range of motion around a joint.
- SPEED – Distance divided by the time taken
- MUSCULAR STRENGTH – Maximum force that can be generated by a muscle or muscle group.
- BODY COMPOSITION – Ratio of fat mass in the body compared to the % of fat free mass found as muscle.

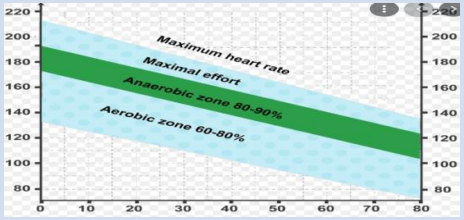


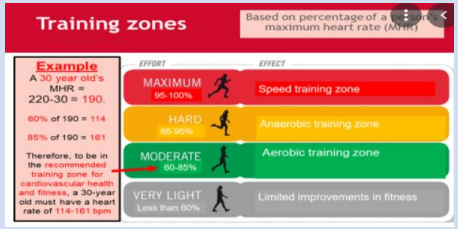


EXERCISE INTENSITY

Heart rate max

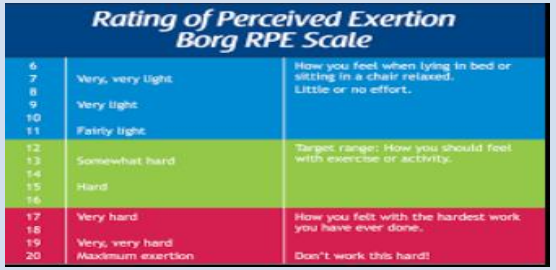
- Measure heart rate by measuring beats per minute.
- Max Heart Rate is calculate 220 – AGE
- Then work out 60% and 80% threshold and apply the recommended training zones to the athletes.





THE BORG SCALE

- Rate of Perceived Exertion, ranges from 6 to 20.
- Athletes choose a stage in which they feel they are working at. To work out HR multiply by 10.



Dance

Tech Award Dance Component 2 - Shadows

Shadows

What was the initial stimulus for this choreography? The music basically, I had heard this piece of music a long time ago and I've seen one or two choreographic pieces already to the music so the music had been in my mind hanging around, I loved it, in its various forms and I'd always had an idea that I would like to make a work to it. So that was the initial stimulus

So what would you say this dance work is about? Well the music basically for me is very eastern European, of course you'd sort of call it minimal. But it seems to have a weight and a sense of history and culture behind it or at least that's what I hear in the music. Basically, I married the ideas of the history of Eastern Europe and particularly the 20th century, the second world war, the horrors that Europe has gone through. It was very much influenced by the horrors of the second world war in Europe under the Nazis but it could equally be about what happened under the Russians later. Or you can go back to the pogroms of the 18th/19th century and further back of course. It's about really a family, a group of people waiting for the knock on the door because they know they are going to be on the next train, if not the next train, the train after, on the way to a concentration camp. That is basically the idea. But it's of course, when you begin to make a dance about it you cannot be too figurative. And this is the power of dance, you're able to say many different things with a dance. The audience can interpret it on so many levels – I always say it's like a collage and you can see and hear in the work whatever you see and hear

Meet the choreographer

Christopher Bruce was born on the 3rd October 1945 in Leicestershire. He is a famous British performer and choreographer.
He was Artistic Director of the Rambert Dance Company until 2002.

Bruce was appointed a CBE for a lifetime's service to dance because he was one of Britain's leading choreographers

Bruce often creates an impressive work by mixing the modern dance and classical ballet in his performance

In 1989, he became a resident choreographer for Houston Ballet.

He often used popular music as the background of his performance. He chose Rolling Stones and Bob Dylan

'I want people to be moved and feel something for these people. They may not be able to do much, but public opinion in the end means something, and that is a way that I, as an artist, can do my bit for humanity' **Christopher Bruce**
https://www.rambert.org.uk/explore/news-and-blog/news/story-i-wanted-tell-christopher-bruce-ghost-dances/

Bruce choreographic approach

Dramatic themes linked to the human condition (political or social) **Human rights themes have provided him with a good source of inspiration**	**A range of styles; contemporary, ballet, folk, popular dance.** **Christopher Bruce's signature movement style is grounded in modern dance techniques with a combination of classical and contemporary dance language**	**Movement must be appropriate to the piece and dancers** **A number of his early works were performed without accompaniment or had music added after they were choreographed**
His personal range of stimuli is extensive including a wide range of literature and music.	Most of his productions have an underlying emotional content.	Most performances are deliberately open to a range of interpretations rather than having a fixed story-line

Bruce Style

Stemming from his own training, Christopher Bruce's signature movement style is grounded in modern dance techniques with a combination of classical and contemporary dance language termed "neo-classical".

Bruce does not prepare movement before entering the studio, preferring to wait and work with the dancers so that he can be influenced by them. For Bruce, as well as being appropriate to the piece, the movement must also sit well on the dancers.

Bruce's choreography reflects a range of styles: ballet, contemporary, folk and popular dance. He deals with themes linked to the human condition, political or social issues and tends to portray them through dramatic, emotive and theatrical elements.

Tech Award Dance Component 2 - Exploring different styles of dance; The physical skills

Alignment-
The correct placement of the body parts in relation to each other.

Balance-
A steady or held position achieved by even distribution of

Co-ordination- The ability to use different parts of the body together smoothly and efficiently.

Dynamics-
The quality of movements based upon variations of speed, strength and flow.

Extension- Lengthening one or more muscles or limbs.

Facial expressions- Use of face to show mood or feelings.

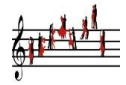
Focus- Use of eyes to enhance the performance.

Posture- the way the body is held.

How can we improve these skills? How can we review them for each style we learn?

Movement memory
Remembering a set pattern of movements. This is when your whole body is able to copy the exact movements using neurological pathways.

Musicality- Ability to make the unique qualities of the accompaniment evident in performance.



Projection- The energy the dancer uses to connect with and draw in the audience.

Spatial Awareness- Consciousness of the surrounding space and its effective use.

Stamina-
Ability to maintain physical and mental energy over periods of time

Flexibility-
The range of motion in your joints or joints and lengthening of muscles which cross a joint to enable motion.

Strength-
The quality of being physically strong and the ability to apply force


Child
Development

Hartford Church of England High School

Child Development Tech Award

Component 2: Learning through play

Play is both fun and motivating for young children. It helps to promote areas of development and allows children to gain new skills.

You will learn in component 2 that it is important for adults to provide play opportunities in different settings such as early years setting and the home.

Stages of play 0-2 years

Unoccupied play

Usually occurs between birth and 3 months old
The child does not interact with others and makes movements with their body
Babies learn about their body and begin to understand how to control their movements
Have you ever seen a baby kicking their legs around and moving their arms?
Random movement with their body e.g. kicking, stretching, grabbing and moving their faces
This is their attempt at learning about their environment and how the muscles move
Movements of arms and legs make their muscles stronger which helps develop their gross motor skills – without this they would find it difficult to learn and perform basic tasks such as walking or climbing; preventing them from being able to play with other children.

Solitary play

Playing alone is a natural step in the process of play
This occurs from birth to 2 years of age
Children are not curious about what others are doing
They don't show an interest in playing with their peers
Children will often sit and play with a toy and repeat actions e.g. banging a spoon or moving parts on an activity cube
A small child playing with a treasure basket, taking objects out and exploring them, will be improving their confidence

Stages of play 2-3 years

After the age of 2 children are keen to explore their environment and try to understand what is going on around them.
Play allows them to do this. They need to touch each toy or object to work out how it moves, how it makes noises or how to use it
Their imagination is used more and more when playing
As well as trying to understand their environment they are also trying to understand other children.

Spectator/onlooker play

Takes place around 2 years of age
Watching other children is central to this stage of play
Children are beginning to explore the world around them but lack the skills to join in with others
Children learn through personal interaction with others and the objects in their environment
Children will notice other children around them and may sit and watch them without talking to them
They are using this time to think about what others are doing and how they are doing it
During an arts and crafts session a child with watch others and may ask questions about what they are doing and give suggestions.

Parallel play

Around the age of 2-3 years, play has moved from simply observing others to sitting near them and playing at the side of them.
Parallel play involves a child playing in close proximity to another child/children but will not join in and play with them
Playing at the side of another child is one way of beginning to build trust around others and to help with social interaction
While playing at the side of others, children are learning what their peers are doing and are starting the process of forming an understanding of others

Component 2: Learning through play

Play is both fun and motivating for young children. It helps to promote areas of development and allows children to gain new skills.

You will learn in component 2 that it is important for adults to provide play opportunities in different settings such as early years setting and the home.

Stages of play 3-5 years

Associative play

Associative play. a form of **play** in which a group of children participate in similar or identical activities without formal organization, group direction, group interaction, or a definite goal.

Rather than simply playing side-by-side with other kids, associative play involves some type of interaction between them. They're not yet to the point of working together to achieve a common goal, but they're also no longer completely in their own little world.

Associate play generally occurs around the 3-4 years and consists of each child engaging in an separate activity but with the assistance and cooperation of others.

https://www.youtube.com/watch?v=Yb1NOekWf_o

What age is associative play?
How is associative play different from parallel play?
What skills are developing during associative play?
How will the children interact during associative play?

Cooperative play

Cooperative play involves **children playing and working with others towards a common goal or purpose**. Being able to participate in cooperative play is extremely important. It means that your child has the skills they'll need later to collaborate and cooperate at school and in other typical social settings, like sports.

As children progress through the play stages they around 4 or 5 years old come to the cooperative play stage. It is quite apparent in the later preschool years when children have acquired the skills to interact together for the purpose of play.

Any form of organised activity that encourages children to work towards a common goal, cooperative play includes activities like building sandcastles and putting on plays, and usually requires children to distribute roles and responsibilities between themselves.

https://www.youtube.com/watch?v=7VH7a7oDRdU

What are the key signs that cooperative play is happening?
What age does cooperative play happen?
What toys/games require cooperative play?

Adult – led play

This type of play requires an adult to plan, organise and lead children in an activity. The adult tells the child what to do and how to play. As the activities are focused children often don't see them as play. Adult-led activities are planned with an awareness of the child in a particu;ar setting. They build up on what the child already knows and can do and considers their interests. The adult should carefully plan the activity based on the particular needs of the child and the milestones that they need to meet. The activity will follow a sequence of steps or tasks that the children need to complete.

Adult – initiated play

In this style of play an adult sets up a play scenario for children but does not lead it. The childcare worker or parent/carer will leave tasks and resources out for children but will allow them to complete the activities in their own way and in their own time. Providing resources encourages children to play with them in a certain way, leading them to develop new skills.


Food
Technology

Hartford Church of England High School

Food Science

Functions of ingredients
Ingredients provide a variety of functions in recipes.

Carbohydrate, protein and fat
Carbohydrate, protein and fat all have a range of properties that make them useful in a variety of food products.

Carbohydrates perform different functions in food.
They can:
- help to cause the colour change of bread, toast and bakery products (dextrinisation);
- contribute to the chewiness, colour and sweet flavour of caramel;
- thicken products such as sauces and custards (gelatinisation).

Maillard reaction
Foods which are baked, grilled or roasted undergo colour, odour and flavour changes. This is primarily due to a group of reactions involving amino acids (from protein) and reducing sugars.

Dextrinisation
When foods containing starch are heated they can also produce brown compounds due to dextrinisation. Dextrinisation occurs when the heat breaks the large starch polysaccharides into smaller molecules known as dextrins which produce a brown colour.

Caramelisation
When sucrose (table sugar) is heated above its melting point it undergoes physical and chemical changes to produce caramel.

Gelatinisation
When starch is mixed with water and heated, the starch granules swell and eventually rupture, absorbing liquid, which thickens the mixture. On cooling, if enough starch is used, a gel forms.

Proteins perform different functions in food products.
They:
- aerate foods, e.g. whisking egg whites;
- thicken sauces, e.g. egg custard;
- bind ingredients together, e.g. fishcakes;
- form structures, e.g. gluten formation in bread;
- gel, e.g. lime jelly.

Gluten formation
Two proteins, gliadin and glutenin, found in wheat flour, form gluten when mixed with water. Gluten is strong, elastic and forms a 3D network in dough. In the production of bread, kneading helps untangle the gluten strands and align them. Gluten helps give structure to the bread and keeps in the gases that expand during cooking.

Gelation
Gelatine is a protein which is extracted from collagen, present in animal connective tissue. When it is mixed with warm water, the gelatine protein molecules start to unwind. On cooling, a stable, solid network is formed, trapping the liquid.

Denaturation
Denaturation is the change in structure of protein molecules. The process results in the unfolding of the protein's structure. Factors which contribute to denaturation are heat, salts, pH and mechanical action.

Coagulation
Coagulation follows denaturation. For example, when egg white is cooked it changes colour and becomes firmer (sets). The heat causes egg proteins to unfold from their coiled state and form a solid, stable network.

Aeration
Products such as creamed cakes need air incorporated into the mixture in order to give a well-risen texture. This is achieved by creaming a fat, such as butter or baking spread, with sugar. Small bubbles of air are incorporated and form a stable foam.

Fats performs different functions in food.
They help to:
- add 'shortness' or 'flakiness' to foods, e.g. shortbread, pastry;
- provide a range of textures and cooking mediums;
- glaze foods, e.g. butter on carrots;
- aerate mixtures, e.g. a creamed cake mix;
- add a range of flavours.

Plasticity
Fats do not melt at fixed temperatures, but over a range. This property is called plasticity.

Raising agents
Raising agents include anything that causes rising within foods, and are usually used in baked goods. Raising agents can be:
- biological, e.g. yeast;
- chemical, e.g. baking powder;
- mechanical, e.g. adding air through beating or folding.

Functional ingredients
These are ingredients that are specifically included in food for additional health benefits. They include:
- probiotics – 'good' bacteria that may have a positive impact on human health;
- prebiotics – food ingredients that promote the growth of beneficial microorganisms in the gut;
- sterols/stanols – compounds that can lower cholesterol;
- healthy fats (e.g. omega-3);
- added vitamins and minerals (more than in the original food).

Colloidal systems
Colloidal systems give structure, texture and mouthfeel to many different products.

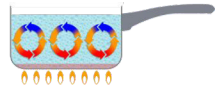
System	Disperse phase	Continuous phase	Food
Sol	Solid	Liquid	Unset jelly
Gel	Liquid	Solid	Jelly
Emulsion	Liquid	Liquid	Mayonnaise
Solid emulsion	Liquid	Solid	Butter
Foam	Gas	Liquid	Whipped cream
Solid foam	Gas	Solid	Meringue

Why is food prepared and cooked?
Food is prepared and cooked to:
- make the food more palatable – improves flavour, texture and appearance;
- reduce the bulk of the food;
- provide variety and interest to meals.

Methods of cooking food
The methods of cooking are divided up into groups. These are based on the cooking medium used.
They are:
- moist/liquid methods, e.g. boiling;
- dry methods, e.g. grilling;
- fat-based, e.g. frying.

Selecting the most appropriate way of preparing and cooking certain foods is important to maintain or enhance their nutritional value.
- Vitamins can be lost due to oxidation during preparation or leaching into the cooking liquid.
- Fat-based methods of cooking increase the energy (calories) of the food.
- The use of different cooking methods affects the sensory qualities of the food.

There are three ways that heat is transferred to food.
- Conduction – the exchange of heat by direct contact with foods on a surface.
- Radiation – energy in the form of rays.
- Convection – currents of hot air or hot liquid transfer the heat energy to the food.



Tasks
1. Choose a recipe that you enjoy or have made recently and explain in detail the functions of the ingredients.
2. Explain the function of raising agents, giving examples of recipes.

Key terms
Conduction: The exchange of heat by direct contact with foods on a surface.
Convection: Currents of hot air or hot liquid transfer the heat energy to the food.
Functional ingredients: Included in food for additional health benefits.
Heat transfer: Transference of heat energy between objects.
Radiation: Energy in the form of rays.

Tenderisation
- Mechanical tenderisation – a meat cleaver or meat hammer may be used to beat the meat. Cutting into small cubes or mincing can also help.
- Chemical tenderisation (marinating) –the addition of any liquid to flavour or soften meat before cooking.

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Food Science

Food spoilage
As soon as food is harvested, slaughtered or processed it starts to change. This happens for two main reasons:
- autolysis – self destruction, caused by enzymes present in the food;
- microbial spoilage – caused by the growth of micro-organisms, i.e. bacteria, yeasts and moulds.

Food spoilage: Autolysis – enzymes
Enzymes are chemicals which can cause food to deteriorate in three main ways:
- ripening – this will continue until the food becomes inedible, e.g. banana ripening;
- browning – enzymes can react with air causing certain foods to discolour, e.g. apples;
- oxidation – loss of nutrients, such as vitamin C from food, e.g. over boiling of green vegetables.

Food spoilage: Microbial spoilage
Spoilage can be caused by the growth of:
- bacteria – single celled micro-organisms which are present naturally in the environment;
- yeasts – single celled fungi;
- moulds – fungi which grow as filaments in food.

Food contamination
Food contamination can lead to food poisoning. There are three ways which food can be contaminated: **bacterial**, **chemical** and **physical**.

Chemical contamination
Chemical contamination can occur in a variety of ways at different stages of food processing and production. For example, chemicals from the farm; cleaning products used in the processing plant and fly spray used in the kitchen.

Physical contamination
This can occur in a variety of ways at different stages of food processing and production. Some examples are:
- soil from the ground when harvesting;
- a loose bolt from a processing plant when packaging;
- a hair from a chef in the kitchen.

Bacterial contamination
Most bacteria are harmless but a small number can cause illness. These are known as pathogenic bacteria. Food which is contaminated with pathogenic bacteria can look, taste and smell normal.
Bacteria can be transferred onto food through cross-contamination, via equipment, people or pests, or can be naturally present in the food.
Some bacteria can produce toxins which can cause food poisoning.

Micro-organisms
Micro-organisms need conditions to survive and reproduce these can include:
- temperature;
- moisture;
- food;
- time;
- oxygen and pH level.

Temperature
Bacteria need warm conditions to grown and multiply.
- The ideal temperature for bacterial growth is 30ºC – 37ºC.
- Some bacteria can still grow at 10ºC and 60ºC.
- Most bacteria are destroyed at temperatures above 63 ºC.
- Bacterial growth danger zone is 5ºC - 63ºC.

At very cold temperatures, bacteria become dormant – they do not die, but they cannot grow or multiply.

Moisture
Where there is no moisture bacteria cannot grow. However, bacteria and moulds can both produce spores which can survive until water is added to the food.

To find out more, go to: https://bit.ly/3nE9fpE

Food
Bacteria need a source of food to grow and multiply, these food are usually high in moisture, fat and protein, and may be ready to eat.
Food where bacteria rapidly multiply in is called a **high risk food**. For example:
- meat, meat products and poultry;
- milk and dairy products;
- eggs – uncooked and lightly cooked;
- shellfish and seafood;
- prepared salads and vegetables;
- cooked rice and pasta.

Time
Given the right conditions, one bacterium can divide into two every 10-20 minutes through a process called binary fission.

People at high risk of food poisoning
Elderly people, babies and anyone who is ill or pregnant needs to be extra careful about the food they eat.

Symptoms of food poisoning
Food poisoning can be mild or severe. The most common symptoms are:
- feeling sick;
- being sick;
- diarrhoea;
- abdominal pain.

Campylobacter
Sources
Raw and undercooked poultry, unpasteurized milk, contaminated water.
Signs and symptoms
Onset 2 – 5 days (can be longer). Fever, headache and dizziness for a few hours, followed by abdominal pain.

E Coli 0157
Sources
Raw and undercooked meat and poultry. Unwashed vegetables. Contaminated water.
Signs and symptoms
Onset usually 3-4 days. Diarrhoea, which may contain blood, can lead to kidney failure or death.

Listeria
Sources
Unpasteurised milk and dairy products, cook-chill foods, pâté, meat, poultry and salad vegetables.
Signs and symptoms
Onset 1-70 days. Ranges from mild, flu-like illness to meningitis, septicaemia, pneumonia.
During pregnancy may lead to miscarriage or birth of an infected baby.

Salmonella
Sources
Raw meat, poultry and eggs. Flies, people, sewage and contaminated water.
Signs and symptoms
Onset 6-48 hours. Headache, general aching of limbs, abdominal pain and diarrhoea, vomiting and fever. This usually lasts 1 – 7 days, and rarely is fatal.

Staphylococcus aureus
Sources
Humans: nose, mouth and skin. Untreated milk.
Signs and symptoms
Onset 1 – 6 hours. Severe vomiting, abdominal pain, weakness and lower than normal temperature.
This usually lasts 6 – 24 hours.

Key terms
Bacteria: Small living organisms that can reproduce to form colonies. Some bacteria can be harmful (pathogenic) and others are necessary for food production, e.g. to make cheese and yogurt.
Binary fission: The process that bacteria uses to divide and multiply.
Cross-contamination: The transfer of bacteria from one source to another. Usually raw food to ready-to-eat food but can also be the transfer of bacteria from unclean hands, equipment, cloths or pests. Can also relate to allergens.
Food spoilage: The action of enzymes or microorganisms which make the food unacceptable to consume.
Food poisoning: Illness resulting from eating food which contains food poisoning micro-organisms or toxins produced by micro-organisms.
Toxin: A poison produced by some bacteria which can cause food poisoning.

Allergens
Allergenic ingredients can cause adverse reactions in some people. Care must be taken at each stage of food processing to prevent contamination.

Desirable food changes
Desirable changes that can be caused by micro-organisms include:
- bacteria in yogurt and cheese production;
- mould in some cheeses, e.g. Stilton;
- yeast in bread production.

Task
Explain in detail the conditions bacteria need to survive and reproduce. Give examples of controls to reduce the likelihood of bacterial multiplication and risk of food poisoning.


French

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French

Ma maison et ma ville

Les verbes	
Habiter	To live
Visiter	To visit
Construire	To build
Partager	To share
Avoir	To have
Déménager	To move house

Les adjectifs	
Meublé(e)	Furnished
Une maison individuelle	A detached house
Plein de	Full of …
Connu pour	Known for
Animé(e)	Lively
Bruyant(e)	Noisy
Tranquille	Quiet
Propre	Clean
Sale	Dirty
Laid(e)	Ugly
Joli(e)	Pretty
Vieux/Vieille	Old
Moderne	Modern
(In)Confortable	(Un)Comfortable
Grand(e)	Big
Petit(e)	Small

Les noms (Là où j'habite)	
J'habite …/ On habite …	I live in/ We live in …
un appartement	an apartment
Une maison jumelée	a semi-detached house
Une ferme	a farmhouse
Une maison individuelle	a detached house
Une maison de retraite	an old people's home
Un quartier	a neighbourhood in the city
Il/elle est situé(e) loin de …	it is situated far from
Il/elle est situé(e) près de	it is situated near to
Il/elle est situé(e)	it is situated in
Dans le nord / sud	In the north/ south
Dans l'est/ l'ouest	In the east/west
Dans une grande ville	In a city
Dans une ville	In a town
Dans une rue	In a street
Dans la banlieue	On the outskirts
Sur la côte	On the coast
À la campagne	In the countryside
À la montagne	In the mountains

Les possessifs	
Ma (maison)	My (house)
Ta/votre (maison)	Your (house)
Sa (maison)	His/her (house)
Notre (maison)	Our (hous

Les substantifs – Ma maison	
Ma maison a/Ma maison n'a pas de .. Dans ma maison il y a …/Il n'y a pas de ….	My house has (has not) ….. In my house there is (isn't)…
(deux) étages	(two) floors
(cinq) pièces	(five) rooms
Au premier étage/au deuxième étage il y a …	On the first/second floor there is/are
Au rez de chaussée il y a …	On the ground floor there is /are
En haut/en bas il y a …	Upstairs/downstairs there is/are
Une chambre	a bedroom
Une cuisine	a kitchen
Un studio	a studio
Un sous-sol	a basement
Une salle de bains	a bathroom
Une salle à manger	a dining room
Une toilette	a toilet
Un salon/un séjour	a living room
Un jardin avec de l'herbe /des fleurs	a garden with grass/flowers
Un garage	a garage

Ma maison idéale
Serait = would be Aurait = would have Je voudrais que ce soit = I would like it to be Je voudrais qu'il ait = I would like it to have

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French

Knowledge organiser: Ma région

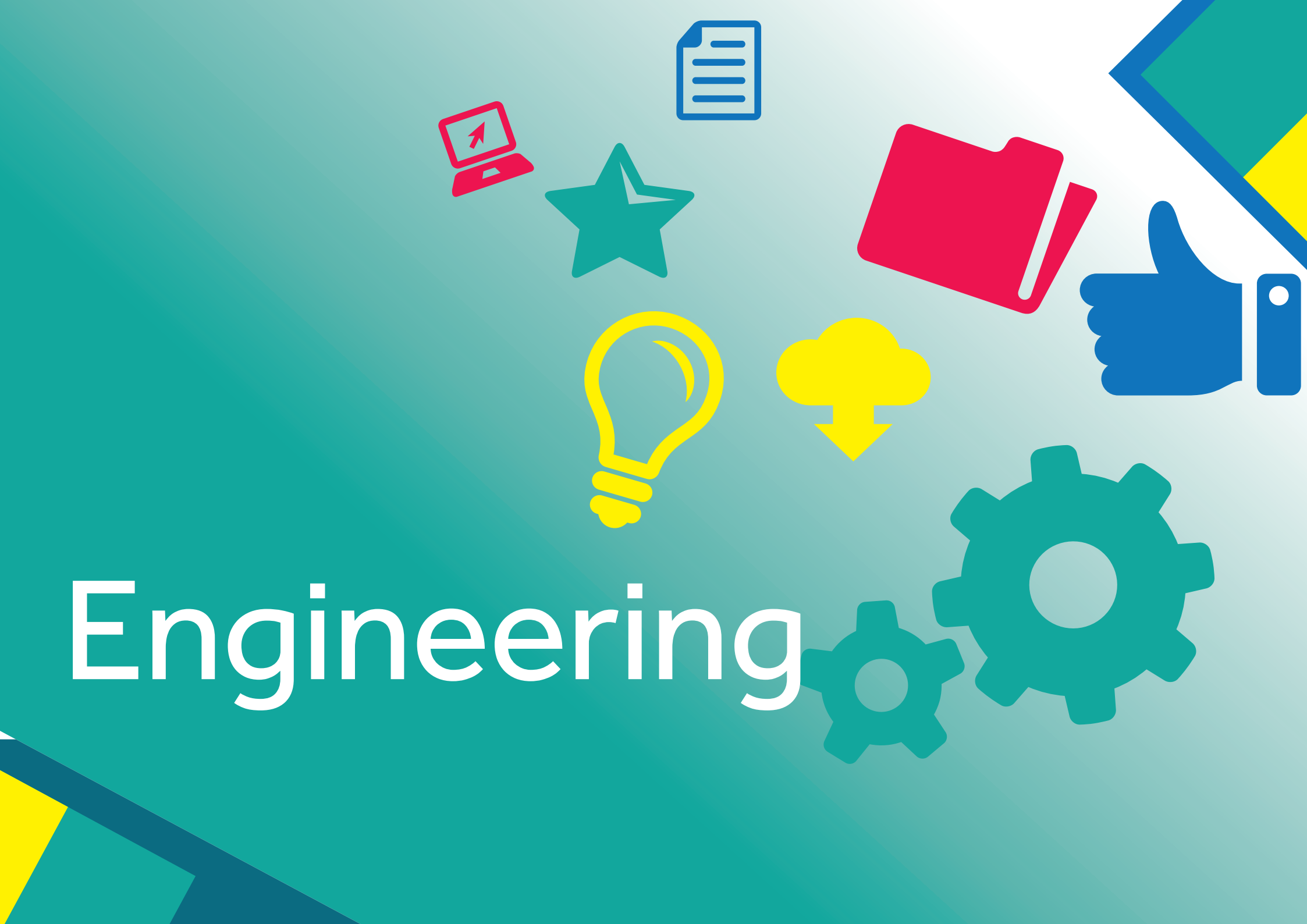
En ville… In the city….			
Un hôtel de ville	A town hall	Une usine	A factory
Un château	A castle	Un cinéma	A cinema
Un marché	A market	Un parc	A park
Un musée	A museum	Un centre sportif	A sports centre
Un port	A port	Un théâtre	A theatre
Un bowling	A bowling alley	Une bibliothèque	A library
Une église	A church	Une mosquée	A mosque
Une piscine	A swimming pool	Une plage	A beach
Une place	A square	Une banque	A bank
Un tabac	A tobacconist's	Un café	A café
Une gare	A train station	Une pharmacie	A pharmacy
Une épicerie	A grocery shop	Une librairie	A book shop
Une boulangerie	A bakery	Une pâtisserie	A cake shop
Un salon de coiffeur	A hair salon	Un magasin	A shop
Une agence de voyages	A travel agency	Un magasin de chaussures	A shoe shop
Un centre commercial	A shopping centre	Un magasin de souvenirs	A gift shop

Les prépositions			
Où est ….?	Where is …?	C'est…	It is …
À côté de	Next to	Ici	Here
Devant	In front of	Là-bas	There
Derrière	Behind	Au bout de la rue	At the end of the road
À droite	On the right	Près	Near
À gauche	On the left	Loin	Far away
Sous	Underneath	Au dessus de	On top of

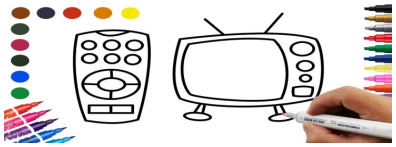
If Clause
S'il fait du soleil, j'irai au centre commercial
If (it is sunny), I will go to the shopping centre
Si. (weather) + full infinitve + ai (I will….)

Les avantages et les désavantages d'habiter dans une ville/un village			
Ce qui est bien c'est que	The good thing is that	La ventaja es que	The advantage is that
Ce qui est mauvais c'est que	The bad thing is that	La desventaja es que	The disadvantage is that
C'est plus …. que	It is more …than	Es menos ….que	It is less …than
Il y a beaucoup/peu à faire		there is a lot/little to do	
Il y a une bonne vie nocturne		there is good night live	
Il y a plus d'opportunités d'emploi		there is more job opportunities	
Il y a trop de gens/personnes		there are too many people	
Il y a plus de contamination		there is more pollution	
Les vues sont meilleures		the views are better	
Il y a plus de chômage		there is more unemployment	
Les gens sont plus à l'aise/détendus		people are more relaxed	
es demasiado industrial		it is too industrial	

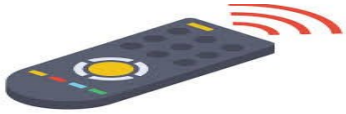
Clues for Tenses		
Past	Present	Future/Conditional
Il y a un mois – a month ago	Maintenant -Now	À l'avenir – In the future
Avant - before	De nos jours - Nowadays	Après - after
Dans le passé – In the past	Actuellement - Currently	L'année prochaine – Next year
L'année dernière – Last year	Aujourd'hui - Today	Dans..within…
Il y avait – There was/were C'était – It was	Il y a - There is/are C'est – It is	Il y aura – There will be Il y aurait = There would be


Engineering

Engineering - Design - R039



COMMUNICATING DESIGN



R039—Communicating Designs

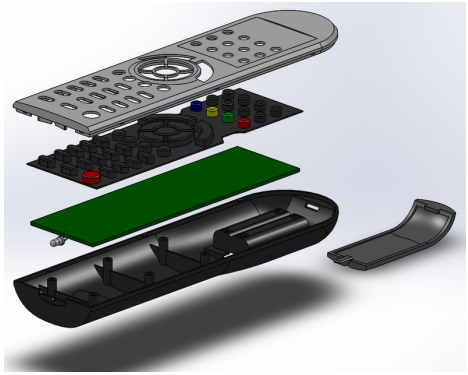
Learning Outcome 1 Be able to generate design proposals using a range of freehand sketching techniques

Learning Outcome 2 Know how to develop designs using engineering drawing techniques and annotation

Learning Outcome 3 Be able to use Computer Aided Design (CAD) software and techniques to produce and communicate design proposals

KEY INFORMATION FOR THIS MODULE:

Scenario for the Assignment: A national company produces a range of TV appliances. You have been tasked with designing the remote control unit that will support the new TV equipment. Your design will be packaged with the TV and be available to be purchased online and in electrical goods retailers



Coursework (R039)will involve: Sketching, developing ideas using CAD, Isometric and Orthographic projections of design drawn correctly by hand. All work must be annotated, labelled or dimensions added.

DESIGN CYCLE:

IDENTIFY - Brief , research, process planning

DESIGN – Specification, plan, manufacturing plan

OPTIMISE – Prototyping, error proofing

<u>The specification given by OCR for the product is:</u>

- Consist of a moulded construction
- Be comfortable to hold
- Be sized to suit the 5th to 95th percentile range
- Include buttons to press
- Include numbers 1 through to 0, play, fast forward, rewind, pause and stop as a minimum
- Allow users to identify its functions
- Be aesthetically pleasing
- Be powered by 2 single AA batteries
- Maximum size: 220mm x 80mm x 30mm


Health and
Social Care

Health and Social Care - Component 2 H&SC Services & Values

Learning Aim A: Understand the different types of health and social care services and barriers to accessing them	Learning Aim B: Demonstrate the care values and review own practice

Providing good health and social care services is very important and a set of 'care values' exist to ensure this happens. Care values are important because they enable people who use H&SC services to get the care they need and to be protected from different sorts of harm.

A1. Health and Social Care services

1. **Different health care services and how they meet service user needs**
   a) Primary care e.g. dental, optometry, community health care
   b) Secondary and tertiary care e.g. specialist medical care
   c) Allied health professionals e.g. physiotherapy, occupational therapy, speech and language therapy, dieticians
2. **Different social care services and how they meet service user needs**
   a) Services for children and young people e.g. foster care, residential care, youth work
   b) Services for adults or children with specific needs (learning disabilities, sensory impairments, long term health issues) e.g. residential care, respite care, domiciliary care
   c) Services for older adults e.g. residential care, domiciliary care
   d) Role of informal social care provided by relatives, friends and neighbours

B1. Care values

1. Empowering and promoting independence by involving individuals, where possible, in making choices
2. Respect for the individual by respecting service users' needs, beliefs and identity
3. Maintaining confidentiality
4. Preserving the dignity of individuals to help them maintain privacy and self-respect
5. Effective communication that displays empathy and warmth
6. Safeguarding and duty of care
7. Promoting anti-discriminatory practice by being aware of types of unfair discrimination and avoiding discriminatory behaviour

A2. Barriers to accessing services

1. **Types of barriers and how they can be overcome by the service provider and users**
   a) Physical barriers e.g. issues getting into and around the facilities
   b) Sensory barriers e.g. hearing and visual difficulties
   c) Social, cultural and psychological barriers e.g. lack of awareness, differing cultural beliefs, social stigma, fear of loss of independence
   d) Language barriers e.g. differing first language, language impairments
   e) Geographical barriers e.g. distance of providers, poor transport links
   f) Intellectual barriers e.g. learning difficulties
   g) Resource barriers for service provider e.g. staff shortages, lack of local funding, high local demand
   h) Financial barriers e.g. charging for services, cost of transport, loss of income whilst accessing services

B2. Reviewing own application of care values

1. **Key aspects of a review**
   a) Identifying own strengths and areas for improvement against the care values
   b) Receiving feedback from teacher or service user about own performance
   c) Responding to feedback and identifying ways to improve own performance

Use connectives to extend your sentences and link each paragraph….

Explain an idea
- Although
- Except
- Unless
- However
- Therefore

Sequencing
- Firstly
- Secondly
- Next
- Finally
- Since

Give examples
- Such as
- In the case of
- For example
- As revealed by
- For instance

Adding to
- And
- Also
- As well as
- Moreover
- Too
- Furthermore

Cause and Effect
- Because
- So
- Therefore
- Consequently
- Thus
- As a result of

To compare
- Likewise
- Equally
- In the same way
- Similarly

Contrasting
- Whereas
- Instead of
- Alternatively
- Otherwise
- In another way
- Then again

To Emphasise
- Above all
- Ultimately
- Especially
- Significantly

Elaborating your ideas. Ask "So what?"
- This suggests
- This shows
- This signifies
- This implies
- This means
- Therefore
- However
- Furthermore

What do you think? language
- In conclusion…
- It is clear that…
- From looking at…
- The evidence suggests…
- Overall…