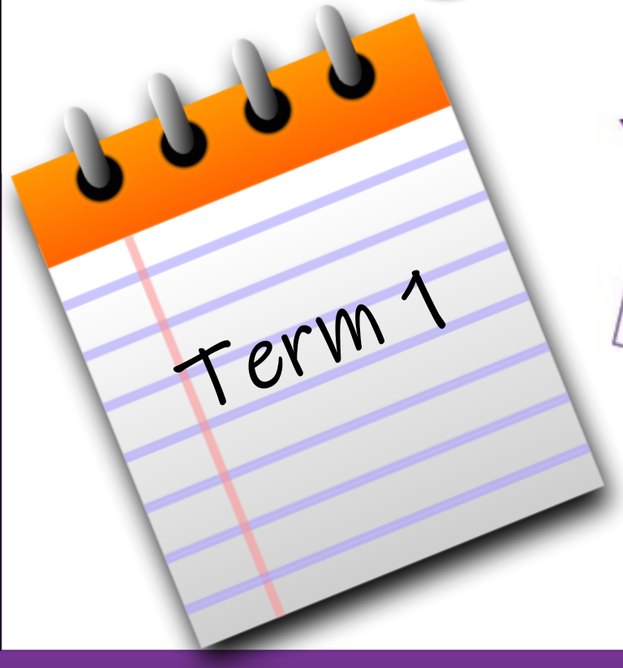
The Knowledge Organisers Pack



Year 11

ATHERTON HIGH SCHOOL

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Macbeth KNOWLEDGE ORGANISER

Context – The play was written by William Shakespeare, and was first performed around 1606

Shakespeare's Time – Shakespeare wrote at the time of two monarchs: Queen Elizabeth I and James I. The plays that he wrote during the period of Queen Elizabeth are generally happy and joyful, reflecting the mood at the time. However, darker plays such Macbeth were written in the era of James I, which was far more unstable. For example, the gunpowder plot was the year before.

James I – 1606 was early in the reign of James I, who was an admirer of Shakespeare's plays, and a patron of his acting company. It is doubtless, therefore, that Shakespeare had the king in mind when writing a play about Macbeth, a figure from Scottish ancestry. Furthermore, King James's family claimed to have descended from a historical figure named Banquo.

The Divine Right of Kings – Divine Right asserts that monarchs were appointed from God above, and that any attempt to question them was to question God himself. This was a widely-held view at the time. King James I often quoted divine right to cement his place on the throne. A play involving a good, 'God-given' king, and the demise of a king-slayer would no doubt have gone down well with King James at the time.

The Role of Women – Despite the strength of Elizabeth I's reign, society at the time was patriarchal – women were considered inferior to men. Women belonged to their fathers (or brothers if their fathers had died) and then their husbands. They were not permitted to own land or enter most professions. They were instead expected to bear children, and be gentle and womanly. Lady Macbeth would therefore be at odds with what was expected of women.

Witches and the Supernatural – At the time of Shakespeare, the belief in witches and the supernatural was extremely strong, and many so-called 'witches' were burnt at the stake. There is no doubt, therefore, that some of the ideas in the play would have been taken very seriously, such as the witches prophecies, Macbeth being seemingly 'possessed' and his vivid hallucinations.

Healthcare and Medicine – Healthcare and medicine were not as advanced in Shakespeare's age as they are today – there were numerous ailments and diseases that were not yet understood. Furthermore, there were a many wars in which scores of men were killed. Therefore, death was a much more frequent thought for people at the time. The high death count in the play would therefore seem slightly more ordinary!

Main Characters – Consider what Shakespeare intended through his characterisation of each of the below...

Macbeth – Macbeth is the lead protagonist of the play. He is introduced as a Scottish general who is thought to be a brave and strong soldier. However, he is easily persuaded to commit the murder of a king that he loves. He becomes a tyrannical and destructive king, who responds to all threats (including his own insecurities) through violence and murder.

First Scene: Act I Scene III **Final Scene:** Act V Scene VIII

Duncan – Duncan is the kind and loved King of Scotland who Macbeth murders in order to fulfil his ambition and the witches prophecy. Duncan is a virtuous King, who is both compassionate and rational – he forms a stark contrast with Macbeth as king. When Duncan dies, order in Scotland is shattered. It is only restored when his son, Malcolm eventually takes the throne.

First Scene: Act I Scene II **Final Scene:** Act II Scene I

The Three Witches – The witches represent trickery, manipulation and the supernatural. They use charms, spells and prophecies to prompt Macbeth into murdering Duncan. There is some ambivalence over how much of their power comes from supernatural abilities, as opposed to knowing the weaknesses of their victim. In any case, they take pleasure in toying with human lives and emotions.

First Scene: Act I Scene I **Final Scene:** Act IV Scene I

Lady Macbeth – Macbeth's wife, an extremely ambitious woman who lusts for power. At the beginning of the play, she seems stronger than Macbeth, urging and aiding him to kill Duncan. Later in the play, however, she becomes racked with guilt and madness, proving unable to come to terms with what they have done. Her conscience affects her to such a degree that she eventually commits suicide.

First Scene: Act I Scene V **Final Scene:** Act V Scene V

Macduff – A Scottish nobleman who is dubious and hostile towards Macbeth's reign from the beginning. His wife and young son are murdered by Macbeth. Macduff leads the battle against Macbeth's tyrannical reign, eventually becoming the man who kills Macbeth (in line with the witch's prophecy as he was not of 'woman born.') In doing so, he helps Malcolm to the throne.

First Scene: Act II Scene III **Final Scene:** Act V Scene VIII

Banquo – Banquo is a brave and noble gentleman who is a friend and fellow soldier to Macbeth. Banquo is also given prophecies by the witches, but unlike Macbeth, he chooses not to act on them. After being murdered, Banquo's ghost returns to haunt Macbeth, causing him a great deal of fright, and reminding him of the path he chose not to take. In accordance with the witches' prophecies, Banquo's descendants later take their place on the throne.

First Scene: Act I Scene III **Final Scene:** Act III Scene IV

Themes – A theme is an idea or message that runs throughout a text.

Unchecked Ambition – The tale of Macbeth ruthlessly exposes the dangers of ambition when it is not held by moral constraints. Ambition turns Macbeth from a brave and loyal Scottish general into a murderous tyrant. Lady Macbeth is another example of this theme, as she is unable to deal with the acts that she and Macbeth have committed to fuel their ambition, and so commits suicide.

Fate vs Free Will – Throughout the play, the audience is frequently forced to question the notion of fate vs free will – does the story pan out the way that it does because it was predetermined, or because of the actions that Macbeth chose to take? Macbeth fervently attempts to fight the negative aspects of his fate, and yet it is these very actions (his free will) that cause the predetermined downfall (fate)

Gender, Masculinity and Femininity – Lady Macbeth manipulates her husband by questioning his masculinity, as he originally declines to murder King Duncan for the throne. She states that she wishes she could be 'unsexed' so as to give her bravery to commit the deed. Masculinity is frequently associated with raw aggression, and femininity with weakness and kindness.

Inversion of the Natural Order – Wherever the natural order is disturbed in Macbeth (the three supernatural witches, the murder of a king) disorder and chaos soon follow. There is only peace when the natural order is restored (Malcolm is seated on the throne). In line with the beliefs of King James, through Macbeth Shakespeare expresses that the inversion of the natural order is dangerous and destructive.

Scene-by-Scene Summary – Take note of the key quotations from each scene.

Act 1 Scene 1	Three witches meet on a heath. They plot to trick Macbeth at a later time.	*Fair is foul and foul is fair;* *Hover through the fog and filthy air.*
Act 1 Scene 2	King Duncan is told of Macbeth's bravery in battle. He tells a messenger to award him Thane of Cawdor.	*No more that thane of Cawdor shall deceive...* *...And with his former title greet Macbeth.*
Act 1 Scene 3	The witches confront Macbeth and Banquo and deliver their prophecies. The messenger arrives to tell Macbeth that he is the Thane of Cawdor.	*All hail, Macbeth! hail to thee, thane of Glamis!* *All hail, Macbeth, hail to thee, thane of Cawdor!* *All hail, Macbeth, thou shalt be king hereafter!*
Act 1 Scene 4	At the Kings' Palace, Duncan names Malcolm (his eldest son) as his successor.	*The Prince of Cumberland! that is a step* *On which I must fall down, or else o'erleap,*
Act 1 Scene 5	At Macbeth's castle, Lady Macbeth receives a letter from Macbeth detailing the witches' prophecies. She plans Duncan's murder, but fears that Macbeth is too kind to fulfil his ambition.	*You spirits / That tend on mortal thoughts, unsex me here, /* *And fill me from the crown to the toe top-full / Of direst cruelty;*
Act 1 Scene 6	Duncan arrives at Macbeth's castle. He professes his love for Macbeth as a dear friend.	*Conduct me to mine host: we love him highly,* *And shall continue our graces towards him.*
Act 1 Scene 7	Macbeth has doubts about the assassination. Lady Macbeth tells him of the plot and he then agrees to it.	*If it were done when 'tis done, then 'twere well* *It were done quickly . . .*
Act 2 Scene 1	Banquo and Fleance arrive. When they depart to bed, Macbeth sees a vision of a dagger leading him towards Duncan's chamber.	*Is this a dagger which I see before me,* *The handle toward my hand? Come, let me clutch thee.*
Act 2 Scene 2	Macbeth emerges from the chamber, visibly shaken. He has forgotten to place the daggers with the chamberlains to absolve the blame. Lady Macbeth must return them.	*Will all great Neptune's ocean wash this blood* *Clean from my hand?* *Sleep no more, / Macbeth does murder sleep*
Act 2 Scene 3	Macduff arrives and finds Duncan dead. Macbeth explains that he killed the chamberlains in rage. Duncan's sons flee.	*O horror, horror, horror! Tongue nor heart* *Cannot conceive nor name thee!*
Act 2 Scene 4	Macduff tells Ross, a thane, that Macbeth has been named King.	*The sovereignty will fall upon Macbeth.*
Act 3 Scene 1	Macbeth, fearing the witches' prophecies about Banquo's descendants sitting on the throne, arranges to have Banquo and Fleance killed.	*It is concluded. Banquo, thy soul's flight,* *If it find heaven, must find it out to-night.*
Act 3 Scenes 2-3	Macbeth tells Lady Macbeth of his plan to kill Banquo. Elsewhere, the murderers kill Banquo, but Fleance escapes.	*O, treachery! Fly, good Fleance, fly, fly, fly!* *Thou might revenge. O slave!*
Act 3 Scene 4	Macbeth holds a banquet. He sees the ghost of Banquo and becomes hysterical. The guests are eventually asked to leave by Lady Macbeth.	*I pray you, speak not; he grows worse and worse;* *Question enrages him. At once, good night.*
Act 3 Scenes 5-6	The witches are scolded by Hecate for their meddling. Elsewhere, Lennox tells of Macduff gathering an army to fight Macbeth.	*May soon return to this our suffering country* *Under a hand accursed!*
Act 4 Scene 1	Macbeth again visits the witches, and through terrible apparitions is given several new prophecies regarding his fate. The witches then vanish.	*beware Macduff;...none of woman born/Shall harm* *Macbeth...Great Birnam wood to high Dunsinane hill* *Shall come against him.*
Act 4 Scenes 2-3	Macduff's wife and children are murdered by Macbeth's assassins. Macduff and Malcom unite in order to fight Macbeth.	*Macbeth's ripe for shaking, and the powers above* *Put on their instruments.*
Act 5 Scene 1	A doctor and gentlewoman watch Lady Macbeth sleepwalk. She tells of the murders of Duncan and Banquo, and imagines stubborn blood on her hands.	*Out, damned spot; out, I say. . . . Yet who would have* *thought the old man to have had so much blood in him?*
Act 5 Scene 2	Lords discuss how the rebel army will gather at Birnham Wood.	*Make we our march towards Birnam.*
Act 5 Scenes 3-4	Inside, Macbeth boasts that none of woman born can harm him. Macduff and co gather at Birnham Wood	*I will not be afraid of death and bane,* *Till Birnam forest come to Dunsinane.*
Act 5 Scene 5	A scream is heard at Macbeth's castle. It is announced that Lady Macbeth is dead (suicide). Macbeth reacts numbly. A messenger reveals that the trees of Birnham Wood are advancing.	*Life is "a tale / Told by an idiot, full of sound and fury, /* *Signifying nothing"*
Act 5 Scenes 6-7	The battle begins. Macbeth fights without fear, as he believes no man born of woman can harm him. The castle is breached.	*But swords I smile at, weapons laugh to scorn,* *Brandish'd by man that's of a woman born.*
Act 5 Scene 8	Macbeth and Macduff finally meet. Macduff reveals that he was born by caesarean section (not "by woman born.") He kills Macbeth. Malcolm is proclaimed King.	*Tell thee, Macduff was from his mother's womb* *Untimely ripp'd.* *Hail, King of Scotland!*

Dramatic Devices in Macbeth

Dramatic Irony	*'t is a peerless kinsman.* Duncan trusts Macbeth. The audience knows that Macbeth is plotting Duncan's murder.
Soliloquy	*This supernatural soliciting cannot be ill, cannot be good.* Macbeth's soliloquy reveals his inner torment.
Aside	*The Prince of Cumberland, that is a step that I must fall down.* Macbeth reveals his ambition through an aside.
Rhyming Couplets	*Away and mock the time, with fairest show/ Fake face must hide what the heart doth know.*

Features of a Tragedy in Macbeth

Tragic Hero – A main character cursed by fate and possessed of a tragic flaw (Macbeth).

Hamartia – The fatal character flaw of the tragic hero (ambition).

Catharsis – The release of the audience's emotions through empathy with the characters.

Internal Conflict – The struggle the hero engages in with his/her fatal flaw.

Key Vocabulary: Ambition, regicide, antithesis, malevolent, patriarchal, femininity, deceitful, masculinity, hubris, hamartia, usurp, heinous, treachery, mercurial

Macbeth and Narrative Writing

WHY?:

Being able to plan, organise and articulate your own narrative is a skill that will not only benefit you for your exams in summer; these skills could help build towards careers in sectors such as journalism, novel/playwriting, film production and editing and many

Key questions to consider…

Am I using the best vocabulary I can use?

Am I varying my use of punctuation?

Am I using a variety of language features?

Is my writing detailed and engaging?

Am I *showing* rather than *telling*?

Character/Narrator Types

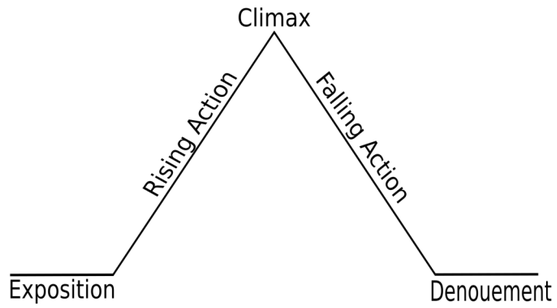
Protagonist/antagonist— Leading character or major character/opposing force. Usually brings conflict to main character.

Foil— a character who contrasts another character.

Omniscient Narrator— knows everything about all the characters.

Unreliable narrator—a narrator who has had their credibility compromised.

Freytag's Pyramid



Styles of Opening

- **The rhetorical start—starting your piece with a single, or series of, rhetorical question(s).**
- **The statement start—starting your piece with a strong topic statement that will grab the readers' attention.**
- **The hypothetical start—putting your reader in a "what would you do?" scenario**
- **The flashback start—starting your piece by going to a place/event in the past.**

Key Vocabulary

heinous, mercurial, foreshadowing, barbarous, caliginous, culpability, reticent, tension, climactic, malice.

Language Devices

- **Extended Metaphor— a metaphor that is introduced and further developed throughout a piece of writing.**
- **Sensory description— describes objects in a manner that can be experienced through the senses.**
- **Foreshadowing— a warning, or indication, of a future event.**
- **IMAGERY—visually descriptive or figurative language.**
- **PERSONIFICATION— attributing a human behaviour to something non-human.**
- **OXYMORON—to have two contradictory terms next to each other.**
- **HYPERBOLE—immense exaggeration.**

The Big Question: *Is my writing compelling? Does it incorporate a range of complex ideas?*

Language Paper 2 Knowledge Organiser					
AO1-AO6	**QUESTION 1**	**QUESTION 2**	**QUESTION 3**	**QUESTION 4**	**QUESTION 5**
AO 1: What (do you understand what the text is saying?) **AO2:** How (do you understand how the text is communicating its message?) **AO3:** Why (why is the text as it is? Why did the writer choose for it to be that way?) **AO5:** Structure and Content **AO6:** SPaG	4 marks, AO1 5minutes Examiner is looking for: • Understanding of the text • Ability to interpret and identify implicit and explicit meanings.	8 marks, AO1 10 minutes 2/3 points Examiner is looking for: • Understanding of the text- including inferred meaning • Use of detailed evidence from the text • Comparison of the content of the texts	12 Marks, AO2 15minutes 3/4 points Examiner is looking for: • Evaluation of the writer's choice of language and its intended impact • Use of relevant evidence from the text • Use of appropriate terminology • Single word analysis (zoom)	16 marks AO3 20minutes 2.5 sides of writing Examiner is looking for • understanding of the author's attitudes • Description of the author's methods (language and structure) • Sophisticated comparison • Use of appropriate terminology	40 Marks 24 Marks Content and Organisation 16 marks SPaG 55 minutes 2.5-3 sides of writing (about 6 paragraphs) Examiner is looking for Ao5 • Accurate spelling punctuation and grammar • Use of a range of punctuation • Use of a range of sentence structures • Paragraphs joined with connectives indicating a flow of argument • Ambitious vocabulary • Use of literary device
Vocabulary Bank: Imagery Semantic field Contemptuous Inference Synthesise Perspective Tone Accusatory Diplomatic Impartial Objective Subjective Pessimistic	**Contrasting Connectives: (Q2 & 4):** **Similarities** Equally likewise similarly as with like in the same way **To contrast** whereas instead of alternatively otherwise unlike but on the other hand by contrast	**Language Devices: (Q3):** **Simile** – Comparison of one thing with another thing using the words 'like' or 'as'. **Metaphor** – A figure of speech in which a word or phrase is applied to an object or action to which it is not literally applicable. **Personification** – The attribution of a personal nature or human characteristics to something non-human, or the representation of an abstract quality in human form. **Anaphora** – The repetition of a word or phrase at the beginning of successive clauses. **Epiphora** - The repetition of a word or phrase at the end of successive clauses. **Hyperbole** – Exaggerated statements or claims not meant to be taken literally.		**Non-fiction Devices: (Q4 & 5):** **Anecdote** – a short, amusing or interesting story about a real person/ incident **Cyclical structure** – the events at the end are similar to those at the start. **Emotive description** – description that appeals to, or expresses, emotion. **Exaggeration/hyperbole** – exaggerated statements not meant to be taken literally. **Listing** – giving more than one example. **Triplets** – describing something using three descriptive terms. **Direct address** – Talking to the reader directly. **Repetition** – repeating something that has already been said for emphasis. **Statistics** – a fact or piece of data involving numbers.

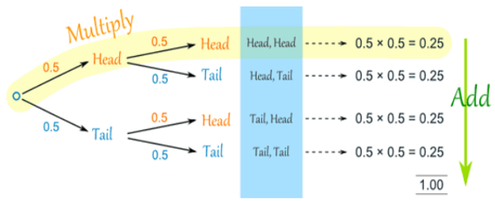
Maths - Foundation

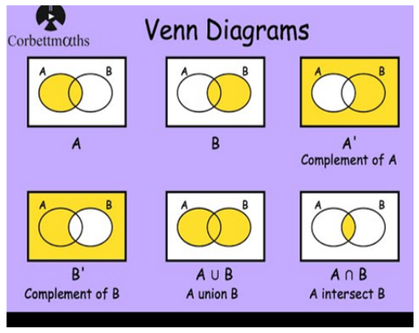
Probability

Key vocabulary

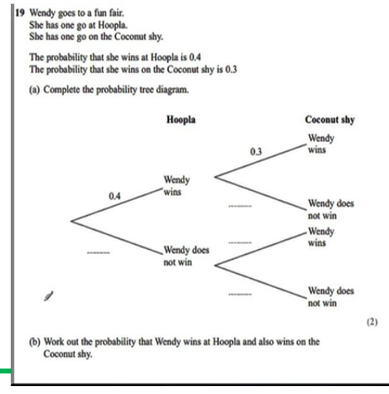
Probability
Random
Likely
Impossible
Certain
Relative frequency
Probability scale
Unbiased
Theoretical probability
Sample space
Two way table
Tree diagram
Venn diagram
Dependant
Independent
Conditional probability

Picture perfect





Assessment style question



19 Wendy goes to a fun fair.
She has one go at Hoopla.
She has one go on the Coconut shy.

The probability that she wins at Hoopla is 0.4
The probability that she wins on the Coconut shy is 0.3

(a) Complete the probability tree diagram.

Hoopla
Coconut shy
0.4
Wendy wins
Wendy does not win
0.3
Wendy wins
Wendy does not win
Wendy wins
Wendy does not win
(2)

(b) Work out the probability that Wendy wins at Hoopla and also wins on the Coconut shy.

Always remember

Types of events

Mutually exclusive

Events that cannot happen at the same time

Rolling a die → $P(1 \text{ and } 6)$

All probabilities from the event will **sum** to make **1**

Independent events

Events where the outcome of one **doesn't** affect the outcomes of the others

Picking a counter out of a bag, replacing it and repeating.

Dependent events

Events where the outcome of one **does** affect the outcomes of the others

Picking a counter out of a bag, **not** replacing it and repeating.

Calculating expected outcomes

$$P(event) \times number\ of\ trials$$

Maths - Foundation

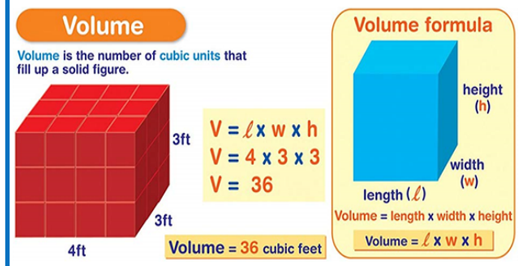
Volume

Key vocabulary

Volume
Cross section
Length
Width
Height
Pi (π)
Circumference
Diameter
Radius
Units^3

Picture perfect

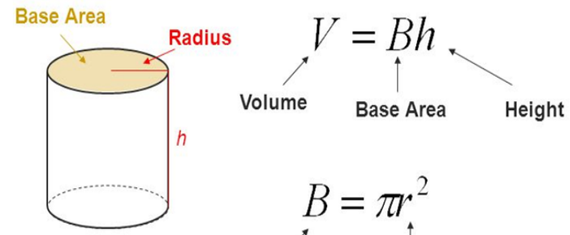
Volume is the space inside a 3D shape.



Always remember

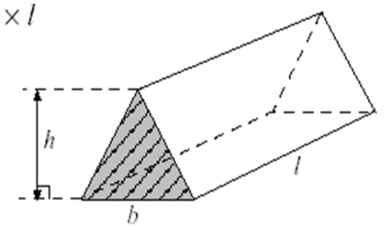
Volume units include mm^3, cm^3, m^3 etc.

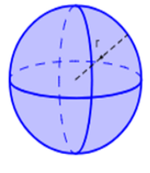
Volume of a Cylinder



Volume of triangular prism = area of cross-section × length

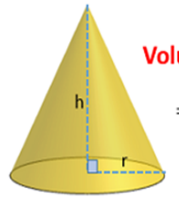
$$= \frac{1}{2} \times b \times h \times l$$





Volume of Sphere

$$= \frac{4}{3}\pi r^3$$



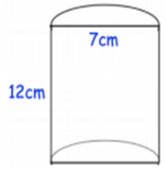
Volume of Cone

$$= \frac{1}{3}\pi r^2 h$$

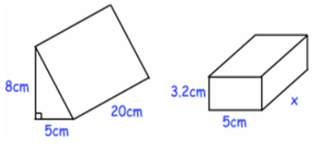
Assessment style question

The cube on the TV show "The Cube" is a cube with each side measuring 4m.
Work out the volume of the cube.

Calculate the volume of this shape.



The cuboid and the triangular prism have the same volume.
Find x.



A solid sphere fits perfectly inside of a cube box of side length 10cm.
What percentage of the box is empty?

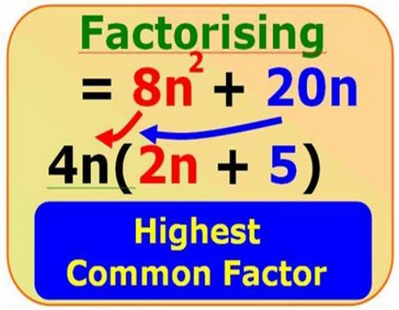
Maths - Foundation

Quadratic equations

Key vocabulary

Quadratic equations
Binomial
Expand
Simplify
Factorise
Difference of two squares
Rearrange formulae

Picture perfect



Assessment style question

Make **p** the subject of the following equation:

$$m = 2p - 5$$

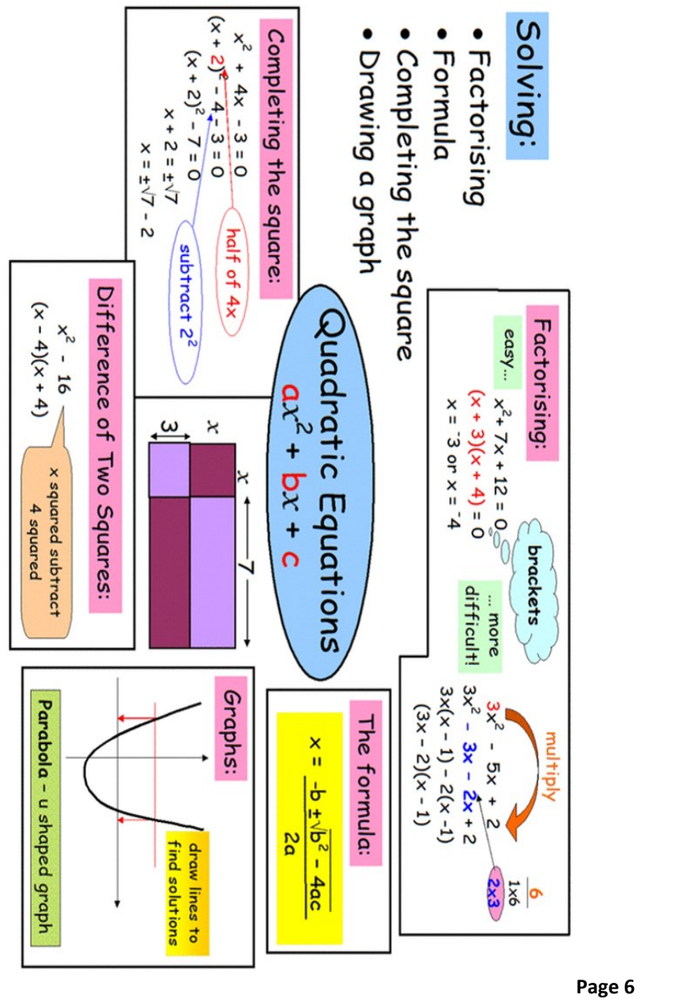
A) $p = \frac{m}{2} + 5$ C) $p = \frac{m+5}{2}$

B) $p = 2m - 5$ D) $p = \frac{m-5}{2}$

3. (i) Factorise $x^2 - 13x + 36$

(ii) Hence, or otherwise, solve the equation $x^2 - 13x + 36 = 0$

Always remember



Maths - Foundation

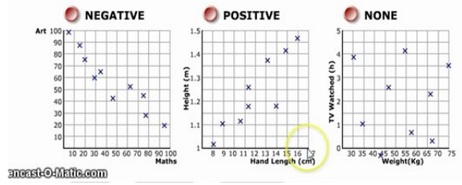
Scatter graphs

Key vocabulary

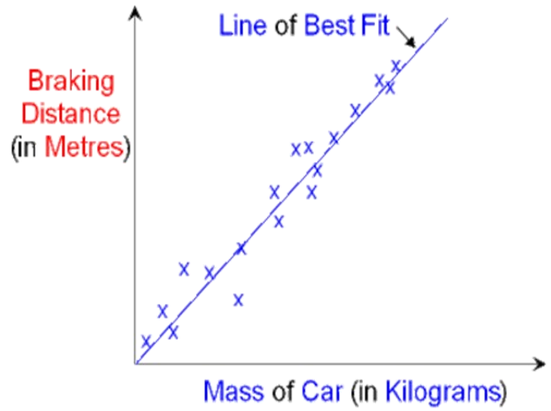
- Scatter graph
- Plot
- Positive correlation
- Negative correlation
- No correlation
- Line of best fit
- Interpolate
- Extrapolate

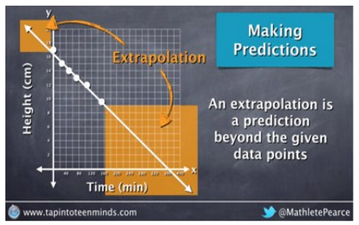
Picture perfect

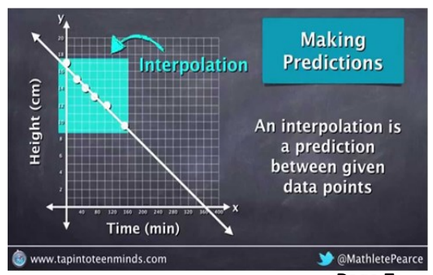
Summary
A Scatter Graph helps us to determine whether there is a link between two sets of data.
If a graph has a 'direction' we can fit a Line of Best Fit to it.
If there is a link we call it a Correlation.
These three graphs show example of;



Always remember







Assessment style question

5. Make a scatter plot with a proper title (at the bottom) with the data and answer the question using hypothesis test.

The yearly data have been published showing the number of releases for each of the commercial movie studios and the gross receipts for those studios thus far. Based on these data, can it be concluded that there is relationship between the number of releases and the gross receipts?

No. of release x	311	290	206	32	33	15	9	11	18
Gross receipts y (millions $)	3744	2062	1571	1664	214	301	258	134	155

Plot the following scatter graph and estimate a line of best fit.

Height, cm	157	160	148	160	177	156	166	170
Weight, kg	53	60	44	53	54	60	54	70

Maths - Foundation

Inequalities

Key vocabulary

Less than
Less than or equal to
Greater than
Greater than or equal to
Represent on number line
Solve

Picture perfect

Inequality Symbols

$<$ – Less Than

$>$ – Greater Than

$\leq$ – Less Than or Equal to

$\geq$ – Greater Than or Equal to

Assessment style question

Solve the inequality

$4x + 3 > 2(3x - 1)$

Answer _____ [3]

Choose the correct inequality that best describes each graph.

1)

a) $x \leq 1 + \frac{6x}{5}$ b) $1 + \frac{6x}{5} > x$

c) $1 + \frac{6x}{5} < x$ d) $x \geq 1 + \frac{6x}{5}$

2)

a) $15 < 3(4x - 7)$ b) $3(4x - 7) \leq 15$

c) $3(4x - 7) \geq 15$ d) $15 > 3(4x - 7)$

Always remember

$x > 1$

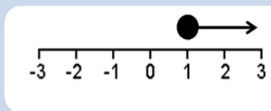
x is any number greater than 1

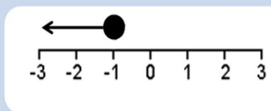
Examples: 2, 3, 4, 5...

$x < -1$

x is any number less than -1

Examples: -2, -3, -4, -5...





$x \geq 1$

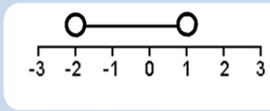
x is any number greater than or equal to 1

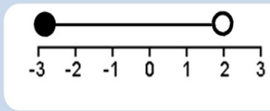
Examples: 1, 2, 3, 4, 5...

$x \leq -1$

x is any number less than or equal to -1

Examples: -1, -2, -3, -4, -5...





$-2 < x < 1$

x is any number greater than -2 and less than 1

Examples: -1 and 0 only

$-3 < x \leq 2$

x is any number greater than or equal to -3 and less than 2

Examples: -3, -2, -1, 0 and 1 only

Maths - Foundation

Pythagoras' theorem

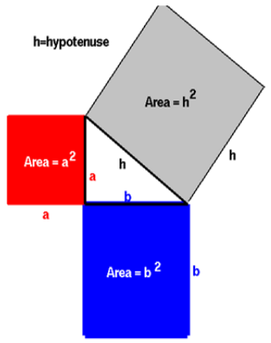
Key vocabulary

- Hypotenuse
- Right angled triangle
- Rearrange
- Solve
- Missing side
- Square
- Square root

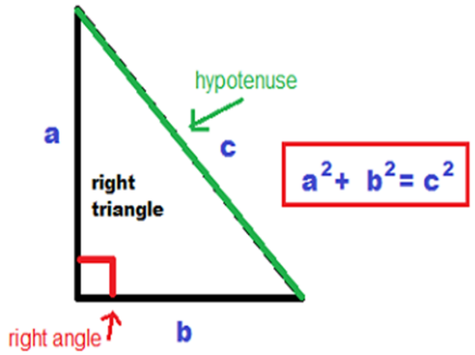
Picture perfect

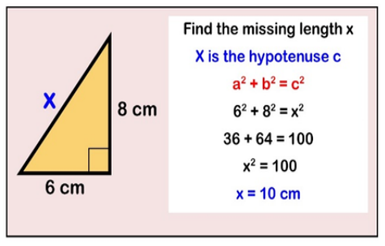
For any right triangle with sides a and b and hypotenuse h, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

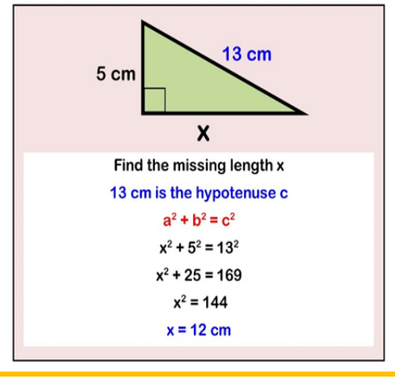
$h^2 = a^2 + b^2$



Always remember

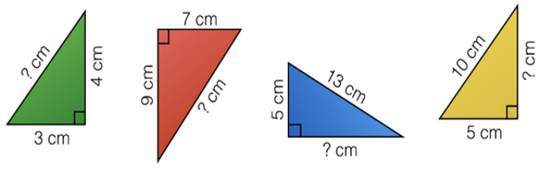






Assessment style question

Find the length of the missing side of each triangle.
Give your answers to 2 d.p. where appropriate.



Maths - Foundation

Simultaneous equations

Key vocabulary

Solve
Substitute
Eliminate
Variable
Linear
Quadratic
Simultaneous

Picture perfect

What are simultaneous equations?

$x + y = 5$

$2x + 3y = 12$

- If x=3 and y=2 **both** equations are true
- If you are asked to ***solve simultaneous equations***, you are being asked to ***find the values for x and y that fit both the equations***.

Always remember

This is when you have two equations with two unknowns which you can solve either algebraically or graphically.

Example 1
Solve the simultaneous equations:

$3x + y = 7$ (1)
$5x + y = 5$ (2)

Label the equations 1 and 2.
The coefficient of the y values is the same so we want to eliminate the y values. We must subtract one equation from the other as both y values have the same sign.
(2) – (1)

$$\begin{array}{rl} 5x + y = 5 & \_ \\ 3x + y = 7 & \\ \hline 2x \quad = -2 & \end{array}$$

Therefore, $x = -1$.
Substitute this into equation (1)

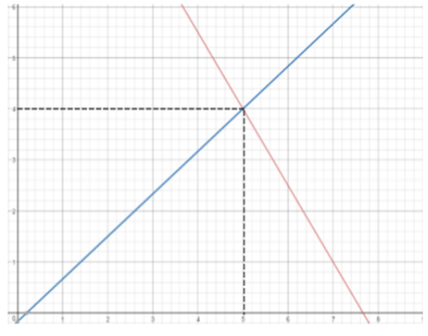
$3 \times -1 + y = 7$
$-3 + y = 7$
$y = 10$

Check your answers by substituting both values into the other equation.

$5 \times -1 + 10 = 5$

Solve the simultaneous equations:

$3x + 2y = 23$
$5x - 6y = 1$



The solution to these simultaneous equations is given by the point where the lines meet.
The x-coordinate gives the solution of x and the y-coordinate gives the solution of y.
In this example, the solution is $x = 5$ and $y = 4$.

Assessment style question

1. Solve the simultaneous equations

$5x + 3y = 41$
$2x + 3y = 20$

Do not use trial and improvement

Solve the simultaneous equations

$2x + 4y = 26$
$3x - y = 4$

Do not use trial and improvement

Maths - Higher

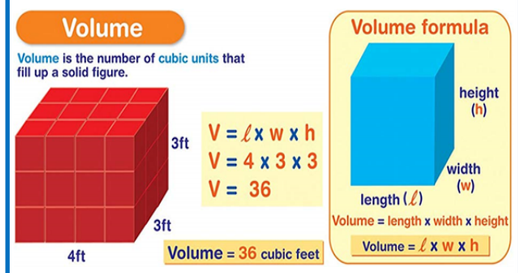
Volume

Key vocabulary

Volume
Cross section
Length
Width
Height
Pi (π)
Circumference
Diameter
Radius
Units^3

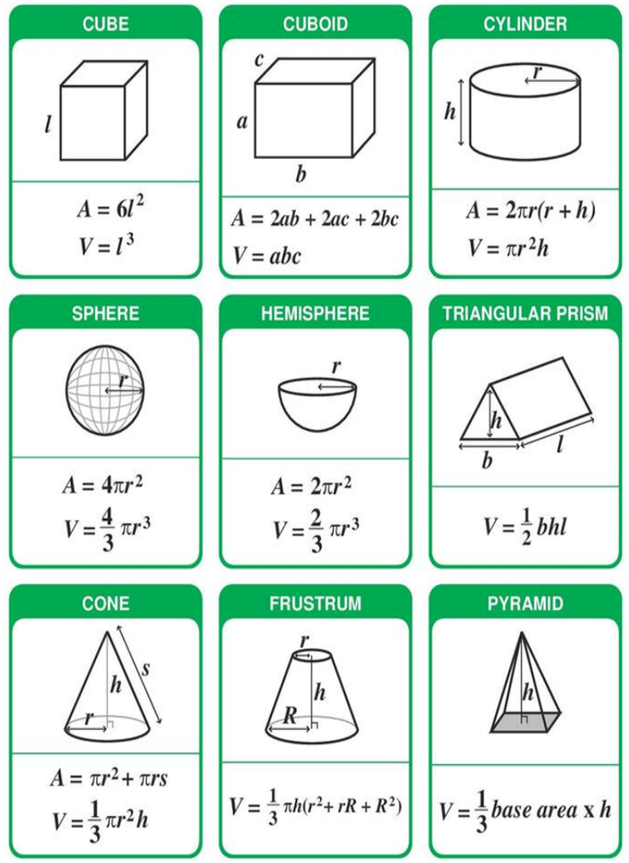
Picture perfect

Volume is the space inside a 3D shape.



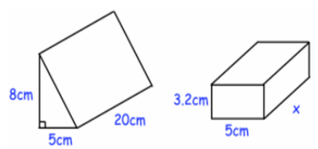
Always remember

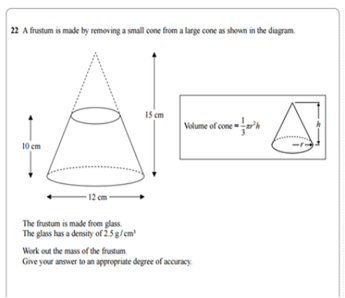
Volume units include mm^3, cm^3, m^3 etc.



Assessment style question

The cuboid and the triangular prism have the same volume.
Find x.





A solid sphere fits perfectly inside of a cube box of side length 10cm.
What percentage of the box is empty?

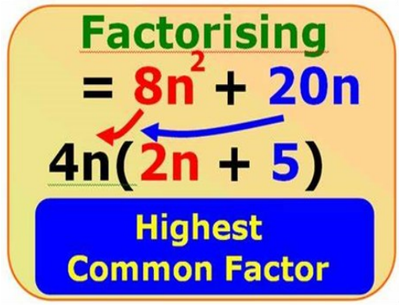
Maths - Higher

Quadratic equations

Key vocabulary

Quadratic equations
Binomial
Expand
Simplify
Factorise
Difference of two squares
Rearrange formulae

Picture perfect



Assessment style question

Make **p** the subject of the following equation:

$$m = 2p - 5$$

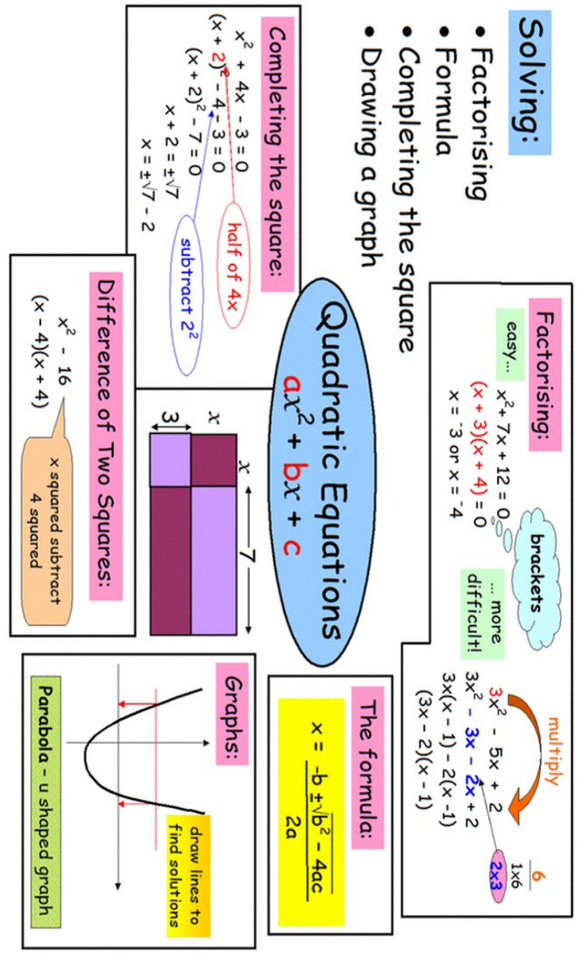
A) $p = \frac{m}{2} + 5$ C) $p = \frac{m+5}{2}$

B) $p = 2m - 5$ D) $p = \frac{m-5}{2}$

3. (i) Factorise $x^2 - 13x + 36$

(ii) Hence, or otherwise, solve the equation $x^2 - 13x + 36 = 0$

Always remember



Maths - Higher

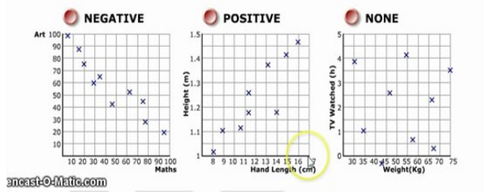
Scatter graphs

Key vocabulary

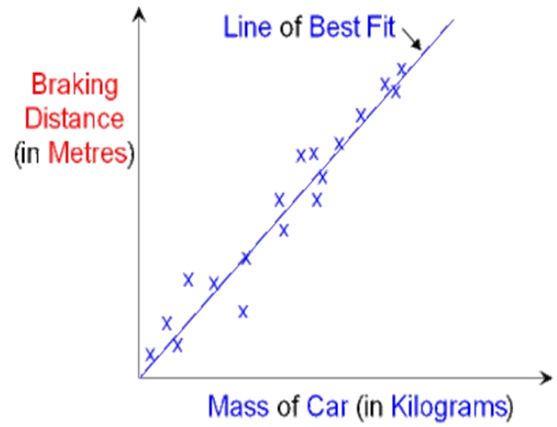
- Scatter graph
- Plot
- Positive correlation
- Negative correlation
- No correlation
- Line of best fit
- Interpolate
- Extrapolate

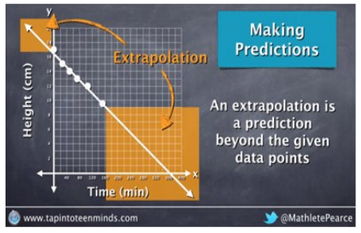
Picture perfect

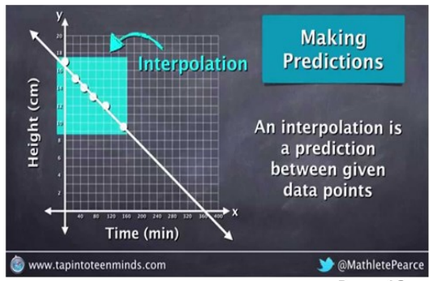
Summary
A Scatter Graph helps us to determine whether there is a link between two sets of data.
If a graph has a 'direction' we can fit a Line of Best Fit to it.
If there is a link we call it a Correlation.
These three graphs show example of;



Always remember







Assessment style question

5. Make a scatter plot with a proper title (at the bottom) with the data and answer the question using hypothesis test.

The yearly data have been published showing the number of releases for each of the commercial movie studios and the gross receipts for those studios thus far. Based on these data, can it be concluded that there is relationship between the number of releases and the gross receipts?

No. of release x	311	290	206	32	33	15	9	11	18
Gross receipts y (millions $)	3744	2062	1571	1664	214	301	258	134	155

Plot the following scatter graph and estimate a line of best fit.

Height, cm	157	160	148	160	177	156	166	170
Weight, kg	53	60	44	53	54	60	54	70

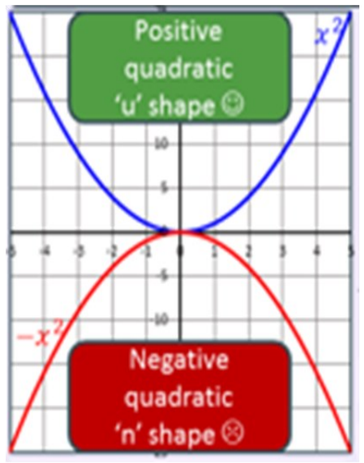
Maths - Higher

Quadratic Equations

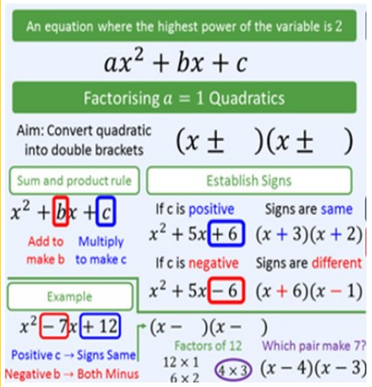
Key vocabulary

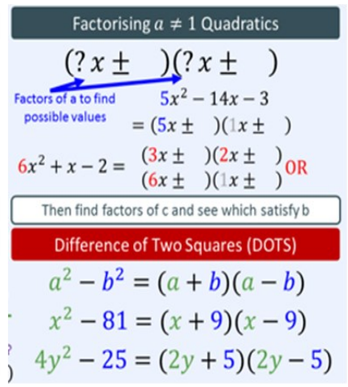
- Equation
- Quadratic
- Factorise
- Formula
- Substitute
- Coefficient
- Complete the square

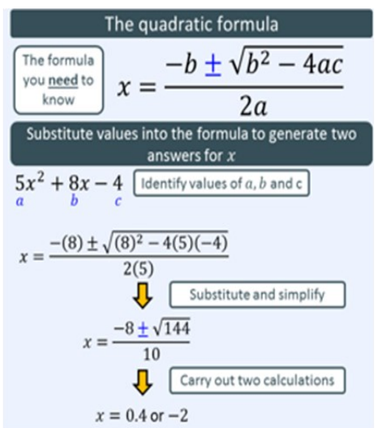
Picture perfect



Always remember







Assessment style question

1. Find the roots of the quadratic equations by using the quadratic formula in each of the following:

   (i) $2x^2 - 3x - 5 = 0$ (ii) $5x^2 + 13x + 8 = 0$

   (iii) $-3x^2 + 5x + 12 = 0$ (iv) $-x^2 + 7x - 10 = 0$

   (v) $x^2 + 2\sqrt{2}x - 6 = 0$ (vi) $x^2 - 3\sqrt{5}x + 10 = 0$

   (vii) $\frac{1}{2}x^2 - \sqrt{11}x + 1 = 0$

2. Find the roots of the following quadratic equations by the factorisation method:

   (i) $2x^2 + \frac{5}{3}x - 2 = 0$ (ii) $\frac{2}{5}x^2 - x - \frac{3}{5} = 0$

   (iii) $3\sqrt{2}x^2 - 5x - \sqrt{2} = 0$ (iv) $3x^2 + 5\sqrt{5}x - 10 = 0$

   (v) $21x^2 - 2x + \frac{1}{21} = 0$

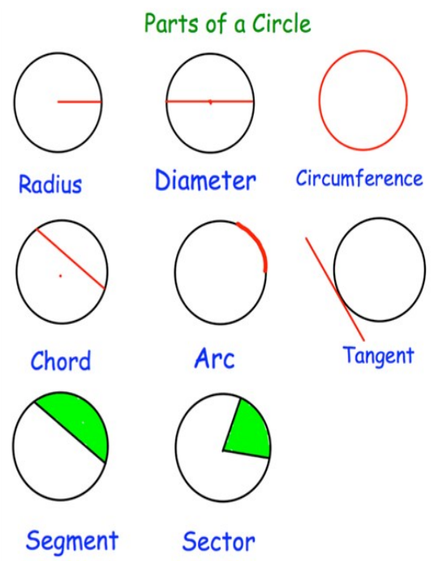
Maths - Higher

Equation of a circle

Key vocabulary

- Equation
- Circle
- Radius
- Origin
- Gradient
- Intercept
- Reciprocal
- Tangent

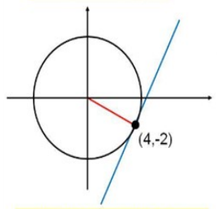
Picture perfect



Assessment style question

How many mistakes can you find?

The graph shows a circle, centre (0,0)



gradient of radius $= \frac{4}{-2} = -2$

so gradient of tangent $= \frac{1}{2}$

substitute (4,-2) into $y = \frac{1}{2}x + c$

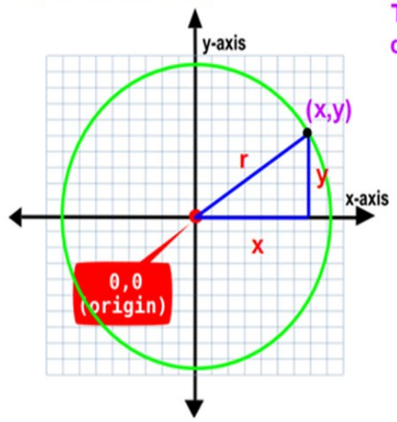
$\Rightarrow 4 = -1 + c$

$\Rightarrow c = 5$

$$y = \frac{1}{2}x + 5$$

Find the equation of a tangent to the circle at (4,-2)

Always remember

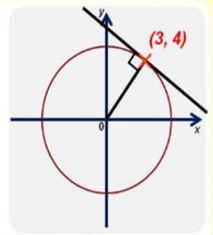


The equation of a circle centered at the origin

$$x^2 + y^2 = r^2$$

Gradient of Tangent at a Point

Example 1: The circle with equation $x^2 + y^2 = 25$ passes through the point (3, 4). Find the equation of the tangent to the circle at that point.



As this circle has an equation of the form $x^2 + y^2 = r^2$, it has centre (0, 0)

The gradient of the radius connecting (0, 0) and (3, 4) is $\frac{4}{3}$

So the gradient, m, of the tangent at (3, 4) is $\frac{-3}{4}$

The equation of the tangent has the form $y - y_1 = m(x - x_1)$

At the point (3, 4), $x_1 = 3$ and $y_1 = 4$

So substituting these values gives $y - 4 = \frac{-3}{4}(x - 3)$

Expand brackets $y - 4 = \frac{-3}{4}x + \frac{9}{4}$

Add 4 to both sides to give the equation of the tangent in terms of y $y = \frac{-3}{4}x + \frac{25}{4}$

Key Stage 4 Maths Topics - Algebra

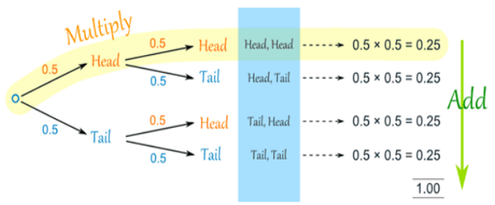
Maths - Higher

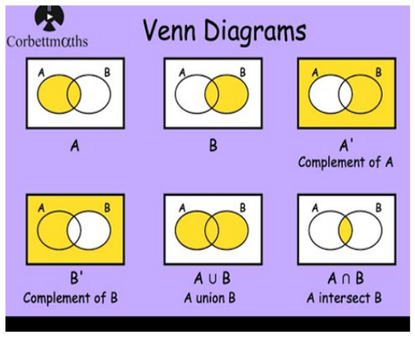
Probability

Key vocabulary

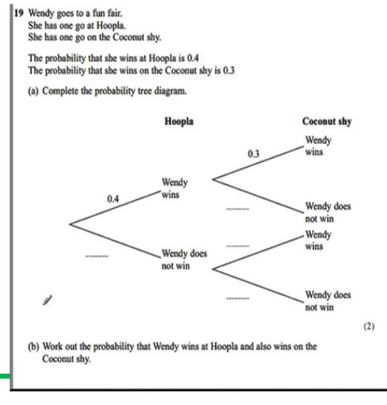
Probability
Random
Likely
Impossible
Certain
Relative frequency
Probability scale
Unbiased
Theoretical probability
Sample space
Two way table
Tree diagram
Venn diagram
Dependant
Independent
Conditional probability

Picture perfect





Assessment style question



19 Wendy goes to a fun fair.
She has one go at Hoopla.
She has one go on the Coconut shy.

The probability that she wins at Hoopla is 0.4
The probability that she wins on the Coconut shy is 0.3

(a) Complete the probability tree diagram.

Hoopla
Coconut shy
0.4
0.3
Wendy wins
Wendy does not win
Wendy wins
Wendy does not win
Wendy wins
Wendy does not win
(2)

(b) Work out the probability that Wendy wins at Hoopla and also wins on the Coconut shy.

Always remember

$$P(\text{Event}) = \frac{\text{number of successful outcomes}}{\text{total number of outcomes}}$$

$$P(3) = \frac{2}{8} \Rightarrow \frac{1}{4}$$

Simplify answers where possible

The 'OR' rule (mutually exclusive)

$$P(a \text{ or } b) = P(a) + P(b)$$

$$P(2 \text{ or } 4) = \frac{2}{8} + \frac{1}{8} \Rightarrow \frac{3}{8}$$

Add each probability

The 'AND' rule (independent)

$$P(a \text{ and } b) = P(a) \times P(b)$$

Flip a coin twice

$$P(2 \text{ tails}) = \frac{1}{2} \times \frac{1}{2} \Rightarrow \frac{1}{4}$$

Multiply each probability

Science: GCSE Organic Chemistry

1. Key Words

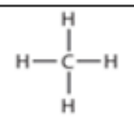
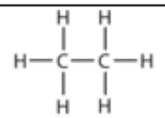
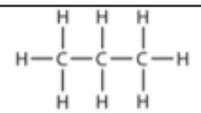
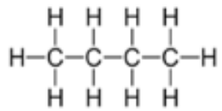
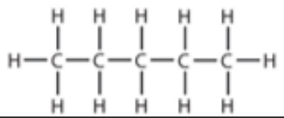
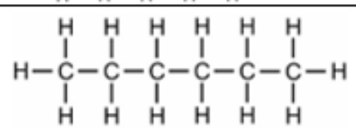
Hydrocarbon	Compound made up of only carbon and hydrogen atoms
Alkane	Saturated hydrocarbon containing only single bonds between the atoms
Alkene	Unsaturated hydrocarbon containing at least one double bond
Cracking	A process that uses high temperatures and a catalyst to break down long chain alkanes into smaller alkanes and alkenes making more useful products
Fractional Distillation	A process of separating the different chain lengths of hydrocarbons found in crude oil
Crude oil	Fossil fuel made from the remains of dead plants and sea creatures millions of years ago and contains a millions of years ago, containing a mixture of different hydrocarbons

2. Properties of Hydrocarbons

Viscosity	This refers to the thickness of the liquid hydrocarbon. As the length of the hydrocarbon chain increases, the viscosity increases and the liquid compound becomes thicker
Boiling point	This refers to the temperature at which the liquid hydrocarbon changes into a gas. The longer the hydrocarbon chain, the higher the boiling point
Flammable	This refers to how easily the hydrocarbon sets on fire. The smaller the hydrocarbon chain the more flammable it is

Challenge Questions	
1	How is crude oil formed?
2	Why would hexane be an unsuitable fuel for cars?
3	How could you investigate the effects of temperature on the viscosity of a hydrocarbon?
4	Research some uses of simple alkenes (ethane to hexane)

3. Alkanes

General Formula	C_nH_{2n+2}	
Alkane name	Alkane formula	Alkane structure
Methane	CH_4	
Ethane	C_2H_6	
Propane	C_3H_8	
Butane	C_4H_{10}	
Pentane	C_5H_{12}	
Hexane	C_6H_{14}	

Science: GCSE Chemical Analysis

1. Key Words

Pure substance	A substance that contains a single element or compound, not mixed with any other substance
Formulation	A mixture that has been designed for a specific purpose
Melting point	The temperature at which a substance changes from a solid to a liquid
Boiling point	The temperature at which a substance changes from a liquid to a gas

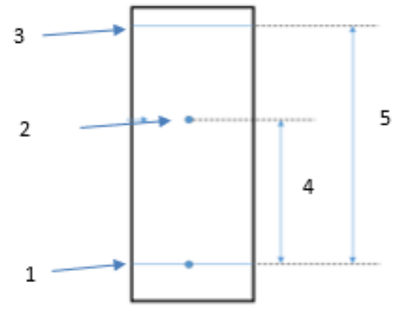
2. Chromatography

This is a separation technique used to separate mixtures in dyes inks, paint and DNA

The R_f value is a measure of how far up the chromatography paper the solute moves compared to the solvent.

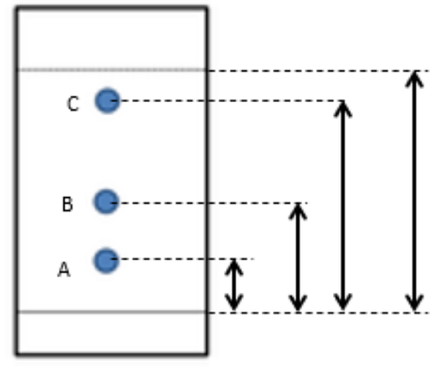
R_f equations $= \frac{\text{Distance moved by the solute}}{\text{Distance moved by the solvent}}$

1	Baseline	Pencil line that the solute is placed on
2	Solute	The final position of the solute
3	Solvent front	The final position of the solvent
4	Distance moved by the solute	
5	Distance moved by the solvent	



3. Testing for Gases

Gas	Test	Positive Result
Hydrogen	Place a lit splint into the gas	Squeaky pop noise
Oxygen	Place a glowing splint into the gas	Splint will relight
Carbon dioxide	Bubble the gas through limewater	Limewater will change from colourless to cloudy
Chlorine	Place damp blue litmus paper into the gas	Litmus paper will change colour to pink and then bleach to white



Challenge Questions

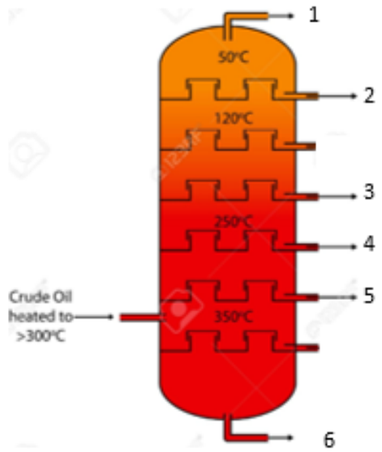
1	Name 3 formulations
2	Calculate the R_f of solute B
3	Why might you need to test for the presence of a gas
4	Use the diagram above to explain the relationship between R_f value and the distance travelled by the solute

Science: GCSE Organic Chemistry

4. Fractional Distillation

1. In a furnace, crude oil is heated until it boils.
2. The vapour then passes into the fractionating column which cools as it moves up the column.
3. Those hydrocarbons with the highest boiling points condense first and are extracted.
4. This continues up the column

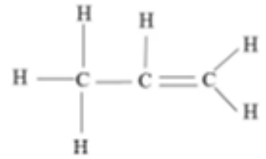
	Fraction and chain length	Use
1	Fuel gas (C 1 – 4)	In camper stoves and gas bottles
2	Petrol (C 5 – 10)	Used as fuel in cars
3	Kerosene (C 10 – 16)	Used a fuel for aeroplanes
4	Diesel (C 14 – 20)	Used as fuel for cars and lorries
5	Lubricating oil (C 20 – 50)	Used in making oils, waxes and polishes
6	Bitumen (C 70+)	Used to tar roads and felt roofs



5. Alkenes and Cracking

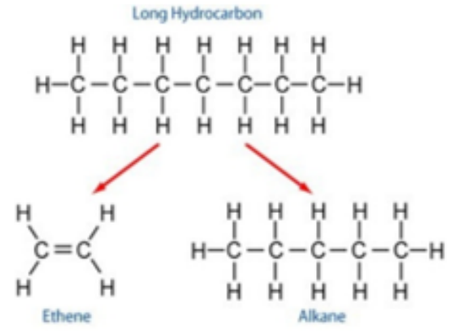
Formula of alkenes	C_nH_{2n}

Alkanes contain a double bond between one of the carbon –carbon bonds
e.g. propene



Cracking: Most hydrocarbons produce products with limited or no use. Cracking allows the large chain hydrocarbons to be broken down into useful products.

Conditions needed for cracking	Temperatures between 450 - 700˚C A catalyst called zeolite which contains aluminium oxide and silicon oxide



Testing for the presence of alkenes	Adding bromine water to the sample. If the sample turns colourless, then the sample is an alkene.

Science: GCSE Using Resources

1. Key Words

Finite resource	A resource that will eventually run out
Renewable resources	Resources that reform at a similar, or faster, rate that we use them
Life Cycle Assessment (LCA)	An assessment of the environmental impact of a product over each stage of its life
Sustainable development	Meeting the needs of the present society whilst not damaging the lives of future generations

2. Life Cycle Assessments

These are often used to determine the most environmentally viable option in production of a product.

LCA Stage	Plastic bag	Paper bag
Raw Materials	Crude oil	Timber
Manufacturing and packaging	Key components extracted by fractional distillation. Waste has other uses	Takes lots of energy to pulp timber and creates lots of waste
Using the product	Reusable	Single-use
Product disposal	Recyclable, not biodegradable	Biodegradable and recyclable

3. Extracting Copper

Copper is a finite resource that is becoming scarce
Sustainability can be improved by extracting copper from low grade ores

Phytomining	Plants are grown in copper rich soils The plants absorb the copper and levels build up in the leaves Crops are harvested and burned to leave ash containing copper compounds Copper is extracted using a displacement reaction with scrap iron.
Bioleaching	Bacteria are used to convert the copper compounds in the ore into soluble copper compounds The copper is then extracted using electrolysis

4. Recycling

Recycling helps to save on the large amounts of energy required to extract and process natural resources.

Material	Process	Extra Info
Recycling metals	Waste metals are melted down and recast into new products	Amount of separation required for the recyclable metal depends on the metal and the final product
Recycling glass	Waste glass is separated in to colours, crushed and melted This is then reshaped in to new products	Glass bottles can also be washed and sterilised and used again instead of recycling them

Science: GCSE Using Resources

5. Treating Water

Key Word	Definition
Potable water	Water that is safe to drink
Pure water	Water that contains only water molecules
Ground water	Water from underground rocks and rain

Treating ground water to produce potable water:

1	Passed through a mesh that removes larger debris such as twigs and stones
2	Passed through a filter to remove any smaller solid bits
3	Water is sterilised to kill off any harmful microbes using chlorine, ozone or UV light

There are two methods of treating salt water to produce potable water:

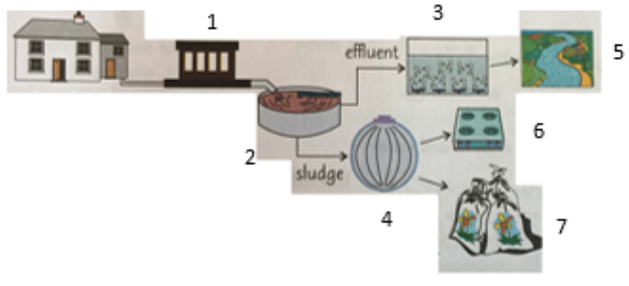
Distillation	Reverse osmosis
Water is boiled and the condensed to remove the salt	The water is passed through a membrane that only allows water molecules through

Life cycle stage of a pillow case	Lifetime energy use (%)
Raw materials	10
Manufacture	15
Use	70
Disposal	5

Challenge Questions	
1	What do humans use natural resources for?
2	How can sustainability be improved?
3	Why might extracting metals form low grade ores desirable?
4	Evaluate the use of energy in the lifecycle of a pillow case and suggest how the energy use could be reduced

6. Waste Water Treatment

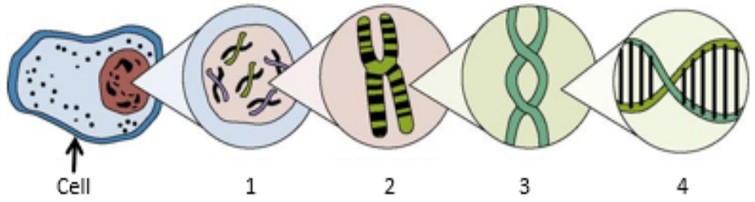
1	Screening	Large waste products are removed such as paper
2	Sedimentation	Tiny particles settle to the bottom of a still tank that then splits in to two sections effluent and sludge
3	Aerobic digestion of organic matter	The effluent is treated with aerobic bacterial to reduce the volume of solid waste
4	Anaerobic digestion of organic matter	The sludge is digested anaerobically by specific bacteria
5	Released back into the environment	The treated effluent is returned to rivers and water ways
6	Natural gas	Methane gas is produced from the anaerobic digestion of sludge and can be used as a fuel
7	Fertiliser	The remaining sludge is rich in minerals and can be used as a natural fertiliser



Science: GCSE Variation, Inheritance and Evolution

1. DNA

1	Nucleus	Organelle that contains the genetic material
2	Chromosomes	Long molecule of DNA that comes in pairs
3	DNA	Sequence that codes for the
4	Gene	Single section of DNA that is responsible to specific characteristics



2. The Human Genome Project

Genome	The entire sequence of the genetic material in an organism
Human Genome Project	25 year research project that mapped the entire human genome to identify specific locations of the genes each chromosome.

Application	**Advantage**
Genes linked to genetic diseases can be identified	Gives a better understanding of how genetic diseases are inherited, so effective treatments can be developed
Tiny differences in peoples genomes can be studied	Helps to trace migration patterns of past human populations

3. Cell Division in humans

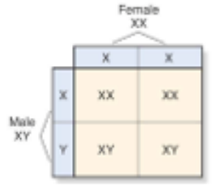
Mitosis	**Meiosis**
Used for growth and repair	Used in the production of gametes
Once cell division per cycle	Two cell divisions per cycle
Daughter cells contain 46 chromosomes	Daughter cells contain 23 chromosomes

4. Key Words

Gamete	Sex cell
Allele	Single gene from a gene pair
Genotype	Coding used for a characteristic
Phenotype	Description of the chearacteristic
Dominant	An allele that is always expressed
Recessive	An allele only expressed when there are 2 recessive genes present
Homozygous	Alleles code for the same characteristic
Heterozygous	Genes code for different characteristics
Sexual reproduction	Fusing of nuclei from gamets, produces variation
Asexual reproduction	One parent, produces genetically identical offspring
Mutation	A random change in the sequence of DNA
Variation	Changes in a population caused by a mutation (differences in phyisical, chemical and behavioural characteristics between organisms or individuals)
Genetic variation	Variation that is caused by the inheritance of alleles of genes
Environmental variation	Variatio that is caused by the effects of environmental factors

Science: GCSE Variation, Inheritance and Evolution

5. Determining Gender

Female Genotype	XX
Male Genotype	XY
Each time an egg is fertilised there is a 50% chance it will be a girl.	

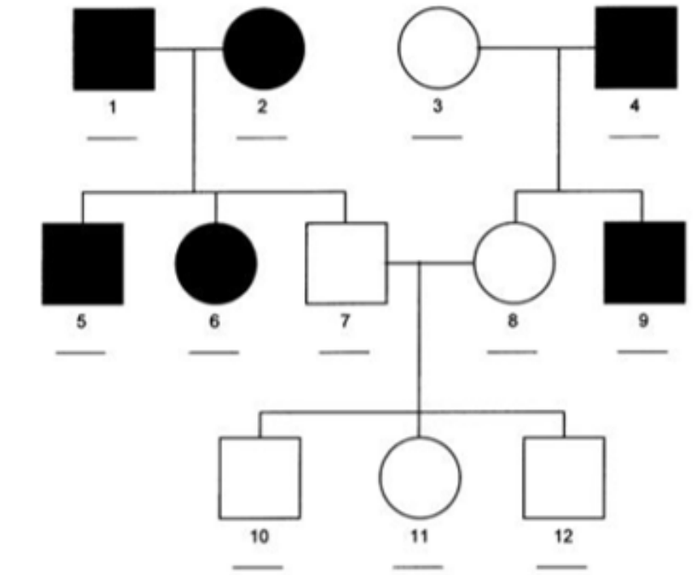
6. Inherited diseases

Cystic Fibrosis	Caused by a recessive gene Affects the cell membrane formation, causing mucus to build up in the lungs and digestive tract
Polydactyly	Caused by a dominant gene Causes an extra digit to grow on the hand or feet

7. Embryo Screening

This is where one cell from an embryo is taken and the DNA is checked for the presence of specific genes

For	Against
It will help prevent people suffering	Screening is expensive
Treating disorders costs the government a lot of money	People might want to screen embryos so they can pick the most 'desirable' trait
There are laws to stop the procedure being misused	Ethical issues as embryos found with genetic disorders are often destroyed (killing potential life)



Key

- Female without disorder
- Male without disorder
- Female with disorder
- Male with disorder

Challenge Questions	
1	What is the function of DNA?
2	Compare sexual and asexual reproduction
3	How does the diagram above show that this is a recessive disorder?
4	Evaluate the statement – *'if parents 3 and 4 have another baby, there is a 50% chance of having a child with the disorder'* Justify your answer

Science: GCSE Variation, Inheritance and Evolution

8. Evolution

The theory of EVOLUTION by NATURAL SELECTION was put forward by Charles Darwin

	Stage	Explanation
1	Variation	There is genetic variation within a population caused by inherited genes
2	Competition	Over production of offspring leads to increased competition
3	Selection	Individuals with beneficial adaptations are more likely to survive to pass on their genes
4	Inheritance	Over many generations there is a change in the allele frequency

Species	A group of organisms that have similar features that can breed to produce fertile offspring

9. Extinction

What is extinction?	When the all the organisms of a species have die and there are none left alive
Causes of extinction	1. NEW disease 2. NEW predator 3. Lack of food 4. Climate change 5. Natural disasters

10. Fossils

What are fossils?	Remains or imprint of an organism that dies millions of years ago, found in rocks, ice and peat
How do fossils form? (rocks)	1. Organism dies and falls to the ground 2. Layers of sediment over the dead organism 3. Over millions of years, the layers turn to rock and minerals in the rock replace the minerals in the bones of an animal This happens because decay cannot occur.
What information can fossils tell us?	Early life was simple. The evolution of a species can be predicted by looking at differences between the fossils of a species.
Why do we not have fossils for the early life on Earth?	Fossilisation is rare as most organisms decay Fossils can be easily become damaged as the rocks move due to tectonic plates Most early life has soft body forms which do not fossilise

11. Classification

Carl Linnaeus	Developed the system of classification used today
Binomial name	Official name of a species including the genus and species name
3 domain system developed by Carl Woese	All organisms can be classified in to 3 domains • Archaea – ancient simple bacteria, often extremophiles • Prokaryote – bacteria • Eukaryote – complex organisms including animals and plants.

Group	Mnemonic
Kingdom	King
Phylum	Philip
Class	Came
Order	Over
Family	For
Genus	Good
Species	Soup

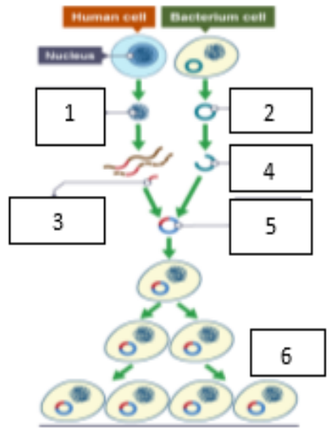
Science: GCSE Variation, Inheritance and Evolution

12. Genetic engineering

Genetic Engineering (Genetic Modification – GM)	Process of inserting the gene of one organism to the DNA of another to change or enhance specific characteristics.
Plasmid	Ring of secondary DNA in a bacteria cell

Genetically engineering insulin using bacteria (HT only)

1	Chromosome containing desired gene is removed
2	Plasmid from a bacteria is removed
3	Enzymes are used to cut the gene from the DNA
4	Enzymes are used to cut out a section of the plasmid DNA
5	The desired gene is inserted in to the plasmid using enzymes
6	The plasmid is placed back into the bacteria, which multiplies rapidly, copying the gene and making insulin



13. Selective Breeding

Process of selecting individuals of the same species with the desired characteristic and breeding them to produce offspring with the desired characteristics

Benefits of selective breeding	Produce disease resistant crops, increase the yield of milk and meat from cattle, increased growth rate of chickens so meat can be sold earlier, domestication of pets (more attractive and docile) and many more
Concerns of selective breeding	It does not always work and takes a long time. Interbreeding of organisms can cause disease or defects

Method for selective breeding

1.	Select a male and female with the desired characteristics
2.	Breed together
3.	Check the offspring for the desired characteristics
4.	If desired characteristics are present continue to interbreed until the characteristic is always present. If the desired characteristic is not present, go back to step 1.

Challenge Questions

1	Why might people not agree with the use of GM crops as food sources?
2	Why are bacteria used in genetic engineering of human proteins?
3	Explain how a cactus with small spines may have evolved from an ancestor with larger leaves.
4	Compare the information gained from ice fossils compared to the information gained from fossils formed in rocks.

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Learning Outcome 1: Understand the purpose and content of pre-production

Mood Boards

Definition

The purpose of a mood board is to assist in the design of a media product by collecting a wide range of materials (images, fonts, colours, etc.) that give an overall feel for what is needed. A mood board therefore provides a starting point which can be used for discussion with the client and can also be used to keep the project on track by referring back to it. It is not a representation of what the final product will look like.

Example

The above mood board shows examples of images, styles and colours that may be used in a graphic.

Mind Map/ Spider Diagram

Definition

These can be used to quickly generate different ideas or to show links between different concepts. Mind maps will have a central theme with branches springing from it connecting different sub nodes. They are used at the start of the design process.

Example

This example has a central theme springing different ideas. Each idea springing from the central theme is called a 'node'.

Storyboards

Definition

Storyboards are used for moving images (animation/film) to help plan what will happen throughout the course of a scene. A storyboard will show images of what is happening in the scene and can also be annotated with a description of the scene and how long it lasts for. Story boards will help people to visualise the camera angles that will be used as well as different aspect of lighting, special effects/sounds and props/costumes. More importantly a storyboard will show how the different elements of a scene fit together. This can be shared with the client before production begins so that changes can be suggested and agreed. It can also be shared with the cast and crew as a guide to what they should be engaged with at a particular time. Storyboards may also help to build up an idea of the budget that may be required.

Example

The above storyboard shows each sections place in the scene, duration and denotes what will be happening along with a pictorial representation.

Visualisation Diagram

Definition

Visualisation diagrams are used to plan the layout of a static image in a visual manner. This will give an indication to the client of how the final document might look. This will enable them to suggest changes before the image goes into production which will save time in the long run.

Example

The visualisation diagram above gives an accurate portrayal of what the final graphic might look like. In this case the graphic is a DVD cover.

Visualisation Diagram

Definition

perform a number of different functions including; identifying the place where an action is to take place, identifying which different characters will be in a particular scene, providing stage directions (movements), and stating what dialogue will be used in a particular scene. Scripts will also contain comments about the particular mood for a scene which the actors can use to take ques from

Example

The script above shows the dialogue between the two characters, as well as setting the scene for what the characters are thinking and their actions.

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Learning Outcome 2: Be able to plan pre-production

Client Brief/ target Audience

Definition

Interpreting client briefs – A client brief will explain what the client's needs are for a specific product. It will also normally outline who the target audience is for the product that is to be designed as well as any specific design elements that the client may have. It is then the job of the designer to interpret this to develop success criteria through which the product can be developed.

The importance of target audience – The target audience is the group of people who the end product will be designed for. The client could request that the product be developed for people of a certain age, gender, occupation or with specific interests. The type of person who the product is being developed for will have a huge impact on how it is designed influencing colours, images, complexity, etc. Without having a really good understanding of the target audience it is unlikely that a designer will be able to create an effective solution to the client's needs.

Health and Safety Considerations

There are a number of different health and safety concerns that could arise in the media industry including; loud noises, machinery, lighting, weather, heavy lifting, trip hazards, working with water and electricity. Methods of reducing these risks needs to be considered before work starts!

Legislation

Copyright - gives the creator of an original work the intellectual property right to decide how the work can(not) be used. The creator is protected by the law so that any breach of copyright could lead to people who have used the work without permission being sued. This could lead to them having to pay compensation to the copyright holder and for businesses would have a negative impact on their reputation. If the creator of an original work feels they would like others to be able to use it free of charge then they can register it under a creative commons licence to enable people to do this so long as they acknowledge the original creator and any limitations as to use.

Trademarks – a trademark is a method used by businesses to make their work recognisable. This could be in the form of an image (logo), word, phrase, symbol or design. The symbol ® is used for a registered trade mark and ™ for an unregistered trade mark.

Data protection – this legislation makes it the responsibility of organisations to seek permission to hold personal information about people (e.g. names, addresses, phone number, etc.), be transparent about how they use the information and ensure that it is kept secure. As such they need to ensure that they follow these rules:

1. Always have permission from the person whose data you are storing.
2. Only keep the amount of data that you have a reason to keep.
3. Only keep the information for as long as it is required.
4. Ensure that any information held is kept up to date.
5. Ensure that the information is stored in a secure location and that all possible steps are taken to avoid theft, deletion or modification of data.
6. Do not share the information with other organisations without permission.
7. Never share data with organisations in other countries that do not have data protection legislation.

Breach of these rules can lead to legal action being taken against the company and damage caused to its reputation.

Privacy – In UK law the right to privacy is protected under the Human Rights Act 1998. This means that a person has the right to have their private and family life respected, and as such not to be subjected to an invasion of privacy in their home or to have their correspondence tampered with (post, emails, telephone, etc.)

Defamation – this is where a false statement has been made about a person that could cause damage to their reputation.

Certification and Classification

U – This rating is aimed at children of 4 years and older. As such to meet this requirement media must ensure that there is no language which may be considered discriminatory (unless disapproved of) or offensive. There should be no nudity of a sexual nature and violence will be very mild. Drug used should not be present unless in the form of an educational message.

PG – As for U except mild violence may be permitted as long as it is not prolonged and is in context. Frightening sequences where characters are in danger should not be prolonged and sexual activity can only be implied.

12 – Misuse of drugs must be infrequent and should not be glamorised. Media should not promote dangerous acts that could be imitated. Nudity should be discreet and seldom. Horror images may be shown however these should not form the main basis of the work. There may be moderate violence but this should not lead the viewer to dwell on the detail.

15 – Discriminatory language may be used (racist, homophobic, etc.) however this cannot be endorsed by the film. Drug use may be shown but this should not be glamorised. Dangerous situations can be shown however these should not be easy to imitate. Strong language may be used infrequently and in context. There are no constraints on nudity in a non-sexual nature. Strong violence may be shown but the image should not focus on pain or injury.

18 – These works are deemed as being suitable only for adults who are free to choose their own entertainment.

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Learning Outcome 3: Understand the purpose and content of pre-production

Creating Pre-production Documents

Mind mapping – There are multiple steps which can be used in order to create an effective mind map:

1. You need to ensure that you start with a central idea. This should be in the centre of the page so that it draws your attention. You can also include an image that represents the mind map's topic, this will help to strengthen the connection you have to the main theme.
2. Add branches to the mind map – the main branches forming from the central idea should each follow a specific theme, which can then be explored in more depth by adding more branches from them giving more detail.
3. Ensure that key words are used on separate branches as this will help to spark more associations.
4. Colour code the different branches of the mind map to help personalise it further and add more visual stimulation.

Visualisation diagrams – when creating these it is important that you remember who the audience is as this will affect the amount of detail that needs to be included. Remember this should give the client a clear idea of what the final product will look like. Add annotations or labels where required to enhance their understanding. Also if required give an indication of scale.

Storyboards – A storyboard is a series of diagrams that shows a sequence of displays. A storyboard should contain the number of scenes, scene content, timings, camera shots (e.g. close up, mid, long), camera angles (e.g. over the shoulder, low angle, aerial), camera movement (e.g. pan, tilt, zoom or using a track and dolly), lighting (e.g. types, direction), sound (e.g. dialogue, sound effects, ambient sound, music), locations (e.g. indoor studio or other room, outdoors).

Scripts - Scripts perform a number of different functions including; identifying the place where an action is to take place, identifying which different characters will be in a particular scene, providing stage directions (movements), and stating what dialogue will be used in a particular scene. Scripts will also contain comments about the particular mood for a scene which the actors can use to take ques from.

Naming Conventions

Ensure that all files are given an appropriate name so that they could be identified by a third party. Where there are different versions of a file version control should be implemented by adding the version of the document to the end of the file name e.g. _V0.1 would indicate that it is the first version of the file.

File Formats

Depending on the different type of document being created a different file format will need to be selected. The table below outlines the different file formats available for different types of media:

File	Use	Description
MPG	Video Files	• Compressed file formats (Lossy) • Smaller file sizes • Faster loading online (speed) • Compression lowers quality
MOV		
MP4		
SWF	Animation	• Compressed file formats • Small file sizes • Fast loading online (speed) • Can be animations, games and video
FLV		• Flash video format • Not compressed • Opens in 'Flash' software • Editable
JPEG	Image Files	• Lossless compression; photography
GIF		• Small file sizes/ Online / web buttons
PNG		• Lossless compression; supports transparency; photography
TIFF		• Large file sizes / Posters / high quality printing
PDF		• Un-editable/ Documents
WAV	Audio Files	• Uncompressed / high quality / Windows only
AIFF		• Uncompressed / high quality / Mac only
MP3		• Compressed / small file sizes / good for devices

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Learning Outcome 4: Be able to review pre-production documents

Reviewing a Pre-production Document

Introduction

In order to review a pre-production document it is important to ensure that you are consistently referring back to the brief / client's requirements - Review and compare your work to the original brief – have you done what was asked? How? Think about the following:

- Format – Has the client specified the type of file format or layout required? If not how have you interpreted what is needed to deliver on this?
- Style – Has the client requested a specific style? Or do you need to analyse the target audience to develop a suitable house style? How have you achieved this?
- Clarity – Is the documentation understandable? Look back at the documentation and think that if you were the client, would you be able to understand the plans that have been drawn up in sufficient detail in order to make an assessment of whether they are correct or not. Clarity in the design phase will save a lot of time and effort in the long run as fewer things will need to be corrected before final approval.
- Suitability of content for the client and target audience – this could be in terms of the content that has been included in the design or the level of language that has been used e.g. is it too simplistic or complex. Pitching this right is a real skill that needs to be developed over time.

Analysing Positives and Negatives

When thinking about what went well in the project, and what could potentially be improved upon, make sure that you refer back to the project brief and comment on the following:

- Format
- Style
- Clarity
- Suitability of content for the client and target audience
- Colour scheme
- Content

Writing a Conclusion

When writing a conclusion in order to be successful you need to summarise in brief how well you feel you met the requirements of the overall brief. Also assess what you have learnt from the process of the project and explain how this could be taken forward into future projects that you may undertake. You should also give some consideration to the future of the project that you have undertaken. How could it be further improved or extended upon? For example. You should write about your role in the project management process e.g. how well do you feel you managed your time/ resources? How well did you act on advice or feedback from the client?

Finishing Touches

In order to make sure that the final pre-production documents are professional you should always take care to do the following:

- Use technical language & terminology correctly and to a level that will be understood by the target audience.
- Focus on correct spelling, grammar and punctuation.

GCSE Design & Technology
New & Emerging Technologies

1. CAD – Computer Aided Design

Advantages of CAD	Disadvantages of CAD
Designs can be created, saved and edited easily, saving time	CAD software is complex to learn
Designs or parts of designs can be easily copied or repeated	Software can be very expensive
Designs can be worked on by remote teams simultaneously	Compatibility issues with software
Designs can be rendered to look photo-realistic to gather public opinion in a range of finishes	Security issues - Risk of data being corrupted or hacked
CAD is very accurate	
CAD software can process complex stress testing	

CAD Software

2. CAM – Computer Aided Manufacturing

Advantages of CAM	Disadvantages of CAM
Quick – Speed of production can be increased.	Training is required to operate CAM.
Consistency – All parts manufactures are all the same.	High initial outlay for machines.
Accuracy – Accuracy can be greatly improved using CAM.	Production stoppage – If the machines break down, the production would stop.
Less Mistakes – There is no human error unless pre programmed.	Social issues . Areas can decline as human jobs are taken.
Cost Savings – Workforce can be reduced.	


Laser Cutter


Robots


Barcode Scanner


AGV – Automated Guided Vehicle

3: Production Techniques

3.1 Flexible Manufacturing Systems (FMS) : involves an assembly of automated machines commonly used on short-run batch production lines where the products frequently change.

3.2 Lean Manufacturing: It aims to manufacture products just before they are required to eliminate areas of waste including:

- Overproduction
- Waiting
- Transportation
- Inappropriate processing
- Excessive inventory
- Unnecessary motion
- Defects

3.3 Just In Time (JIT) : Items are created as they are demanded. No surplus stock of raw material, component or finished parts are kept.

Advantages of JIT	Disadvantages of JIT
No warehousing costs	Reliant on a high quality supply chain
Ordered secured before outlay on parts is required	Stock is not available immediately off-the-shelf
Stock does not become obsolete, damaged or deteriorated	Fewer benefits from bulk purchasing

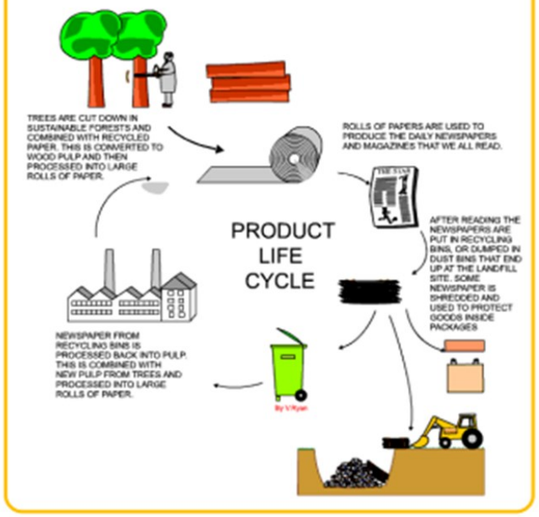
4. Scales of Production

One off: when you make a unique item
Batch: when you make a few/set amount
Mass: when you make thousands
Continuous: open ended production

5: Informing Design Decisions

5.1 Planned obsolescence - Planned obsolescence is when a product is deliberately designed to have a specific life span. This is usually a shortened life span.
5.2 Design for maintenance - Products are often designed to be thrown away when they fail... This can be achieved by designing products that can be repaired and maintained.
5.3 Disposability – Some products are designed to be disposable.

5.4 Product Lifecycle -



7: KEY WORD FOCUS

You should be able to explain the meaning of each of these words by the end of this rotation.

CNC	Computer Numerical Control
EPOS	Electronic Point Of Sale (Barcodes)

Social, Moral, Environmental and Sustainability issues.

Social
We are all part of one world and we do rely upon each other. Any thing we can do to promote positive work or play is good however as designers we also have a responsibility to make sure designs don't have a negative impact. Products can really influence us as people and as designers we need to be positive role models encouraging 'Social Harmony'.

Moral
As a designer you have a moral responsibility to do the right thing. Moral issues is about being fair and honest. You should be thinking about what is 'right' for the consumer. For example a moral designer should be considering the safety of potential users as a high priority as well as making sure they don't feel uncomfortable or come to any harm. People with strong morals are honest and decent and will put other people before their own personal gain.

Environmental & Sustainability
When developing designs you need to think about environment and sustainability issues as we only have one planet and need to make sure we look after it.
-The materials will have an impact of some kind
-using materials that can be easily recycled is a good start
- locally sourced uses less fuel
- open cast mines and deforestation have negative impact
Energy consumption is also important. A lot of energy comes from fossil fuels so needs to be reduced. An efficient making process uses less electricity and relies less on fossil fuels.

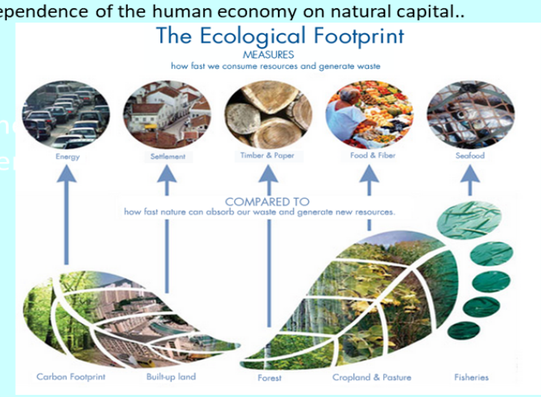
Fairtrade

Fair trade is an institutional arrangement designed to help producers in developing countries achieve better trading conditions. Members of the fair trade movement advocate the payment of higher prices to exporters, as well as improved social and environmental standards

FAIRTRADE ®

Ecological Footprint

The **ecological footprint** measures human demand on nature. it is a measure of human's impact on Earth's ecosystem and reveals the dependence of the human economy on natural capital..



Carbon Footprint

Sustainable living is a **lifestyle** that attempts to reduce an individual's or society's use of the Earth's natural resources and personal resources. Practitioners of **sustainable living** often attempt to reduce their carbon footprint by altering methods of transportation, energy consumption, and diet.

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Sustainability

1. Sustainability

Avoidance of the depletion of natural resources.

Finite Resources e.g. Ore and Oil

Materials which are in limited supply. Use of these should be avoided where possible or only used in small amounts.

Non Finite Resources e.g. Trees and Plants

Materials in abundant supply and are unlikely to ever run out or ones that can be grown again.

The impact of the use of resources can be measured by the following:

- CO_2 emissions
- Transportation method and distance travelled
- Impact on the environment through mining or harvesting
- Availability or scarcity
- Maintenance or repair costs
- Ethical and moral issues

2. Life Cycle

Life cycle assessment (LCA) to assess the impact of a product during the different stages of its life. The 5 main stages are:

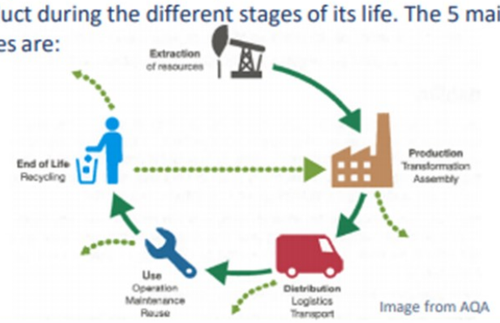

Image from AQA

3. Waste Disposal

Consideration to waste disposal has an impact on the environment and a product life cycle.

Businesses are charged for waste disposal, reducing waste disposal will save money.

The effects of careful consideration of waste disposal within a business are:

- Less raw materials required
- Reusing waste materials/components within a company
- Sale of recyclable waste
- Energy to heat and power a business could be generated

4. Environment

Technologies that have a **positive impact**:

- Renewable materials from managed resources
- Use of renewable energy
- Using recyclable materials
- Consideration to the 6r's
- Designing products with low power consumption
- Designing products with fewer components and reduced weight
- Designing products that are upgradable extending their life
- Creating products that are sourced, produced and sold locally

Technologies that have a **negative impact**:

- Use of finite/non-recycled materials
- Use of components that are hard to repair
- Use of fossil fuels for power
- Products with high power consumption
- Products that have built in **planned obsolescence**
- Components that are shipped globally

5. Key Terms

Continuous Improvement

Kaizen, also known as continuous improvement, is a long-term approach to work that seeks to achieve small, incremental changes in processes in order to improve efficiency and quality. It is best known for being used in **lean manufacturing.**

Efficient Working

Just in time (JIT) and **lean manufacturing** are examples of how businesses reduce costs. Other examples are members of staff doing 'energy walks' to turn off lights etc. to reduce costs and CO_2 emissions.

Pollution

Business's should aim to reduce pollution by conducting an LCA.

Global Warming

The release of CO2, methane (CH4) and nitrous oxide (N2O) into the environment resulting in the rise of average temperatures of the earth's atmosphere and oceans.

Carbon Offsetting

Image from AQA

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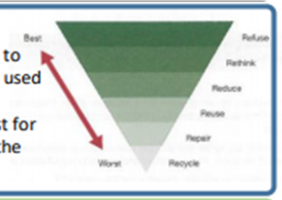
Sustainability

The 6 R's

The 6 Rs are an important checklist. They are used by designers to reduce the environmental impact of products. They can also be used to evaluate the environmental impact of other products.
The hierarchy of sustainability places the strategies that are best for the planet about those that have a greater negative impact on the environment.



1. Refuse

The first stage in the process is to ask whether the proposed product, part, purchase or even journey is required at all. Asking the question 'Is it really necessary?' can play a major role in reducing the demand on materials. Simply not using something saves 100% of what you have chosen not to use. Example include:

- Using your own carrier bag rather than purchasing a new one.
- Walking or cycling to school instead of being driven.
- Not using products such as some pesticides that are known to be harmful to the environment.
- Not eating (or using) products that are over-farmed, over-fished or on the endangered list.

2. Rethink

Consumers have a growing number of choices to make about where and on what they spend their income. Greener and more sustainable options are not always the cheapest or the best, but making informed decision and rethinking ones spending power can play a huge part in conserving resources.
Deciding on the design of a product, e.g. the materials being used in its production, will directly affect its sustainability. The types of questions designers need to ask are:

- Are the materials locally sourced?
- Are they sustainably produced?
- Is it essential to use this material, of which there is a finite supply?

By rethinking how the product is likely to be made, the product can often be redesigned in a more responsible way.

3. Reduce

Reduction is often the result of having re-thought a design or action. Materials and energy are saved due to efficient manufacturing practices and the use of clever design, incorporating sustainable materials.

- Modern materials that are lighter and stronger than traditional ones have contributed to the miniaturisation of products, saving material and energy in manufacture and use.
- Reducing the complexity or number of parts a product uses and reducing the number of different materials in a product makes recycling easier.
- In factories, schools and hotels, fitting motion sensitive lighting and smart heating systems can significantly reduce energy usage.
- Many large companies employ staff to conduct 'energy walks' to turn off unused appliances and lights and to ensure windows and doors are shut to conserve heat.

4. Reuse

Reusing products multiple times for the same purpose is also known as **primary recycling.** Reusing a product in a different way from the one it was designed for is known as **secondary recycling.**
The classic glass milk bottle is reused many times before it reaches the end of its useful life, as which point it is recycled. A plastic milk bottle, however, is intended to be used only one, although it can have many different subsequent uses.
Donating to and buying from charity shops extends the life of products and in recent years there has been a resurgence of in products having second lives, thanks to websites such as eBay, Freecycle or Gum tree.

It is also becoming popular for furniture and other household items to be **upcycled** with a coat of paint and some minor repairs or adaptations, extending their useful life by many years.

5. Repair

Being able to repair a product when it is broken or worn is a way of extending its life and delaying the purchase of a new one. Repairing is a positive option over replacement as it means that only some parts of the product are replaced. This creates jobs for skilled people who conduct repairs and stimulates a spare parts market.
Unfortunately, repairing products has become harder over years. Growing number of products are not design to be repaired. There are a number of reasons why items may be designed this way, but it is usually because they are cheaper to replace than repair. Some products, especially modern electronic products, are designed to last only a few years as technology dates quickly and older products will be superseded by newer, faster, more efficient models. This is called **planned obsolescence.**

6. Recycle

Tertiary recycling, although a very important stage, is lower down the hierarchy of preferred options because most materials that are recycled this way tend to be of lower quality than the original material. It takes a lot of energy to recycle materials.
This form of recycling requires the reprocessing of the material and in many cases involves chemicals and/or heat to recover the recycled materials. In an ideal world, tertiary recycling would remove all recyclable materials from our household waste so that only biodegradable materials would be left. Only very few parts of the world are set up to cope with this level of processing.

7. Sustainability

Our planet has to provide all of our basic human needs, such as food, shelter and warmth.
Designers now have a much better understanding of which materials are sustainable and which are not.
The general principle is that resources fall into two categories:
Finite resources – are ones which are in limited supply or cannot be reproduced.
Non-finite resources – are ones which are in abundant supply and are unlikely to be exhausted.

8. Recyclable materials

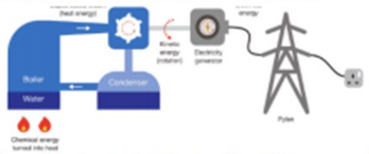
Once all useful and recyclable materials are removed, the majority of the remaining waste is organic matter and can be processed in one of two ways; **'Recover'** or **'Rot'**. Food waste and garden waste can be processed at a high temperature and turned into compost. The waste can also be buried in **landfill** sites where the resulting methane gas from the rotting matter is collected and burned and used to generate heat or electricity in the same way.

GCSE Design & Technology
Energy Generation & Energy Storage

1. Energy Generation

Power can be generated from renewable and non-renewable sources. Non-renewable power is generated from fossil fuels.

Most electricity is created by rotating a turbine which turns a generator. Fossil fuels are burnt to create heat which superheats the water. The steam rotates the turbine which is linked to the generator to supply the electricity.



1.1 Fossil Fuels – Most electricity in the UK comes from burning Fossil Fuels such as **Coal, Gas and Oil**. Fossil fuels are **finite** resources and **cannot be replaced** as they run out. Burning fossil fuels creates carbon dioxide and is not environmentally friendly and contributes to **global warming.**

1.2 Fracking – Shale gas is trapped within the earths crust. Fracking is the process which removes it so it can then be burnt to create electricity. It involves drilling the earths crust and sending high pressure water, sand and chemical mixtures into the rock to release the gas.

3. Nuclear Power

Nuclear power is highly controversial. The process harnesses a nuclear reaction to create to create heat to power the turbines.

• Clean • Efficient	• High start up costs • Radioactive waste which is very dangerous to all living things. • Nuclear waste stays radioactive for millions of years and is stored underground.

2. Renewable Energy

Energy that comes from the planets non-finite resources is renewable. It includes



2.1 Wind Power	
• Low cost • Produce More power in winter when demand is higher.	• Do not create power when not enough wind or it is too windy. • Harmful to wildlife • Ugly
2.2 Solar Energy	
• Low maintenance costs. • Improvements in technology mean the efficiency is always improving.	• Only produce energy during daytime. • Production is less in winter.
2.3 Tidal Energy	
• Predictable and consistent.	• Machinery has to be located some distance from land making repair and maintenance difficult.
2.4 Hydro Electric Power	
• Very reliable	• High set up costs both financially and environmentally.
2.5 Bio Fuel	
• Carbon Neutral – They absorb the CO_2 whilst growing and produce similar amounts when burnt for energy.	• Vast amounts of land and water needed to produce the crops which contribute to food shortages in developing countries.

4. Energy Storage

Most mechanical power is stored by using tension or compression. Coiled springs used in clocks, watches and wind up toys store physical energy from the winding process which is then released slowly through cogs, gears and other mechanisms.

4.1 Pneumatics – A form of compression is used to store gas or air under pressure. They are commonly used to controlling production lines. They are accurate, efficient and low maintenance.

4.2 Hydraulics – Very similar to Pneumatics but uses a liquid, most commonly Oil. Extremely powerful and using in manufacturing industrial applications.

Both systems will use a compressor which pump the air or liquid into a storage tank to hold it until it is needed.

4.3 Kinetic Energy – any object in motion has kinetic energy. Objects not in motion store potential energy which is converted to kinetic energy when a force is applied to the object such as gravity.

4.4 Batteries – Electrical power can be stored in batteries. Battery technology has vastly improved alongside the power consumption of modern electronic devices helping save valuable finite resources.

Alkaline batteries are more efficient than traditional acid based batteries and hold their charge well.

Rechargeable batteries are capable of being charge d and discharged thousands of times reducing the resources needed. The time it takes for rechargeable batteries to reach full charge has also improved in recent years making their use much more convenient.

4.5 Disposal of Batteries – Batteries must be disposed of correctly as they contain toxic electro chemicals. If placed in the normal bin and they end up in land fill sites, it will degrade over time and release harmful chemicals and metals into the soil and water.

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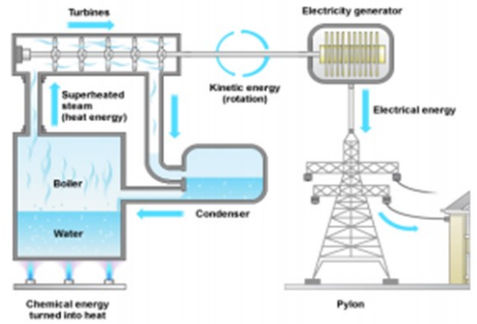
Energy Types

Energy Types
1. Fossil Fuels – Non-renewable energy

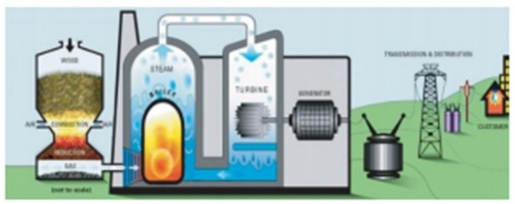


In a thermal power station fuel such as coal, oil or gas is burned in a furnace to produce heat - chemical to heat energy.

- this heat is used to change water into steam in the boiler.
- the steam drives the turbine - heat to kinetic energy
- this drives the generator to produce electricity - kinetic to electrical energy.

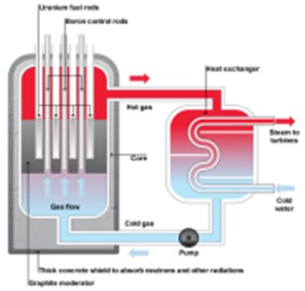
Some experts believe that fossil fuels will run out in our lifetime.

Energy Types
2. Biomass Energy – Renewable Energy



Biomass is an industry term for getting energy by burning wood, and other organic matter. Burning biomass releases carbon emissions, but has been classed as a renewable energy source in the EU and UN legal frameworks, because plant stocks can be replaced with new growth.

Energy Types
3. Nuclear Energy – Renewable energy



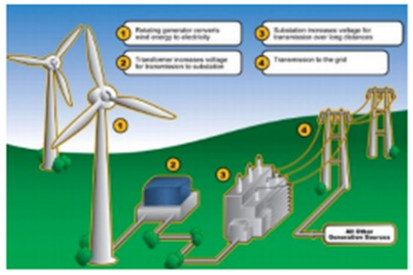
The main nuclear fuels are **uranium** and **plutonium**. In a nuclear power station nuclear fuel undergoes a controlled chain reaction in the reactor to produce heat - nuclear to heat energy.

- heat is used to change water into steam in the boiler.
- the steam drives the turbine (heat to kinetic energy)
- this drives the generator to produce electricity - kinetic to electrical energy.

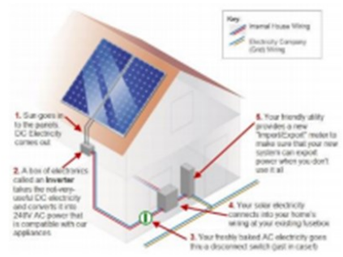
Energy Types
8.Batteries

Alkaline batteries are the most common type of domestic batteries, they are disposable but contain chemicals that are bad for the environment. Fortunately more and more battery recycling banks are appearing now where most of the battery can be reused. **Rechargeable batteries** are better for the environment and more economical in the long run (High initial purchase price). Their lifespan decreases with every charge.

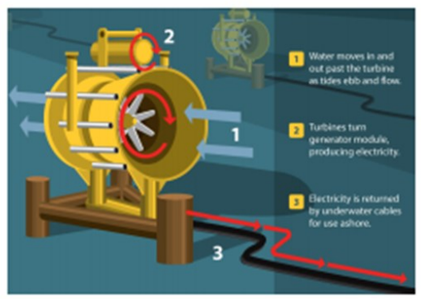
Energy Types
4. Wind Energy – Renewable Energy



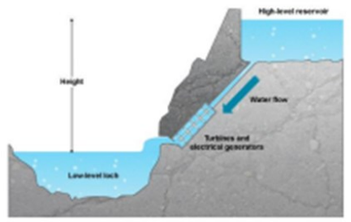
5. Solar Energy – Renewable Energy



6. Tidal Energy – Renewable Energy



7. Hydroelectricity – Renewable Energy



- In a hydroelectric power station water is stored behind a dam in a reservoir. This water has gravitational potential energy.
- The water runs down pipes (potential to kinetic energy) to turn the turbine
- The turbine is connected to a generator to produce electricity (kinetic to electrical energy).

GCSE Design & Technology
Electronic Components

1. Systems

A system is parts or components working together to control tasks or activities.

Systems Diagram

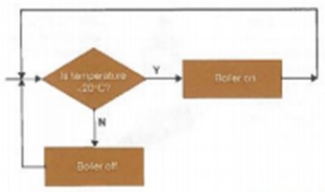
A simple flowchart that lays out input, process, output – an automatic door

Open loop and closed loop

Has no feedback and is unable to make a decision – a room heater- has to be manually switched off

Closed loop

Able to make a decision using feedback – central heating system – automatically switch off when the desired temperature is reached



Images from AQA

2. Input Components

Name and symbol	Appearance	Image	Characteristics	Uses
Toggle switch (latching)	Available in a variety of shapes, sizes and switching positions depending on the task		Off and on positions, once switched they stay on (latched) until switched again	Lighting, power switch, control panels
Push to make (PTM) switch normally open	A wide variety of shapes, colours and sizes		The legs of the switch are only connected when the switch is pressed (momentary); it is normally open, no polarity	Door bell, intercoms, keyboards
Push to break (PTB) switch normally closed	They are identical to PTM switches so you may need to check the connectivity		The legs are only disconnected when the switch is pressed (momentary); it is normally closed, no polarity	Alarm systems, control systems
Light dependent resistor (LDR)	Small light sensitive panel often in plastic shroud, two wires for mounting to circuit		Resistance increases in the dark and decreases in the light, no polarity	Street lights, solar garden lights, security and child night lights, low-light meter for sporting events
Thermistor	Small coloured disc, two wires for mounting to circuit		Resistance changes with a change in temperature, no polarity	Thermostats on central heating systems, fridges and freezers, digital thermometers
Pressure switch	Come in all different shapes, sizes and colours.		Detects pressure from being pressed, can perform on/off tasks or detect gradual pressure being applied	Burglar alarm systems, video game floor mats, sensing fluid pressure in pipes

Image from AQA

3. Output Components

Name and symbol	Appearance	Image	Characteristics	Uses
Light emitting diode (LED)	Available in a variety of sizes, shapes and colours, most commonly 5mm round		Produces light, connected by an anode (+ve) and cathode (-ve), has polarity. Low voltage, low power consumption, long-lasting, can be hard to change if broken	Low power lighting, torches, TV screens, power indicators
Lamp	Available in a variety of sizes, shapes, colours and levels of power (wattage) or brightness (lux)		Produces light, can be brighter than LEDs, less economical due to the heat produced. Not long-lasting but easy to change	Household lamps, car headlamps, street lights, floodlights and security lights
Buzzer	Small compact units in plastic casing, available in a variety of sizes and sounds		Mid- to high-pitched buzz created by fast oscillating electromagnetic parts, has polarity	Alarm systems, door entry systems, children's toys, electronics games
Speaker	Speaker cone shaped into magnetic coil at base, available in a wide variety of sizes		Full range of sound available, variety of power ratings (wattage), variety of frequency responses (treble to bass)	Headphones, music systems, intercoms, radios

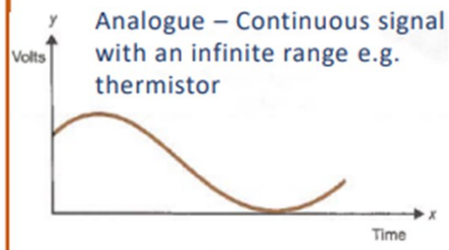
GCSE Design & Technology
Microcontrollers

1. Processes

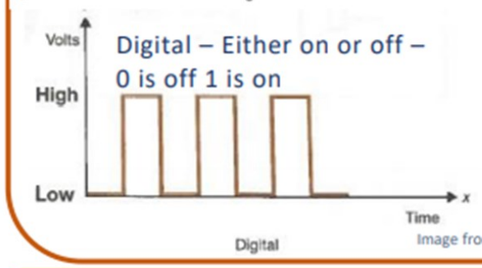
Components that process electronic signals and enable output devices to perform tasks. This is controlled by an integrated circuit (IC) e.g. A microcontroller

2. Digital and Analogue Signals

Analogue – Continuous signal with an infinite range e.g. thermistor



Analogue



Digital – Either on or off – 0 is off 1 is on

Digital

Image from AQA

3. Counters

Counters – Keep count of how many times something occurs, output information to a **seven segment display.**

4. Programming

Micro controllers also called Peripheral interface controllers (PICs) can be programmed to perform differently by a computer.

Timers

Devices used to perform specific tasks. 2 types monostable and astable.

Monostable – output turned on for a set period of time e.g. Automatic doors

Start:

Decision: Has the motion sensor (PIR) connected to the input been activate

If NO, continue to wait for the PIR to be triggered by movement.

If YES, continue with the program.

Output: The motor turns on and opens the doors.

Process: Delay for 5 seconds; the motor is on long enough to open the doo and let people through.

Output: The motor turns on again in reverse and the doors automatically clo

The circuit loops back to the top awaiting the next trigger of the PIR.

Astable – fluctuates between on and off – oscillating output e.g. Seatbelt alarm in a car

Start:

Decision: Has the seatbelt been fixed into the seatbelt clip?

If YES, loop back to the start of the program.

If NO, continue with the program sequence.

Output: The buzzer turns on.

Process: Delay for 0.5 seconds; the buzzer stays on during this time.

Output: The buzzer turns off.

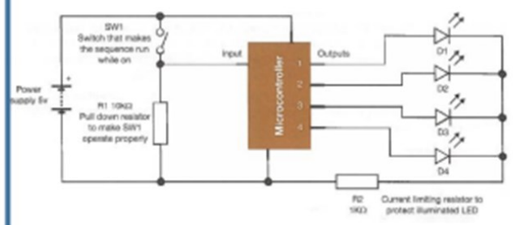
Process: Delay for 0.5 seconds; the buzzer stays off during this time.

The circuit loops back to the top to check if the driver still has seatbelt unfastened.

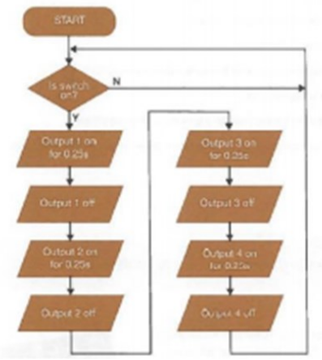
Image from AQA

5. Programming 2

Microcontrollers – How a microcontroller would control a bike light.



Program for the microcontroller to make LED's flash in sequence



Start:

Decision: Has the lighting sequence start switch connected to the input been activated?

If NO, continue to wait for the switch to be triggered by the user.

If YES, continue.

Output and process: The first LED connected to output 1 turns on for 0.25 seconds.
Output: The first LED connected to output 1 turns off.

These steps repeat for LEDs 2, 3 and 4.

The circuit loops back to the top to check if the switch has been activated.

GCSE Design & Technology
Mechanical Devises

1: Mechanical Devices - Motion

There are four types of motion:

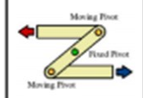
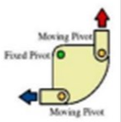
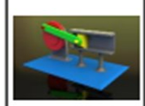
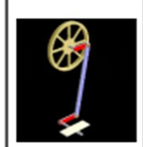
Linear Motion is movement in one direction along a straight line.		
Oscillating Motion This motion is similar to reciprocating motion, but the constant movement is from side to side along a curved path.		
Rotary Motion Examples of circular motion include a ball tied to a rope and being swung round in a circle		
Reciprocating Motion, this is repetitive up-and-down or back-and-forth linear motion		

2: Mechanical Devices – Levers

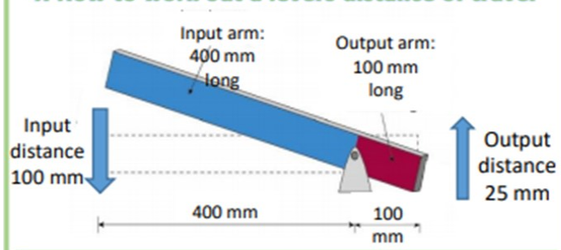
There are three classes of levers.

Class One A class one lever has its input on one side of the fulcrum and its output on the other.		
Class Two A class two lever has its input at one end of the lever, its output in the middle and fulcrum at the other end.		
Class Three A class three lever has its output at one end of the lever, its fulcrum at the other with its input in the middle.		

3: Mechanical Devices – Linkages

Reverse motion linkage	The reverse motion linkage changes the direction of the input motion so that the output travels in the opposite direction. If the input is pulled the output pushes and vice versa. It uses a central bar held in position with a fixed pivot (fulcrum) that forces the change in direction and two moving pivots which are connected to the input and output bars.	
Parallel motion or push/ pull linkage	The push/pull linkage maintains the direction of the input motion so that the output travels in the same direction. If the input is pulled the output is pulled and so on. It uses three linking bars, four moving pivots and two fixed pivots.	
Bell crank linkage	The bell crank linkage changes the direction of the input motion through 90 degrees. It can be used to change horizontal motion into vertical motion or vice versa. It uses a fixed pivot and two moving pivots.	
Crank and slider	The crank and slider linkage changes rotary motion into reciprocating motion or vice versa. It uses a crank which is held with a fixed pivot. A connecting rod uses two moving pivots to push and pull a slider along a set path.	
Treadle linkage	The treadle linkage changes rotary motion into oscillating motion or vice versa. It uses a crank which is held with a fixed pivot. A connecting rod uses two moving pivots and a further fixed pivot to create a windscreen wiper motion.	

4: How to work out a levers distance of travel



Output ÷ Input x Input distance = Output distance

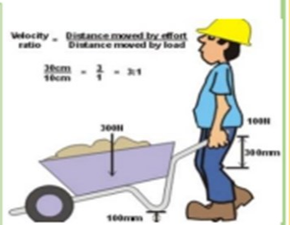
100 ÷ 400 x 100 = 25 mm

5: How to work out the Mechanical Advantage

Or use the following formula:

MA = Load / Effort = 300N / 100N = 3 / 1

This is written as 3:1 or just MA of 3



Verb Endings

1. Find the infinitive
2. Remove AR/ ER / IR
3 Add endings to stem
I speak: hablar -> habl -> hablo

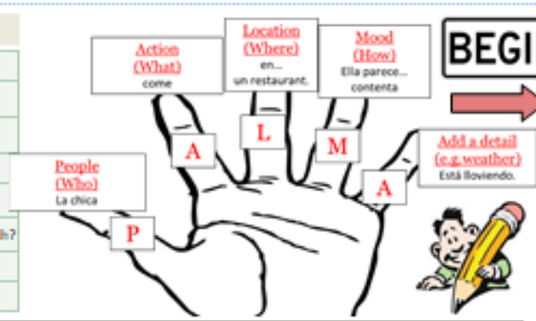
Presente		AR	ER	IR
yo	I	o	o	o
tú	you (s)	as	es	es
el/ella	he /she / it	a	e	e
nosotros	we	amos	emos	imos
vosotros	you (pl)	áis	éis	is
ellos / ellas	they	an	en	en

Pretérito		AR	ER / IR
yo	I	é	i
tú	you (s)	aste	iste
el/ella	he /she / it	ó	ió
nosotros	we	amos	imos
vosotros	you (pl)	asteis	isteis
ellos / ellas	they	aron	ieron

Imperfect		AR	ER / IR
yo	I	aba	ía
tú	you (s)	abas	ías
el/ella	he /she / it	aba	ía
nosotros	we	ábamos	íamos
vosotros	you (pl)	abais	íais
ellos / ellas	they	aban	ían

¿¿¿ PREGUNTAS ???

¿Qué?	What?
¿Cuándo?	When?
¿Cuál(es)?	Which?
¿Quién(es)?	Who?
¿Dónde?	Where?
¿Cuánto(s)?	How many / much?
¿Por qué?	Why?
¿Cómo?	How?



PRESENT		PAST		FUTURE	
normalmente	normally	ayer	yesterday	mañana	tomorrow
en general	in general	anteayer	the day before yesterday	en dos días	in 2 days
siempre	always	el lunes pasado	last Monday	el martes próximo	next Tuesday
todo el tiempo	all the time	el fin de semana pasado	last weekend	la semana que viene	next week
a menudo	often	el mes pasado	last month	el año que viene	next year
a veces	sometimes	el año pasado	last year	en el futuro	in the future
de vez en cuando	from time to time				
nunca	never				

Imperfect: Was-ing, were-ing and used to doing

Preterite: Used for completed action, with a beginning and an end

Opinion

a mi ver	In my opinion
desde mi punto de vista	From my point of view
diría que	I would say
creo que	I believe that
pienso que	I think that
para mí	For me
opino que	I think that

I like	I don't like
me encanta	odio
me gusta	no me gusta
me chifla	no aguanto
me flipa	detest

"because"

P	porque
P	puesto que
Y	ya que
D	dado que
C	como

es / it is — era / it was — será / it will be

Quantifiers

muy	very
bastante	quite
un poco	a bit
mucho	a lot
raramente	rarely
demasiado/a (s)	too much
casi	almost

Connectives

y	and
pero	but
o	or
donde	where
también	also
por ejemplo	for example
(des) afortunadamente	(un) fortunately
por otro lado	on the other hand
especialmente	especially
sin embargo / no obstante	however
al principio / primeramente / primero	firstly
entonces	then
después	after
finalmente	finally
mientras	while

SER

D escription
O ccupation
C haracteristics
T ime
O rigin
R elationship

yo	soy
tú	eres
el/ella	es
nosotros	somos
vosotros	sois
ellos/ellas	son

ESTAR

P osition
L ocation
A ction
C ondition
E motion

yo	estoy
tú	estás
el /ella	está
nosotros	estamos
vosotros	estáis
ellos/ellas	están

¿Cuantos años tienes?

TENER + NUMBER + AÑOS

NOT SER — NOT ESTAR

Future

It hasn't happened yet...so keep the full infinitive - AR / ER / IR

yo	é
tú	ás
el /ella	á
nosotros	emos
vosotros	éis
ellos / ellas	án

Yes, you can!

¡Sí, se puede!

Positivo

- bondadoso/a • caring
- educado/a • polite
- gracioso/a • funny
- listo/a • clever
- extrovertido/a • outgoing

Negativo

- aburrido/a • boring
- vago/a • lazy
- travieso/a • mischievous
- quisquilloso/a • fussy
- egoísta • self

KS4: AO1 – CONTEXTUAL UNDERSTANDING: developing ideas.

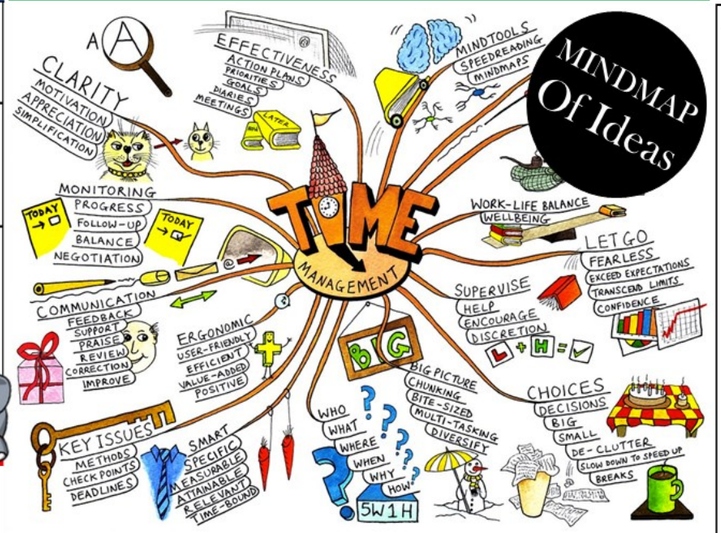
Key Vocabulary…

MIND MAPPING	A graphical way to represent ideas around your theme. Use of keywords and branches to show breadth of initial ideas.
VISUAL MOODBOARD	A collection of imagery and collaged ideas to present a visual understanding of your theme. Keep to a style of scheme of colour.
ARTIST RESEARCH	Show your understanding of contemporary and historical artists and artistic movements by analysing their work. To draw in their style and discuss your intention.

Always remember…

DON'T LIMIT YOURSELF	Even if it doesn't link to your starting point, it may relate to your theme. Add annotations and sketches to show/explain your thought process.
PRIMARY SOURCES	When researching a theme, collect images, photos, samples, magazine cuttings etc. Make sure all images are relevant.
PRESENTATION	Pull your boards together by being consistent. Stick to a particular style and/or colour scheme. Use DAFONT for titles if unsure.

Picture This…



Deeper Learning…

ANALYSING ARTWORK: -

CONTENT:

- What is the work about?
- Is the work realistic/abstract?
- Has it been exaggerated?
- Are there recurring features?
- What is the theme of the work?
- What message is communicated?

FORM:

- What colour does the artist use?
- What shapes does the artist use?
- What mark-making techniques?
- How big is the work – why?
- Does the artist have a style?

PROCESS:

- How has the work been made?
- What media/material has the artist used?

MOOD:

- How does the work make you feel?
- Does the colour, texture, form or composition effect your mood?
- Does the work reminisce about a dream in any way?

The Big Question…

NEXT STEPS:

- What is your intention?
- How will you use this style?
- What features will you try to replicate?
- How are you going to use this knowledge to further develop your work?
- How are you going to develop your own
- imagery in response to the artist and/or movement?

Activity: Take (10-15) of your own images linked to your theme (primary research) from observation. You will then draw from these images and develop further by exploring different media in the style of your chosen artist and/or movement.

KS4: AO2 – REFINE: Refine work by experimenting with ideas.

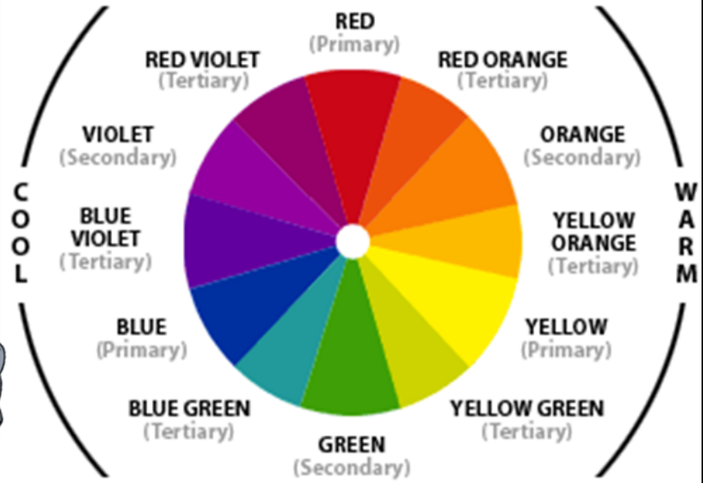
Key Vocabulary…

MEDIA	The substance an artist uses to create art e.g. collage, coloured pencils, paint etc.
MATERIALS	The same idea as media but can also refer to what the work is created on e.g. canvas, paper or clay.
TECHNQUES	The method used to complete the artwork, can be generic such as painting or more focussed such as blending.
PROCESSES	The method used to create artwork that usually follows a range of steps rather than just one skill.

Always remember…

COLOURED PENCILS	• Apply using a soft circular motion • Start with the lightest colours and build up • Avoid applying a thick line of tone
WATERCOLOUR	• Mix your own variations of paint instead of straight from palette • Avoid too much water as paper will bobble
ACRYLIC PAINT	• Mix your own paint instead of out of tub • Add colour to white to lighten rather than white to colour.
COLLAGE	• Rip or cut (not both) • Overlap to avoid gaps • Use a variety of tones
OIL PASTELS	• Start with lightest first • Press on heavy for strong coverage • Blend by overlapping

Picture This…



Complementary

Deeper Learning…

COLOUR THEORY

PRIMARY = RED, YELLOW, BLUE

SECONDARY = ORANGE, GREEN, PURPLE

TERIARY = SECONDARY + PRIMARY
SHADE = ADD BLACK

TINT = ADD WHITE

HARMONIOUS = COLOURS NEXT TO EACH OTHER ON COLOUR WHEEL

COMPLEMENTARY = OPPOSITE ON COLOUR WHEEL

MONOCHROMATIC = ONE COLOUR AND VALUES (LIGHT TO DARK)

HUE = PIGMENT OF ONE COLOUR

WARM = RED, ORNAGE, YELLOW

COOL = BLUE GREEN, PURPLE

The Big Question…

NEXT STEPS:

Have you chosen an image by refining and selecting through your images/drawings?

Have you developed this image further by using a variety of media, materials, techniques and processes?

Have you pushed this further by applying another method?

Activity: Take your favourite drawings and photocopy original before altering. Link to artist style and use a variety of techniques and processes to push further. Change scale and material to add depth to your artwork.

KS4: AO3 – RECORD: observations and insights into intention.

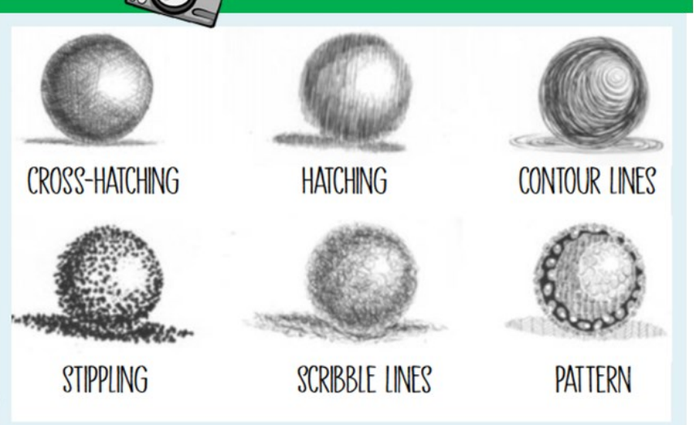
Key Vocabulary…

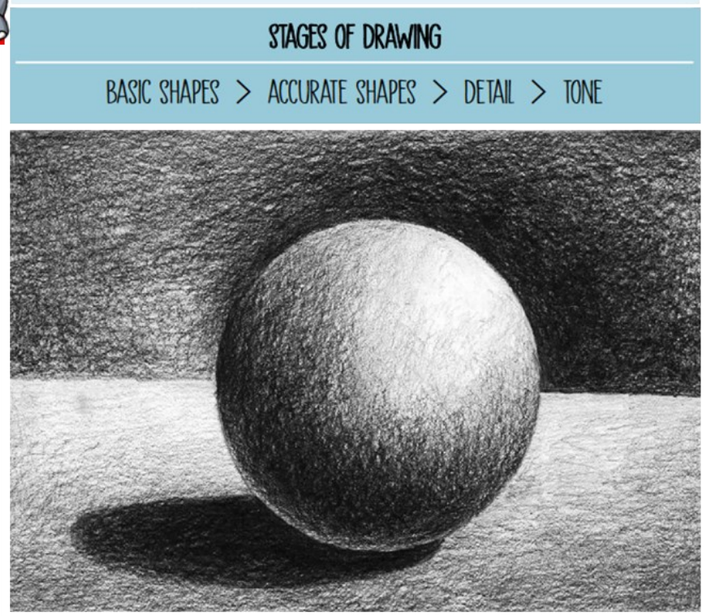
OBSERVATIONAL DRAWING	Drawing from looking at an image or object.
PRIMARY OBSERVATION	Drawing from an object that is directly in front of you.
SECONDARY OBSERVATION	Drawing from an image.
PHOTOGRAPHS	Using a camera to record images – this is classed as primary observation.
SKETCHES	Basic sketches and doodles can act as a starting point to aid in developing an idea.

Always remember…

CROSS-HATCHING	Cross-hatching uses fine parallel lines drawn closely together to create the illusion of shade or texture in a drawing. It is the drawing of two layers of hatching at right-angles to create a mesh-like pattern.
HATCHING	For pencil or pen-and-ink drawing. Hatching is one of the quickest ways to fill in the dark areas. By drawing a lot of fine lines that are parallel, the area as a whole is perceived as being darker.
STIPPLING	The art or process of drawing, painting, or engraving using numerous small dots or specks.

Picture This…





Deeper Learning…

ANNOTATION: -

STEP 1: DESCRIBE

- What is this an image of?
- What have you done?
- What was the purpose of the piece?

STEP 2: EXPLAIN

- How was the work made?
- How did you produce the effect?
- How did you decide on composition?

STEP 3: REFLECT

- Why did you use this specific method?
- Why are some areas better than others?
- What might you do differently next time?
- Why might you do it differently?
- How will your develop in response?

The Big Question…

NEXT STEPS: -

- **Produce a range of tones by varying the pressure and layering**
- **Consider using softer pencils for darker shades**
- **Apply tone using a soft circular motion to create a smooth coverage. Filling all the white gaps and avoid shading in different directions**
- **Add detail/interest by applying tone using mark-making techniques**
- **Mark-making can be produced by making your own tools/paintbrushes**

Activity: Try to annotate or evaluate whenever you have an idea or a change in direction. Write about a technique that was successful or if something didn't go as planned.

KS4: AO4 – PERSONAL: creating a meaningful response.

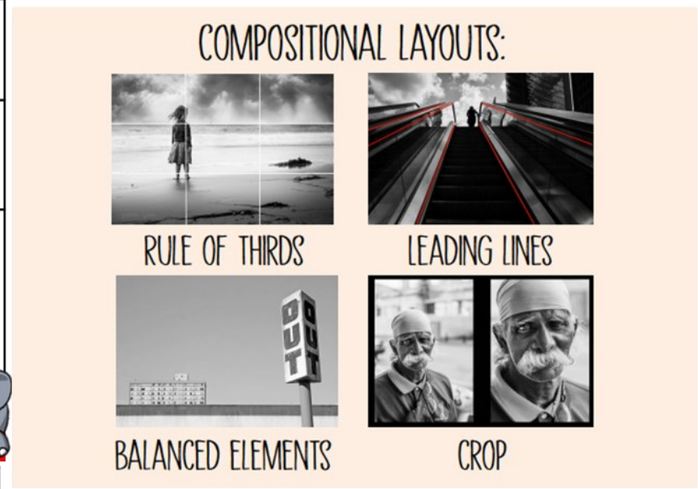
Key Vocabulary…

ROUGH IDEA	Basic sketches of a final idea. Label to ensure clarity.
VISUAL OR MAQUETTE	An image or model created from selected materials (usually smaller in scale than intended.
FINAL PIECE	An image or sculpture that is the end product of your project/journey. Visual representation of pulling all prep work together to showcase your ideas and journey.

Always remember…

RULE OF THIRDS	The rule of thirds is a guideline which applies to the process of composing visual images. The horizon sits at the horizontal line dividing the lower third of the photo from the upper two-thirds.
LEADING LINES	Leading lines refers to a composition technique whereby the viewer's eye is attracted to lines that lead directly to the principle subject in the image.
BALANCED ELEMENTS	When different parts of a photo command your attention equally, perfect balance is achieved.
CROP	Cropping is the removal of unwanted outer areas from a photograph or illustrated image.

Picture This…



Deeper Learning…

FORMAL ELEMENTS OF ART: -

COLOUR: Primary colours cannot be mixed by using any other colours but in theory, all other colours are made from them.

Red + Yellow = Orange
Blue + Yellow = Green
Red + Blue = Purple

Orange, Green and Purple are secondary colours. All other colours (primary + secondary = tertiary).

Colour schemes could be adhered to fit with theme.

SHAPE: An area closed by line. Geometric or basic.

FORM: Form is a 3D shape which can be sculpted using clay, wire or Modroc.

In 2D art, tone and perspective can be used to create an illusion of 3-dimensions using light and dark to create shadows.

TEXTURE: Surface quality. The way it feels physically or the way it is made to feel.

TONE: Light to dark to create depth. This could be a shade or how dark or light a colour appears. Tones are created by the way the light falls onto a 3D object.

PATTERN: Created by repeating lines, shapes, tones or colour. The design used to create a pattern is often referred to as a motif. Motifs can be simple shapes or complex arrangements.

Patterns can be man-made, like a fabric or wallpaper design, or natural, such as the markings on animal fur.

LINE: Line can be used to portray different qualities such as: contours, feelings or expressions and movements.

Activity: Create a draft copy of your final design ideas. Make sure to label and photocopy sections if using a combination of a number of pieces.

SCIENCE OF COOKING FOOD

Raising Agents

- **Whisking:** whisking eggs to trap air and creating a foam, used for meringues and soufflés
- **Sieving:** Sieving will trap air, used for cakes and bread
- **Rubbing in**: Rubbing fat in to flour with add some air, used for cakes and biscuits
- **Creaming:** Mixing fat and sugar together traps air, used for cakes
- **Laminating:** Layers of fat in pastry will trap air when cooked, used for puff and flaky pastry

WHY DO WE COOK FOOD?

- To kill bacteria
- To make it easier to eat and digestible
- To improve the sensory attributes
- Adds variety
- To enable ingredients to perform their function

Acids & alkalis

- **Acids:** can soften connective tissue such as lemon juice or vinegar in a marinade. Can also be used to preserve foods by pickling.
- **Alkalis:** Bicarbonate of soda is used as a raising agent. Mixed with cream of tartar creates 'Baking powder'

Radiation

The transfer of heat by electromagnetic radiation. Example: Grilling or BBQ

Conduction

The transfer of heat by direct contact. Example: Frying

Convection

The transfer of heat via mass movement of particles. Example: Boiling, Poaching

Effect of heat on foods

- **Protein:** proteins denature (unravel) and coagulate. When protein and carbohydrate are heated the maillard effect occurs which turns meat products brown
- **Fat:** Fat melts and becomes soft, this is called plasticity. Fats can also brown adding flavour and colour.
- **Carbohydrate—starch:** When starch and liquid are heated gelatinisation occurs which makes the starch swell, used to thicken sauces. When direct heat is applied to starch Dextrinization occurs turning the food brown and crisp.
- **Carbohydrate– sugar:** When heat is applied to sugar caramelisation occurs which turns the sugar brown and in some cases will go crisp

Oxygen and Food

- Fruit and vegetables when contact with oxygen is made, this is called enzymic browning
- Meat that comes in to contact with oxygen will turn brown, this is a discolouration of the myoglobin
- Fats and oils that come in to contact with oxygen will go rancid where it develops an unpleasant odour and flavour.

Dry Cooking Methods	
Roasting	Cooked in the dry heat of the oven and basted with hot fat
Baking	Cooked in the dry heat of the oven
Grilling	Cooked by the radiant heat of a hot grill
Frying Methods	
Stir Fry	Cooked quickly over intense heat in a wok with little oil
Shallow Frying	Cooked in a shallow pan with hot fat
Deep Frying	Cooked submerged in very hot oil
Moist cooking Methods	
Boiling	Cooked quickly in boiling water
Poaching	Cooked in gentle simmering water
Stewing	Cooked gentle and slow in liquid

EMULSION: a stable mixture of liquids that will not freely combine that has an agent such as egg yolk added to create an emulsion. Example Mayonnaise

Geography- Year 11 Knowledge Organiser – The Changing Economic World

What is development?

Development is an improvement in living standards through better use of resources.

Economic	This is progress in economic growth through levels of industrialisation and use of technology.
Social	This is an improvement in people's standard of living. For example, clean water and electricity.
Environmental	This involves advances in the management and protection of the environment.

Measuring development

These are used to compare and understand a country's level of development.

Economic indictors examples	
Employment type	The proportion of the population working in primary, secondary, tertiary and quaternary industries.
Gross Domestic Product per capita	This is the total value of goods and services produced in a country per person, per year.
Gross National Income per capita	An average of gross national income per person, per year in US dollars.
Social indicators examples	
Infant mortality	The number of children who die before reaching 1 per 1000 babies born.
Literacy rate	The percentage of population over the age of 15 who can read and write.
Life expectancy	The average lifespan of someone born in that country.
Mixed indicators	
Human Development Index (HDI)	A number that uses life expectancy, education level and income per person.

Variations in the level of development

LICs	Poorest countries in the world. GNI per capita is low and most citizens have a low standard of living.
NEEs	These countries are getting richer as their economy is progressing from the primary industry to the secondary industry. Greater exports leads to better wages.
HICs	These countries are wealthy with a high GNI per capita and standards of living. These countries can spend money on services.

Causes of uneven development

Development is globally uneven with most HICs located in Europe, North America and Oceania. Most NEEs are in Asia and South America, whilst most LICs are in Africa. Remember, development can also vary within countries too.

Physical factors affecting uneven development

Natural Resources

- **Fuel sources** such as oil.
- Minerals and metals for fuel.
- **Availability for timber**.
- Access to **safe water**.

Natural Hazards

- Risk of tectonic hazards.
- Benefits from **volcanic material** and **floodwater.**
- Frequent hazards **undermines redevelopment**.

Climate

- **Reliability** of rainfall to benefit farming.
- **Extreme climates** limit industry and affects health.
- Climate can **attract tourists.**

Location/Terrain

- **Landlocked countries** may find trade difficulties.
- Mountainous terrain makes farming difficult.
- **Scenery attracts tourists**.

Human factors affecting uneven development

Aid

- Aid can help some countries develop **key projects** for infrastructure faster.
- **Aid** can improve services such as schools, hospitals and roads.
- Too much **reliance on aid** might stop other trade links becoming established.

Trade

- Countries that export more than they import have a **trade surplus**. This can improve the national economy.
- Having **good trade relationships**.
- **Trading goods** and services is more profitable than raw materials.

Education

- Education creates a **skilled workforce** meaning more goods and services are produced.
- **Educated people earn more money**, meaning they also pay more taxes. This money can help develop the country in the future.

Health

- **Lack of clean water** and poor healthcare means a large number of people suffer from **diseases**.
- People who are ill cannot work so there is little contribution to the economy.
- More money on healthcare means less spent on development.

Politics

- **Corruption** in local and national governments.
- The **stability of the government** can effect the country's ability to trade.
- Ability of the country to **invest into services and infrastructure**.

History

- **Colonialism** has helped Europe develop, but slowed down development in many other countries.
- Countries that went through industrialisation a while ago, have now develop further.

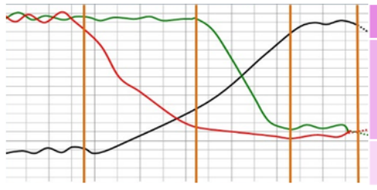
Consequences of Uneven Development

Levels of development are different in different countries. This uneven development has consequences for countries, especially in wealth, health and migration.

Wealth	People in more developed countries have higher incomes than less developed countries.
Health	Better healthcare means that people in more developed countries live longer than those in less developed countries.
Migration	If nearby countries have higher levels of development or are secure, people will move to seek better opportunities and standard of living.

The Demographic Transition Model

The demographic transition model (DTM) shows population change over time. It studies how birth rate and death rate affect the total population of a country.



STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
High DR *High BR* *Steady*	*BR Low* *Declining DR* *Very High*	*Rapidly falling DR* *Low BR* *High*	*Low DR* *Low BR* *Zero*	*Slowly Falling DR* *Low BR* *Negative*
e.g. Tribes	**e.g. Kenya**	**e.g. India**	**e.g. UK**	**e.g. Japan**

Reducing the Global Development Gap

Microfinance Loans
This involves people in LICs receiving smalls loans from traditional banks.
+ Loans enable people to begin their own businesses
- Its not clear they can reduce poverty at a large scale.

Foreign-direct investment
This is when one country buys property or infrastructure in another country.
+ Leads to better access to finance, technology & expertise.
- Investment can come with strings attached that country's will need to comply with.

Aid
This is given by one country to another as money or resources.
+ Improve literacy rates, building dams, improving agriculture.
- Can be wasted by corrupt governments or they can become too reliant on aid.

Debt Relief
This is when a country's debt is cancelled or interest rates are lowered.
+ Means more money can be spent on development.
- Locals might not always get a say. Some aid can be tied under condition from donor country.

Fair trade
This is a movement where farmers get a fair price for the goods produced.
+ Paid fairly so they can develop schools & health centres.
-Only a tiny proportion of the extra money reaches producers.

Technology
Includes tools, machines and affordable equipment that improve quality of life.
+ Renewable energy is less expensive and polluting.
- Requires initial investment and skills in operating technology

CS: Reducing the Development Gap In Jamaica

Location and Background

Jamaica is a LIC island nation part of the Caribbean. Location makes Jamaica an attractive place for visitors to explore the tropical blue seas, skies and palm filled sandy beaches

Tourist economy

-In 2015, **2.12 million** visited.
-Tourism **contributes 27% of GDP** and will increase to **38% by 2025**.
-**130,000 jobs** rely on tourism.
-**Global recession** 2008 caused a **decline in tourism**. Now tourism is beginning to recover.

Multiplier effect

-**Jobs from tourism** have meant **more money** has been spent in shops and other businesses.
-Government has invested in **infrastructure** to support tourism.
-**New sewage treatment** plants have reduced pollution.

Development Problems

- Tourists do not always **spend much money** outside their resorts.
- Infrastructure improvements **have not spread** to the whole island.
- Many people in Jamaica still live in **poor quality housing** and **lack basic services** such as healthcare.

Activities

1. To what extent is the HDI the most effective measure of development?
2. Use a range of development indicators to explain the difference between standard of living and quality of life.
3. Evaluate how far economic development can be linked to the DTM.
4. Compare the population structure of an LIC Or NEE with one of a HIC.
5. Explain the link between trade and the development gap.
6. How does uneven development lead to disparities of global wealth
7. How does uneven development cause international migration?
8. Hoe can industrial development reduce the development gap?
9. Explain why the use of aid must be sustainable if it is to be effective in raising a poor country's level of development.
10. How can debt relief help to improve the status of woman?

Case Study: Economic Development in Nigeria

Location & Importance

Nigeria is a NEE in West Africa. Nigeria is just north of the Equator and experiences a range of environments.
Nigeria is the most populous and economically powerful country in Africa. Economic growth has been base on oil exports.

Influences upon Nigeria's development

Political

Suffered **instability** with a **civil war** between 1967-1970.
From 1999, the country became **stable** with **free and fair elections**.
Stability has **encouraged global investment** from China and USA.

Social

Nigeria is a **multi-cultural, multi-faith society**. Although mostly a strength, diversity has caused **regional conflicts** from groups such as the Boko Haram terrorists.

Cultural

Nigeria's **diversity** has created rich and varied **artistic culture**.
The country has **a rich music, literacy and film industry** (i.e. Nollywood).
A successful national football side.

Industrial Structures

Once mainly based on agriculture, **50% of its economy is now manufacturing and services**.
A thriving manufacturing industry is **increasing foreign investment** and **employment opportunities**.

The role of TNCs

TNCs such as **Shell** have played an important role in its economy.
+ Investment has **increased employment and income**.
- **Profits move to HICs**.
- Many **oil spills** have **damaged fragile environments**.

Changing Relationships

Nigeria plays a leading role with the **African Union** and **UN**.
Growing links with **China** with huge **investment in infrastructure**.
Main import includes petrol from the EU, cars from Brazil and phones from China.

Environmental Impacts

The 2008/09 **oil spills devastated swamps** and its **ecosystems.**
Industry has caused **toxic chemicals** to be discharged in open sewers - r**isking human health**.
80% of forest have been **cut down.** This also increases **CO^2 emissions**.

Aid & Debt relief

+ Receives **$5billion** per year in aid.
+ **Aid groups** (ActionAid) have improved health centres, provided anti-mosquito nets and helped to protect people against AIDS/HIV.
- Some aid fails to reach the people who need it due to **corruption**.

Effects of Economic Development

Life expectancy has increased from 46 to 53 years. 64% have access to safe water. Typical schooling years has increased from 7 to 9.

"Evaluate to what extent, economic development has improved the quality of people's lives in Nigeria"

"Suggest how the UK benefits economically and politically from its membership from the commonwealth"

Case Study: Economic Change in the UK

UK in the Wider World

The UK has one of the largest economies in the world.
The UK has huge political, economic and cultural influences.
The UK is highly regarded for its fairness and tolerance.
The UK has global transport links i.e. Heathrow and the Eurostar.

Causes of Economic Change

De-industrialisation and the **decline** of the UK's industrial base.
Globalisation has meant many industries have moved overseas, where labour costs are lower.
Government investing in supporting vital businesses.

Towards Post-Industrial

The **quaternary industry** has **increased**, whilst **secondary** has **decreased**.
Numbers in **primary** and **tertiary industry** has **stayed the steady**.
Big increase in **professional** and **technical jobs**.

Developments of Science Parks

Science Parks are groups of scientific and technical knowledge based businesses on a single site.

- Access to **transport routes**.
- **Highly educated workers**.
- Staff benefit from **attractive working conditions**.
- Attracts **clusters** of related **high-tech businesses**.

CS: UK Car Industry

Every year the UK makes 1.5 million cars. These factories are owned by large TNCs. i.e. Nissan.

- 7% of energy used there factories is from **wind energy**.
- New cars are more energy **efficient and lighter**.
- Nissan produces **electric and hybrid cars**.

Change to a Rural Landscape

Social

Rising house prices have caused tensions in villages.
Villages are **unpopulated** during the day causing **loss of identity**.
Resentment towards **poor migrant communities**.

Economic

Lack of affordable housing for local first time buyers.
Sales of farmland **has increased rural unemployment**.
Influx of poor migrants puts **pressures** on local services.

Improvements to Transport

A **£15 billion 'Road Improvement Strategy'**. This will involve 10 new roads and 1,600 extra lanes**.**
£50 billion HS2 railway to improve connections between key UK cities.
£18 billion on Heathrow's controversial **third runway**.
UK has many **large ports** for importing and exporting goods.

UK North/South Divide

- Wages are **lower** in the North.
- Health is **better** in the South.
- Education is **worse** in the North.

+ The government is aiming to support a **Northern Powerhouse** project to resolve regional differences.
+ More **devolving of powers** to disadvantaged regions.

The Challenge of Resource Management

Resource Challenges

Resources are things that humans require for life or to make our lives easier. Humans are becoming increasingly dependent on exploiting these resources, and as a result they are in high demand.

Significance of Water

Resources such as food, energy and water are what is needed for basic human development.

FOOD	WATER	ENERGY
Without enough nutritious food, people can become **malnourished**. This can make them ill . This can prevent people working or receiving education.	People need a supply of **clean and safe water** for drinking, cooking and washing. Water is also needed for food, clothes and other products.	A good supply of energy is needed for a basic standard of living. People need **light and heat** for cooking or to stay warm. It is also needed for industry.

Demand outstripping supply

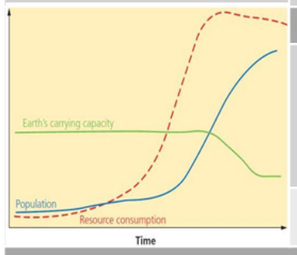
The demand for resources like food, water and energy is rising so quickly that supply cannot always keep up. Importantly, access to these resources vary dramatically in different locations

1. Population Growth

- Currently the global population **is 7.3 billion**.
- Global population has risen **exponentially** this century.
- Global population is expected to reach **9 billion by 2050**.
- With more people, the **demand** for food, water, energy, jobs and space **will increase**.

2. Economic Development

- As **LICs** and **NEEs** develop further, they require **more energy** for industry.
- **LICs** and **NEEs** want similar lifestyles to **HICs**, therefore they will need to **consume more resources**.
- Development means **more water is required** for food production as diets improve.



Resource Reliance Graph

Consumption – The act of using up resources or purchasing goods and produce.
Carry Capacity – A maximum number of species that can be supported.

Resource consumption exceeds Earth's ability to provide!

3. Changing Technology and Employment

- The demand for resources has driven **the need for new technology** to reach or gain more resources.
- More people in the **secondary and tertiary industry** has increased the **demand for resources** required for electronics and robotics.

Food in the UK

Growing Demand

- The UK imports about 40% of its food. This increases people's **carbon footprint**.
- There is growing demand for greater choice of **exotic foods** needed all year round.
- Foods from abroad are more affordable.
- Many food types are unsuitable to be grown in the UK.

Impact of Demand

Foods can travel long distances (food miles). Importing food adds to our carbon footprint.
+ Supports workers with an income
+ Supports families in LICs.
+ Taxes from farmers' incomes contribute to local services.
- Less land for locals to grow their own food.
- Farmers exposed to chemicals.

Agribusiness

Farming is being treated like a large industrial business. This is increasing food production.
+ Intensive faming maximises the amount of food produced.
+ Using machinery which increases the farms efficiency.
- Only employs a small number of workers.
- Chemicals used on farms damages the habitats and wildlife.

Sustainable Foods

Organic foods that have little impact on the environment and are healthier have been rising.
Local food sourcing is also rising in popularity.

- **Reduces emissions** by only eating food from the UK.
- **Buying locally sourced** food supports local shops and farms.
- A third of people **grow their own food**.

Water in the UK

Growing Demand

The average water used per household has risen by 70%. This growing demand is predicted to increase by 5% by 2020.
This is due to:

- A growing UK population.
- Water-intensive appliances.
- Showers and baths taken.
- Industrial and leisure use.
- Watering greenhouses.

Deficit and Surplus

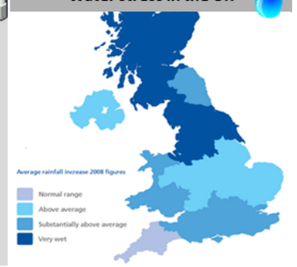
The north and west have a **water surplus** (more water than is required).
The south and east have a **water deficit** (more water needed than is actually available).
More than half of England is experiencing **water stress** (where demand exceeds supply).

Pollution and Quality

Cause and effects include:

- Chemical run-off from farmland can destroy habitats and kills animals.
- Oil from boats and ships poisons wildlife.
- Untreated waste from industries creates unsafe drinking water.
- Sewage containing bacteria spreads infectious diseases.

Water stress in the UK



Management

UK has **strict laws** that limits the amount of discharge from factories and farms.
Education campaigns to inform what can be disposed of safety.
Waste water treatment plants remove dangerous elements to then be used for safe drinking. Pollution traps catch and filter pollutants.

Water Transfer

Water transfer involves moving water through pipes from areas of surplus (Wales) to areas of deficit (London).
Opposition includes:

- Effects on **land and wildlife**.
- High maintenance **costs**.
- The **amount of energy** required to move water over long distances.

Energy in the UK

Growing Demand

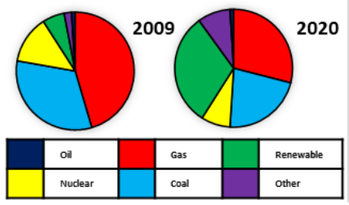
The UK **consumes less energy** than compared to the 1970s despite a smaller population. This is due to the **decline of industry**.

Energy Mix

The majority of UK's energy mix comes from **fossil fuels**. By 2020, the UK aims for 15% of its energy to come from **renewable sources**. These renewable sources do not contribute to **climate change**.

Changes in Energy Mix

- 75% of the UK's oil and gas has been used up.
- Coal consumption has declined.
- UK has become too dependent on imported energy.



Energy in the UK (continued)

Significance of Renewables

+ The UK government is investing more into low carbon alternatives.
+ UK government aims to meet targets for reducing emissions.
+ Renewable sources include wind, solar and tidal energy.
- Although infinite, renewables are still expensive to install.
- Shale gas deposits may be exploited in the near future

Exploitation

Nuclear	New plants provide job opportunities. Problems with safety and possible harm to wildlife. Nuclear plants are expensive.
Wind Farm	Locals have low energy bills. Reduces carbon footprint. Construction cost is high. Visual impacts on landscape. Noise from wind turbines.

Subject: History Year 11 Topic: Power and the People 2

Key Vocabulary…

Catholic	A Christian who follows the teaches of the Pope as leader of the Church.
Protestant	A Christian who does not follow the teaches of the Pope as Church leader.
Economics	The study of the production of wealth and the exchange of goods of services.
Reformation	A period in which large populations in Europe split from the Catholic Church.
Divine Right of Kings	A common belief in the middle ages, the idea that the King alone has the right to rule and was chosen by God.
Puritan	An extreme Protestant who believes that people should live a humble, simple life of Christian worship.
Royal Authority	The unquestioned power of the King or Queen as ruler of the country.
Civil War	A war between different groups of people within the same country.

Timeline

Act of Supremacy	1534	A law passed by Henry VIII making himself Head of the Church of England.
Pilgrimage of Grace	1536	Catholics in Yorkshire and Lincolnshire rebel against Henry's religious changes.
Accession of Charles I	1625	Charles I becomes King of England and Scotland.
Charles I dissolves Parliament	1629	Charles I begins to rule England without the advice or consent of Parliament.
Introduction of Laudian Prayer Book in Scotland	1637	Charles I forces Scotland to accept a new prayer book which causes a the Covenanters Rebellion.
Start of English Civil War	1642	Charles and Parliament start fighting a war for control of England.
Execution of Charles I	1649	After a trial, Charles is found guilty of treason and beheaded.
Declaration of Independence	1776	The Thirteen Colonies declare independence from Britain.

Important People

Henry VIII	King between 1509 and 1547. He started the English Reformation, by breaking from the Catholic Church.
Oliver Cromwell	MP and landowner. He led the New Model Army in the English Civil War and then ruled England for 9 years.
Charles I	Beheaded by Parliament in 1649 after trying to rule England without them.
George Washington	Leader of the American Continental Army and first President of the United States.

What changed over the period?

Henry VIII ruled as an 'absolute monarch', meaning he personally controlled the country and did not have to listen to anyone else. He called Parliament as and when he needed to raise taxes. 100 years later Charles I tried to rule the same way and been beheaded for it. By 1689, Parliament had started to become more powerful than the monarch. Ideas such as democracy and representation had fueled this change.

Always Remember…

- The entire country was Catholic before Henry VIII's Reformation of the English Church.
- Protestantism spread the idea of challenging the established authority, including the authority of the King.
- After the execution of Charles I, this ideas never went away and eventually led to the American Declaration of Independence.

Deeper Learning…

State three differences between Catholicism and Protestantism.
Describe the main events and people involved in the Pilgrimage of Grace.
Explain the causes of the English Civil War.
Analyse the significance of the trial of King Charles I in the short and long-term.
Project: Create a fact-file on the American Constitution and the Declaration of Independence.

Activity – 'The main cause of the English Civil War was the English Reformation.' How far do you agree with this statement?

Subject: History Year 11 Topic: Power and the People 3

Key Vocabulary…

Industrial Revolution	A period of change brought about by new technologies allowing factories to mass-produce.
Suffrage	The right to vote.
Economics	The study of the production of wealth and the exchange of goods of services.
Protest	To gather together to publicly demonstrate disagreement with the rules.
Parliament	A group of people who represent the people of a nation in making decisions on how to run the country.
Abolitionism	The campaign against slavery in the British Empire.
Trade Union	A group of worker who gather together to negotiate for better pay and working conditions.
Chartists	A protest group who wanted to change the rules on who could vote and how elections were run.

Timeline

Abolition of Slavery in Britain	1807	Slavery was made illegal in the British Isles.
End of the Napoleonic Wars	1815	A huge series of wars against France.
The First Great Reform Act	1832	Middle-class wealthy people were given the right to vote.
Formation of the Chartist Movement.	1833	A loose organisation of campaign groups wanting voting reform.
Factory Act	1833	A law restricting working hours and conditions in factories.
Poor Law Amendment Act	1834	A law which meant that unemployed people were put into workhouses.
The Tolpuddle Martyrs	1834	A group of men were sentenced to transportation for trying to start a trade union.
Repeal of the Corn Law	1846	Removal of a law which taxed food imported from abroad.
Third Chartist Petition	1848	A large petition of signatures given to parliament by Chartists.

Important People

Henry Hunt	A radical orator who spoke about reforming the voting system at Peterloo.
Robert Peel	Prime Minister of the United Kingdom who repealed the Corn Law and invented the police force.
William Wilberforce	A prominent abolitionist campaigner against slavery.
Lord Shaftesbury	A reformer responsible for great changes in working conditions in the 19th century.

What changed over the period?

At the beginning of the 19th century slavery was legal throughout the British Empire and the Industrial Revolution was really just getting going; most people still lived in the countryside and farmed the land.
By 1900, slavery was illegal, most men in Britain could vote (but not women) and there were many laws protecting the rights of workers. Most people now lived in huge cities and worked in factories powered by electricity.

Always Remember…

The 8 Key Factors in Power and the People:

- War
- Religion
- Chance
- Government
- Communication
- The Economy
- Ideas like democracy, equality and representation
- The role of the individual

Deeper Learning…

State the names of three protest groups in the 19th century and the years they were active.
Describe the methods of the campaign to abolish slavery.
Explain the causes of the Matchgirls' and Dockers' Strikes in the 1880s and 1890s.
Analyse the aims of the Chartist movement. Which would help the working classes the most?
Project: Research the conditions in factories and mines during the 19th century – were people right to demand better conditions?

Activity – Was communication the main factor in causing protest in 19th century. Explain your answer using a range of examples from across the 19th century.

Subject: History Year 11 Topic: Power and the People 4

Key Vocabulary…

Industrial Revolution	A period of change brought about by new technologies allowing factories to mass-produce.
Suffrage	The right to vote.
Economics	The study of the production of wealth and the exchange of goods of services.
Protest	To gather together to publicly demonstrate disagreement with the rules.
Parliament	A group of people who represent the people of a nation in making decisions on how to run the country.
Strike	Workers refuse to work in order to put pressure on business owners and the government.
Trade Union	A group of worker who gather together to negotiate for better pay and working conditions.
Immigrants	People who move into the country from another, many immigrants came from the British Empire.

Timeline

Formation of the NUWSS	1897	The main women's suffrage groups gathered into one.
Formation of the WSPU	1903	The Suffragette group was set up to take aggressive protest action.
The end of WWI	1918	Millions returned home and the demand for many resources fell.
Women gain the right to vote	1918	Some women over 30 gained the right to vote.
The General Strike	1926	The miners, dockers and railway workers went on strike.
Women gain voting equality with men	1928	Women gained the same right to vote as men for the first time.
The 'Windrush' begins	1948	Lots of working-age people began to move to Britain from the rest of the Empire.
Rivers of Blood Speech	1968	Enoch Powell MP makes a famous speech condemning immigration.
The Miners' Strike	1984	Coal-miners across the country go on strike against mines closures.

Important People

Millicent Fawcett	A campaigner for women's suffrage who formed the Suffragist movement in 1897. (NUWSS)
Emmeline Pankhurst	A campaigner for women's suffrage who formed the Suffragette movement in 1903. (WSPU)
Stanley Baldwin	Conservative Prime Minister during the General Strike in 1926.
Enoch Powell	A Conservative MP who spoke out against the immigration of more non-white people to the UK.

What changed over the period?

By the beginning of the 20th century, Britain was an advanced industrial nation and social changes such as women's suffrage were dividing society. The trade unions were at the height of their power as workers campaigned for better pay and conditions. During the 20th century the power of the trade unions would diminish drastically and Britain would be divided further when the government invited lots of people from the Empire to immigrate here in the mid-part of the century.

Always Remember…

The 8 Key Factors in Power and the People:

- War
- Religion
- Chance
- Government
- Communication
- The Economy
- Ideas like democracy, equality and representation
- The role of the individual

Deeper Learning…

State the main trade union laws created by the government after the strikes in the 1920s and 1980s.

Describe the methods of the suffragist movement led by Millicent Fawcett.

Explain the consequences of end of WWI for British social and industrial changes.

Was the economy was the main factor in causing social change in the 20th century?

Project: Create a fact-file on the 'windrush' generation and its impact on Britain.

Activity – Was the role of the individual was the main factor in causing of protest in the 20th century? Use examples from across the 20th century.

Subject RE Year 11 Topic Islam beliefs

Key Vocabulary…

Tawhid	Oneness & supremacy of Allah
Risalah	Belief in prophet hood
Akhirah	Belief in life after death
Day of Judgement	Belief that people will be judged on how they have lived their life as a good Muslim.
Sunnah	Following the teachings & actions of Muhammad
Night of Power	The first night of the revelation of the Quran
Night Journey	The night Muhammad went on a miraculous journey to heaven (Jannah) to talk to the prophets
Hijrah	The journey Muhammad made from Mecca to Medina to escape persecution
Ummah	The Muslim community
Six articles of faith	Sunni Muslim key beliefs: Supremacy of Allah, Tawhid, Day of Judgement, authority of the Quran, authority of prophets and angels
Five roots of usul ad-Din	Shi'a Muslims beliefs: Resurrection, imamate, prophets, Tawhid and Judgement Day

Angels

Muslims have many beliefs about angels. Firstly, Muslims believe angels are spiritual beings of light and have no free will so follow Allah's will and give messages from Allah to humans. Jibril, (Gabriel) for example, is a special angel (archangel) who gave the words of the Quran to Prophet Muhamad as this is what God wanted. Secondly, Muslims believe that angels are involved in the lives of humans from conception to death. Some angels are **guardian angels** who take care of each person through their lives. Other angels are responsible for writing down in the **Book of Deeds** everything a person does. This book will be used on the **Day of Judgement** to decide if a person goes to Paradise of Hell. The sacred writing about angels in the **Quran** is: "Each person has angels before him and behind, watching over him by God's command."(Qur'an). This sacred writing shows that Muslims believe angels have an important role in the lives of humans and connecting humans to Allah and the belief in angels is one of the **Six Articles of Faith**.

Muhammad

Muhammad received the first revelation of the Quran from angel Jibril on the Night of Power

Muhammad in Mecca: Three years after the first revelation Muhammad began preaching the words he had received from Angel Jibril: there is only one God and complete surrender to God is the only way to live life. He challenged the people of Mecca to give up cheating, drinking alcohol, gambling and idol worship. This was not the message the leaders of Mecca wanted to hear so he was persecuted. He left Mecca to avoid persecution in 622CE and went to the city of Medina. This is known as the Hijrah (departure) and is the beginning of the Ummah (worldwide Muslim community).

The Night Journey

Before the Hijrah Muhammad had a miraculous experience. Angel Jibril took Muhammad on a journey to Jerusalem. This event is known as the **Night Journey.** Muhammad was carried on a horse-like creature with wings to Jerusalem and then he ascended to heaven and spoke to other prophets like Jesus. He was told that Muslims should pray 5 times every day. When he returned he circled the Ka'aba 7 times.

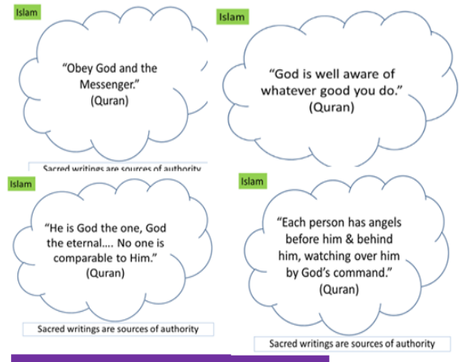
It is important for Muslims to follow the example of Muhammad because firstly, Muhammad is a role model and is an example of a perfect human being. He is a living example of Allah's message. Secondly, Muhammad is the last prophet who Allah gave his final message/Qur'an to – the seal of the prophets. Muhammad's teachings and actions called Sunnah, influences how a person lives their life. The Sunnah teaches Muslims how to carry out Allah's will in their daily lives, for example, how to pray five times every day. The sacred writing which shows Muhammad's importance is: *" He (Muhammad) is God's messenger and the seal of the prophets."* This shows that Muhammad is the last prophet, no other prophet is to follow and that Muhammad is seen a the perfect prophet. He is the most important prophet of them all and seal of the prophet means he is the superior prophet.

Always Remember…

Tawhid

Muslims believe in the Tawhid: the oneness & supremacy of Allah. All the prophets taught people to believe in the Tawhid. The Quran says: "He is God, the one, God the eternal …No-one is comparable to Him."

Sacred writings



Deeper Learning…

Create a connection map to show the links between Muslim beliefs and Muslim practices: show how the beliefs in the six articles of faith (Sunni) and the five roots of Usul ad-Din (Shi'a) link to the Five Pillars of Islam, the celebration of festivals and the Ten Obligatory Acts.

Activity – Plan your evaluation answer to 12 mark questions.

1. "The Quran contains all the guidance that Muslims need to live a perfect Muslim life." 2. "For Muslims, the prophets make better role models than the angels." 3. Predestination means Muslims have no free will." (12)

Subject RE Year 11 Topic Islam Practices

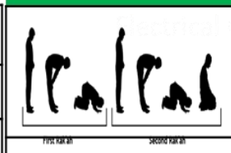
Key Vocabulary…

Shahadah	Declaration of faith in Islam
Salah	Five daily prayers
Rak'ah	A set pattern of prayer movements and recitations when praying.
Jummah	Special Friday prayers. Men are expected to attend the mosque.
Sawm	Fasting during the month of Ramadan. Ramadan is the month when angel Jibril started to recite the Quran to Muhammad.
Laylat-al-Qadr	The Night of Power when Muhammad received the Quran.
Zakah	Muslims give 2.5% of their savings to charity every year. This is almsgiving.
Hajj	A spiritual journey to Mecca. Muslims make this pilgrimage once in their lives. The holy shrine of Islam, the Ka'aba, is in Mecca.
Jihad	The struggle against evil and to live a life to submit to God to please Allah.
Id-ul-Fitr	A festival which celebrates the end of Ramadan.
Id-ul Adha	A festival which celebrates Prophet Ibrahim's obedience to God as he was willing to sacrifice his son, and this festival marks the end of Hajj.
Ashura	A festival which is important to Shi'a Muslims as they remember the death of Husayn in the battle of Karbala.

The Five Pillars of Islam

The Five Pillars of Islam are five duties Muslims perform to submit to the will of Allah, to be good Muslims and to live a perfect Muslim life.

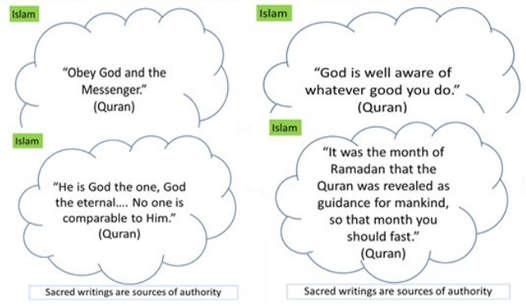
Picture This…

	**Rak'ahs** — A set pattern of prayer movements and recitations when praying. Muslims face the city of Mecca in pray.
	**Wudu** — Washing before prayers to show respect to Allah.
	**Ka'aba** — The holiest shrine in Islam. Prophet Ibrahim re-built it as the first Ka'aba, built by prophet Adam, was destroyed. On the Hajj Muslims circle it 7 times to remember that Prophet Muhammad did when he returned from the Night Journey.
	**Ihram** — On the Hajj pilgrims enter a state of Ihram by washing, praying and wearing a white sheet.
	**Circle the Ka'aba** — Muslims circle the Ka'aba to show Allah is at the centre of their lives.
	**Standing at Arafat** — Muslims spend al day praying in the hot sun to remind them what Judgement Day might be like and asking for forgiveness.
	**Throwing pebbles at Mina** — At Mina they throw stones at three stone walls to remember Ibrahim and how he rejected sin, temptation and evil.
	**Sacrifice an animal** — As part of the festival of Id-ul-Adha Muslims sacrifice an animal and the meat is given to family and the poor.

Always Remember…

Allah is at the centre of a Muslim's life which is reflected in the way they live their lives and the practices they perform. The Five Pillars of Islam, for example, celebrating Id-ul Fitr & Id-Ul-Adha and the greater jihad to be a good Muslim shows their belief in the Tawhid.

Sacred writings



Deeper Learning…

Create a connection map to show the links between Muslim beliefs and Muslim practices: show how the beliefs in the six articles of faith (Sunni) and the five roots of Usul ad-Din (Shi'a) link to the Five Pillars of Islam, the celebration of festivals and the Ten Obligatory Acts.

Activity – Plan your evaluation answer to 12 mark questions.

1. "The Shahadah is the most important pillar of Islam." 2. "Id-ul-Fitr & Id-ul-Adha should be public holidays in Britain." 3."The lesser jihad is more important than the greater jihad."

Year 11 HT 1 – Area of Study 4 Knowledge Organiser

Key Terminology

- **Gradual Transformation**: When a melody or rhythmic pattern gradually change shape.
- **Metamorphosis:** A short motif is changed gradually; one note at a time is changed so that the music completely changes over a period of time.
- **Additive Melody:** A short motif is gradually changed by adding a note at a time or changing a note for a rest
- **Subtractive Melody:** A short motif is gradually changed by taking away/subtracting a note at a time or changing a note for a rest
- **Phase Shifting:** Two or more parts begin with the same motif, these gradually move out of and then back into phase.
- **Polyphonic Texture:** This literally means 'different sounds or voices'. Polyphonic music has parts that weave in and out of each other. Polyphonic music is also sometimes called contrapuntal music.
- **Diatonic Harmony:** Diatonic harmony is a fancy way of saying chords or notes that relate to a certain key – i.e. they should work well together.
- **Phasing:** Phasing is a compositional technique in which the same part (a repetitive phrase) is played on two musical instruments, in steady but not identical tempi.
- **Ostinato:** A short repeated pattern.
- **Pulse:** The beat of the music. Every piece of music has a heartbeat. It doesn't need to be played by drums - you can 'feel' the beat.
- **Rhythm:** Notes have different lengths, some long, some short. When we combine long and short sounds, it creates a pattern, which is a rhythm.
- **Pitch:** Pitch is a variation of high and low sounds. Pitch increases and decreases by steps of a scale. Scales are Major and Minor.
- **Tempo:** Tempo means the speed of the music. Music can change tempo within a piece. We describe tempo using Italian words.
- **Dynamics:** Dynamics means the volume of the music. Music can change dynamics within a piece. We describe dynamics using Italian words.
- **Structure:** Music is divided into sections. The order of these sections creates a structure. Song structure includes Chorus, Verse, Instrumental etc.
- **Texture:** A single melody creates a thin sound. Adding more parts/layers creates a bigger sound. These layers can interact with each other.
- **Timbre:** Each instrument has a unique sound and sounds different to others. This individual sound quality is called Timbre.

Year 11 HT 2 – Area of Study 3 Knowledge Organiser

Key content/ ideas/ concepts

Origins – African slaves brought their musical traditions with them when they were transported to work in the North American colonies. These Work songs were sung rhythmically in time with the task being done. Their songs were passed on orally (word of mouth) and were never usually written down. They used call and response where phrases from a lead singer were followed by the others. Early styles of Blues was known as country blues and was usually a solo singer accompanied on guitar or piano sometimes with added harmonica or drums.

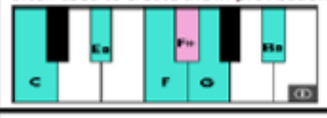
12 Bar Blues – The 12 bar blues is the name of the structure used in blues music. It is split in to 3 sections, which have 4 bars each.

Chords – A chord is 3 notes played together at the same time. A chord is also called a **triad.** Blues music only uses 3 chords which are played at the start of every bar.

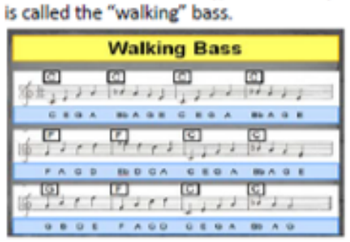
C/// C/// C/// C///
F/// F/// C/// C///
G/// F/// C/// C///

Improvisation – Improvisation is where music is performed 'on the spot'. Music that is improvised isn't traditionally written down, and the performers will use their musical knowledge to perform something from scratch. In Blues music, the improvisation is usually the notes from the Blues scale.

Blues Scale – The blues scale is a certain selection of notes that have been put together to sound 'bluesy'. The scale is often used to create the improvisation.



Walking Bass – The walking bass is the main part of any Blues song. This is usually played by the bass guitar. The tempo of the bass line should be steady, which is why it is called the "walking" bass.



Song Structure– Modern Blues songs can sometimes follow modern pop song structure (Verse-Chorus). Older Blues songs usually consist of 3 lines. Lines 1 & 2 are the same, and line 3 is usually different. (This also ties in with the 12 chords).

Lyrics – The lyrics of Blues songs were often about depression, lack of money/employability, loneliness and them missing their family. The lyrics of line 1 & 2 are usually he same, with line 3 being different.

Musical Elements – Musical elements are often used separately and together to help create the mood and expression the emotion on a song.

Composers–
Robert Johnson
Muddy Waters
Etta James

Keywords/ Glossary

12 Bar Blues	The structure used in Blues music. There are 3 lines of 4 bars.
Blues Scale	A selection of notes that are put together to create a 'bluesy' scale. The blues scale is used for the notes during improvised sections of music.
Chords	The chords are played at the beginning of each of the 12 bars. The chords used in Blues are C, F & G. **Rule for a chord: play a note – miss a note – play a note – miss a note – play a note.**
Improvisation	Improvisation is where music is played and made up 'on the spot'. Music that is improvised is not usually written down, and not pre-planned.
Walking Bass	The name for the bassline heard in Blues music. It is usually played at a "walking" tempo.
Call and Response	A performed plays/sings a 'call' and the other performers will 'respond'.

Wider reading

http://www.bbc.co.uk/schools/gcsebitesize/music/popular_music/blues2.shtml

https://www.misswardmusic.com/blues.html

https://www.educationquizzes.com/ks3/music/jazz-improvisation-01/

GCSE Physical Education – Sports Psychology

Classification of skill
Skills are specific tasks that can be learnt and practiced. *i.e. Golf swing / Lay up / Tennis volley*

Continuum = sliding scale of extremes at each end

Environmental Continuum – Open/Closed skills


OPEN — CLOSED

Difficulty Continuum - Complex/Simple skills


COMPLEX — BASIC/SIMPLE

Skilful Movement
- **Efficiency** e.g. no wasted energy – good timing
- **Pre-determined** e.g. planned like a routine
- **Co-ordinated** e.g. run and kick/hit
- **Fluent** e.g. one skill transfers into another
- **Aesthetic** e.g. technique looks good

Mental Preparation
- **Imagery** e.g. pictures in the mind
- **Mental Rehearsal** e.g. internal view / external view
- **Selective Attention** e.g. filtering relevant information
- **Positive Thinking** (self talk) e.g. rehearsing success
- **Concentration –**

Mental Preparation for Performance
Mental rehearsal/Imagery involves the athlete imagining themselves in an environment performing a specific activity using all of their senses.
This can be used to:
- Familiarise the athlete with a competition site or a complex play pattern or routine.
- Motivate the athlete by recalling images of their goals or of success in a past competition.
- Perfect skills or skill sequences the athlete is learning or refining.
- Reduce negative thoughts by focusing on positive outcomes


Feedback
Vital part of information processing which provides confidence, motivation and improves performance.
Intrinsic feedback: This comes from within the performer. Kinaesthetic senses provide feelings from muscles/joints about the action.
Extrinsic feedback: This comes from results and match analysis.
1.Knowledge of results – the outcome
2.Knowledge of performance – techniques used

Knowledge of Results: Information provided to the athlete detailing stats and data from the event/training
Knowledge of Performance Information provided to the athlete after the performance in terms of technique and tactical decision making.

Guidance (Positive & Negatives)

Visual guidance: Learners are shown the whole action by the coach. *i.e. demonstration/use of video playback.*

Verbal guidance: Learners listen to information given to a performer often using associated terminology. *i.e. instructions told to a team.*

Manual guidance: Coaches will physically move a performer and support them in performing a skill. *i.e. Trampolining somersault support.*

Mechanical guidance: Learners use equipment to help support the practicing of a skill. *i.e. floats during swimming stroke development.*

SMART Targets
Goal setting motivates performers
- Short Term goals:
- Long Term goals:
- Outcome goals: result based
- Performance goals: technique based

Specific	Measureable	Achievable	Recorded	Timed
Targets must be concise and clear. ***"To take a 0.5 second off my time personal best time"***	Must be measured and compared. Easy to monitor. ***"I will time my runs every training session for the next five weeks of training"***	Target must be challenging but yet reachable. Motivating. ***"My coach and I devised the training programme around improving leg power for my start"***	Needs to be recorded to track progress. ***"We keep a diary of times and distances for every training session to inform the planning for the next one and plot progress against our aim"***	Set for a particular time to be completed. ***"We agreed to do the training programme four times per week for the next five weeks"***

GCSE Physical Education – Health, Fitness and Well-Being

Lifestyle choices – the decisions we make about how we live and behave that impact on health.

Diet

Eating healthy	Eating unhealthy
1. Boosts energy levels 2. Reduces the risk of developing serious health conditions 3. Help lose weight	1. Leads to deficiencies 2. Increases weight and % body fat 3. Causes depression with poor body shape

Activity levels

Active lifestyle	Inactive lifestyle
1. Boosts self esteem 2. Reduces stress and anxiety 3. Improves fitness levels	1. Increases risk of disease 2. Decreases muscle mass, strength and energy levels

Work/rest/sleep balance

Good balance	Poor balance
1. Improves mood 2. Increases productivity at work 3. Contributes to quality of sleep	1. Increases the risk of depression 2. Leads to weight gain 3. Increased blood pressure

Well being – a combination of physical, emotional and social health.

Positives effects of training/exercise on:

Physical health

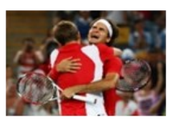
- Stronger bones (increased bone density)
- Lower cholesterol / reduced obesity
- Increase/development of components of fitness
- Increase life expectancy

Emotional health

- To increase self esteem/confidence – increased endorphins released
- Reduced risk of age-related diseases - dementia
- Relieve stress and tension
- Fun/enjoyment / reduced boredom

Social health

- To develop teamwork skill
- To meet new people/friends
- Develop communication skills
- Develop leadership skills



Social benefits may vary depending on age group:
1. Elderly
2. Children

Negative effects of training on:

- Physical health – overexertion leading to heart failure / overuse injuries
- Emotional health – training can lead to injury and cause depression
- Social health – training long hours means less time spent with family.

Recreational drugs – these are taken for pleasure and are legal to those over a certain age.

Smoking

Causes breathlessness and reduces the oxygen-carrying capacity. This affect aerobic ability for endurance events. Smoking (nicotine) increases the risk of lung cancer, bronchitis, pneumonia & emphysema.

Alcohol - contains chemicals which act on the brain affect judgement.

Balance, co-ordination and reactions are affected

Diuretic – increased water levels in urine and cause dehydration

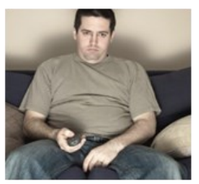
Reduction of glycogen levels and slower lactic acid removal

Liver problems

Sedentary lifestyle – a lifestyle with no or irregular physical activity. This includes sitting, reading, watching television & playing video games.

Health risks associated are:

- Heart disease
- Type 2 diabetes
- Obesity
- Osteoporosis
- Depression



Impact of a sedentary lifestyle on weight

Overweight – weighing more than the expected weight for height and gender / **Overfat** – high percentage of body fat

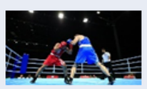
Obese – weighing significantly more than expected.

GCSE Physical Education – Health, Fitness and Well-Being	
Term	Definition/notes/concept

Keywords:

GCSE Physical Education – Performance-enhancing dugs and Ethics

Performance Enhancing Drugs (PEDs)
The rewards that come with winning are so great that athletes are increasingly temped to cheat. Fame, money and pressure are commonly cited despite the health risks or even death.

Drug	Reason for athlete taking this	Health risk	Sporting example who might use it
Beta Blockers	Slows heart rate, calms and steadies hands	Lowers blood pressure and oxygen delivery to muscles	Target sports 
Anabolic Steroids	Promote muscle growth and promotes a faster recovery time	High blood pressure, aggressive behaviour & develops male features	Power Events - 100m 
Stimulants	Increased alertness and reduce tiredness	Heart rate irregularities & increased aggression.	Boxing 100m sprinter
Diuretics	Rapid weight loss from removal of fluids. Masks other PEDs	Dehydration, nausea and headaches. Heart and kidney failure.	Jockey Boxing 
Peptide Hormones	**EPO** – increase Red Blood Cell production **Growth Hormone** – increase muscle mass	Increased blood thickness/blood clot Abnormal growth	Cycling Weight lifting  

Deviancy
Sportsmanship – the qualities of fairness and following the rules. *i.e. shaking hands after a match*

Etiquette – customs e.g. good manners

Gamesmanship – Bending the rules to gain an advantage *i.e. fainting injury to waste time*

Deviant behaviour – Behaviour that goes against the norms of society or the rules of a sport. This type of behaviour causes **negative role models**. *i.e. drug taking or biting a player*

Consequences:
1. Punishment – red card/sin bin/bans
2. Loss of sponsors / contracts with clubs
3. Damaging own reputation or club/country

Violence – A deliberate action with the intend to cause harm or injury.

Reasons for player violence:
- The importance of the result.
- The nature of the game.
- Provocation.
- Disappointment or frustration.
- Crowd behaviour.
- Emotional intensity.

GCSE Physical Education – Performance-enhancing dugs and Ethics	
Term	Definition/notes/concept

Keywords:

GCSE Physical Education – Participation rates and Commercialisation.

Participation rates – The number of people taking part in physical activity.

Age – The reason why different age groups participate can vary based on **access, cost, time available** and the **nature of the activity**.

Ethnicity – The number of **ethnic groups** (black, white & other minorities) playing sport are on the rise. Reasons for the difference include stereotypes, cost and cultural influences.

Socio-economic group – This is determined by profession and available income. Factors include cost, availability and time. *i.e. golf is far more expensive to participate than athletics.*

Gender – Men and women can participate for different reasons including image, cost, time and society. Increased media coverage has helped remove many stereotypes.

Disability – This can be a physical or mental impairment. Activities and rules are often adapted *i.e. Wheelchair tennis.* Other barriers include availability, cost and access.

Reasons for non-participation
Media Coverage – lack of coverage of some sports
Environment & Climate – denotes which sports are more or less relevant for an area
Time – work commitments reduce activity
Resources – facilities & provision
Role Models – lack of direction & peers

Data – facts and statistics gathered to highlight information. Shown in table or graph format.

Trends - a general direction in which something is developing or changing.

Agencies

Sport England – Agency that looks after sport participation across the country including elite athletes.
Department of Culture, Media and Sport – Department of the government responsible for sport in the United Kingdom.
National Governing Bodies – Agencies that are responsible for their specific sport within the country. They focus from grassroots to the elite level.

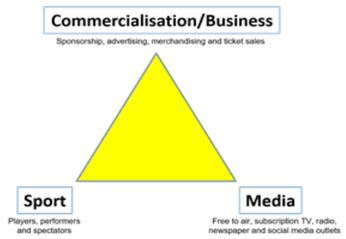
Commercialisation - Sport, media and commercialisation are closely linked in a what is known as a 'GOLDEN TRIANGLE'

Sponsor

Advantages	Disadvantages
• Raise awareness of brand leading to increased sales • Displays goodwill	• Poor behaviour from athletes/clubs causes negative media attention. • Smaller sponsors might struggle to compete with larger more global brands. • Some sponsors are not suitable to be promoted within sport. *i.e. tobacco*

Player/Performers

Advantages	Disadvantages
• Allows athletes to earn income as a full time job. • Can lead to additional roles post playing career within the sport.	• Encourages deviant behaviour due to the pressure of success. • Generally, favours male over female and able bodied over disabled. • Sponsorship might be short term.



Spectator

Advantages	Disadvantages
• Raises the profile of the sport due to increased exposure. • Changes to sport format/rules to make audience friendly.	• Tends to only support the popular sports. • The influence of TV has caused an increase in adverts and changed TV timings (traditions lost)

Advantages	Disadvantages
• Offers a wider choice of sports available to watch. • Viewing experience has ben enhanced due to technology	• Encourages spectating not participating. • Can become very expensive for fans/spectators. • Affects view experience - increased TV breaks.

GCSE Physical Education – Participation rates and Commercialisation

Term	Definition/notes/concept

Keywords:

Devising Log Knowledge Organiser

Section 1 – Response to stimulus (20 marks)

- Start by describing the stimulus you were given/ chosen.
- What was your first response to the stimulus?
- What were the different ideas, themes and settings you considered and how and why you reached your final decision. What did you discuss as a group?
- What YOU discovered from your research. Where did you collect your research from?
- What YOUR own dramatic aims and intentions are – what do you want to achieve with your character?
- What are the overall aims and objectives of the piece – what message would you like to convey?
- What style did you choose to

Section 2 – Development and Collaboration (20 marks)

- How did you develop and refine your ideas and those of the others in your group?
- How did you develop your piece in rehearsals?
- How did you structure your rehearsals? Did you have natural leaders? Did you have different responsibilities?
- How did you develop and refine your own theatrical skills during the devising process?
- What problems did you encounter during rehearsals and how did you overcome them?
- What drama conventions (techniques) did you decide to use and why?
- What structure did you decide for your drama and why?
- How did you give and receive feedback throughout?
- How did you respond to feedback throughout the process?
- How you used your refined theatrical skills in the final performance.
- How did you demonstrate your use of vocal

Section 3 – Analysis and Evaluation (20 marks)

- How far did you develop your theatrical skills?
- What benefits did you bring to the group and in what way did you help to shape the final piece?
- What was the overall impact you personally had on the devising, rehearsals and performance of your drama?
- Which areas of devising did not go as well as you would have hoped or could have been developed further?
- What did you hope to achieve from your performance? Were you successful? How do you think you achieved this? If you weren't successful why not? What would you change?
- Choose an aspect of your contribution to the final piece to write about in more detail – what you did, what was successful about it and what could have been improved?
- What feedback did you get from the audience about your work? Did they understand your work? Would you

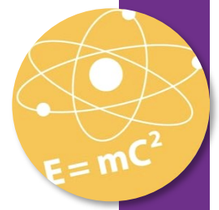
Checking your devising log

- ✓ Have you written three sections with the appropriate headings?
- ✓ Are the sections roughly the same length?
- ✓ Have you stayed within the final word count length? (2500 words)
- ✓ Have you provided evidence of research?
- ✓ Have you stated your dramatic aims and intentions?
- ✓ Have you shown how you developed and refined ideas?
- ✓ Have you explained how you helped the group?
- ✓ Have you shown how you responded to feedback?
- ✓ Have you demonstrated that you developed your theatrical skills?
- ✓ Have you explained how you positively shaped the final piece?
- ✓ Have you used correct theatrical terminology to explain your thoughts?
- ✓ Have you given specific examples to back up your points?
- ✓ Have you analysed and evaluated your work?

Challenge

In order to succeed at a high level, you need to provide precise details and an impressive amount of creativity. Check your work to make sure your creative journey is clear and that you have backed it up with specific details.

Notes



Notes