Year 11
Half Term 1

Knowledge Organisers

The Farnborough Academy

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AN INSPECTOR CALLS KNOWLEDGE ORGANISER

Context – *An Inspector Calls* was written by J.B. Priestley, and was first performed in the UK in 1946. However, it is set in 1912.

J.B. Priestley– John Boynton Priestley was born in Yorkshire in 1894. He fought in the first world war and came very close to death on a couple of occasions. In the 1930s, Priestley became concerned with the effects of social inequality in Britain, and in 1942 set up a new political party, the Common Wealth Party. It merged with the Labour Party, and was integral in developing the welfare state.

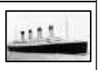
Socialism – Socialism is an approach to economic and social systems that is characterised by social ownership, democratic control, and high levels of equity. Socialist regimes are generally concerned with ensuring that disparities between wealth and social status are erased across society. After the two World Wars, British society was far more open to socialist ideas. In *An Inspector Calls*, the Inspector harbours socialist attitudes.

Pre and Post-War –Before the First World War, there was deemed to be a general air of complacency regarding the prospect of any war taking place. There were strong distinctions between upper and lower classes, and women were subservient to men in society. After the Second World War ended in 1945, class distinctions had been greatly reduced by the two wars, and women had earned a more valued place in society (they had filled in for men whilst they were away at war). After 1945, there was a greater desire for social change.

Social and Moral Responsibility –Attitudes towards social and moral responsibility changed rapidly in the time between when the play was set (1912) and the time when the play was written (1946). In 1912, the general attitude of those with social and economic sway was towards looking after oneself and one's family. By the mid-1940s, however, Clement Atlee's Labour party won a landslide election, reflecting a wave of enthusiasm towards communal responsibility for everyone in society.

Realism and Postmodernism – Many see *An Inspector Calls* as a play that combines contrasting styles. Certainly, it contains elements of both realism (popular early in the 20th Century) and postmodernism (which became popular later). The play features very real characters, speaking in common prose in a similar manner to dialogue in a novel. However, with the presence of the Inspector, Priestley introduces elements that are beyond rational reasoning and explanations.

The Titanic– RMS Titanic was a British passenger liner that sank in the North Atlantic Ocean in the morning hours of 15th April 1912. As around 1,500 people died, it was one of the deadliest commercial maritime disasters in modern history. The Titanic was designed to be the pinnacle of both safety and comfort, and due to its enormous size and quality was frequently labelled 'unsinkable.' In *An Inspector Calls*, Birling claims this, thus immediately losing respect from the audience.



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

Arthur Birling – Arthur is the patriarch of the Birling family. He is described as a 'portentous man in his early fifties.' His success as a businessman in the manufacturing industry allows the Birlings to live in upper-middle class comfort. He believes in capitalist principles and rejects socialist ideas of responsibility for one another in society. He considers his daughters engagement as good for business.

Quote: "You'll have a good laugh over it yet."

Sheila Birling – Sheila is the daughter of Arthur and Sybil. She is described as being 'in her early twenties' and is engaged to Gerald Croft. Sheila is a sensitive character, who shows a caring side, and thus she is devastated upon hearing about her family's role in the death of Eva Smith. She wonders how others in her family can simply go on as though nothing has happened.

Quote: "You're pretending everything's just as it was before."

Sybil Birling – Sybil is the matriarch of the Birling family. She is often described as being a 'cold' character. It is suggested that Sybil comes from a family of higher social standing than Arthur, and at times she reminds him of proper social etiquette. She serves on a local committee to aid those in need, and seems primarily consumed with protecting the family's public image.

Quote: "They're over-tired. In the morning they'll be as amused as we are."

Eric Birling – Eric is the son of Arthur and Sybil Birling, and the older brother of Sheila. Eric works part-time for the family business, and has a drinking problem that he attempts to hide from his family. When it is revealed that Eric has made a woman pregnant, outside of marriage, and has stolen from the family business, the family are finally forced to confront issues surrounding Eric.

Quote: "don't forget I'm ashamed of you as well – yes both of you."

The Inspector – The Inspector is (apparently) a representative of the local police force, sent to investigate the events leading up to the suicide of a young woman, who went by the name of both Eva Smith and Daisy Renton. When speaking to the family, the Inspector seems to know the answers to each of the questions that he asks, and appears to offer them a socialist message. After he leaves, the family gather evidence that he does not actually serve on the force.

Quote: "We are members of one body. We are responsible for each other."

Gerald Croft – Gerald is the fiancé of Sheila and the son of another prominent manufacturing family. Gerald's family have an elevated social status, and as a result Arthur worries that Gerald's family may feel that he is marrying beneath himself. Although the Inspector criticises Gerald's affair (and subsequent breakup) with Daisy, he seems to suggest that Gerald is the least morally culpable of the family for her death.

Quote: "I didn't feel about her as she felt about me."

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

Responsibility and Guilt – All of the family are forced to reflect upon their behaviour towards Eva Smith/ Daisy Renton, and consider how responsible they are for her death. Some characters admit responsibility and feel guilt more readily, such as Sheila and Eric. On the other hand, characters such as Arthur and Sybil are more unwilling to accept responsibility for the girl's demise.

Age– Priestley uses age to show the different prevailing attitudes in society at the time. The older characters represent an outdated way of thinking; characters such as Arthur and Sybil believe in only looking after themselves in their family. The younger characters (Sheila and Eric) represent new towards caring about others in society.

Class and Gender – Class and gender are also predominant themes in the novel. Eva Smith's position in society is severely weakened because she is from a lower class background and she is also a woman. Because of biases related to class and gender, Birling is dismissive of the hundreds of working class girls looking for a pay-rise, whilst Mrs Birling refers to her as 'a girl of that sort' in a derogatory manner.

The Supernatural – The presence of the Inspector weaves a supernatural element into the play. His surname (Goole) is certainly a play on the word 'ghoul' (a ghost). He is unheard of by other members of the police force, leading the characters to at first dismiss him as simply a hoaxer, yet he seems to have prior knowledge of the characters' actions, and foresees the suicide before it happens.

Scene-by-Scene Summary – Alongside key quotations from each scene.

Beginning of Act I	The play begins in 1912, with a dinner at the Birling residence. Arthur leads a toast on the future marriage of his daughter, Sheila, to Gerald. Arthur is pleased that the marriage will bring his company closer together with Gerald's family's established company. Sheila lightly teases Gerald about his distant behaviour the summer before. Arthur explains that the world is in a good time, that talk of German aggression should be discounted, and that a new 'unsinkable' ship is being built. Privately after dinner, Arthur tells Gerald that he is up for a knighthood, which will nullify Gerald's mother's fears of him marrying down. Arthur then tells Eric and Gerald of his belief in looking after one's self and one's family – rejecting ideas of socialism. Edna enters and says that an Inspector wants to speak with them.	*"I've learnt in the good hard school of experience – that a man has to mind his own business and look after himself and his own"* 
End of Act I	The inspector introduces himself as Goole. Arthur declares that he has never heard of him before. The Inspector states that a girl named Eva Smith has committed suicide by drinking disinfectant. He shows Arthur alone a photograph of her. Arthur admits that he employed her two years before, but dismissed her for striking over wages. He then shows Sheila the photograph, who is shocked. She admits to getting the girl fired from her next job, at a clothes shop, out of jealousy. There she worked under the name Daisy Renton. Sheila is horrified. Gerald becomes aware that this is a girl that he had an affair with.	*"Two hours ago a young woman died on the infirmary. She'd been taken there this afternoon because she'd swallowed a lot of strong disinfectant."* 
Beginning of Act II	As the Inspector speaks to Gerald and Sheila, Sybil enters and calls his questions 'impertinent.' Sheila warns Sybil not to fall into the trap of complacency with the Inspector, but Sybil warns her to be quiet. Sybil expresses that Eric has had too much to drink at dinner – to Sybil's embarrassment, Sheila and Gerald admit that this is a steady problem with Eric. The Inspector then questions Gerald, who reluctantly admits that he knows a Daisy Renton. He had protected her in a bar from a lecherous old man, and then put her up in a friend's lodgings. She became his mistress. Eventually it ended, and they lost contact. Sheila explains that she actually respects Gerald now, for telling the truth. However, she says they must start again in their relationship. Gerald is allowed to leave.	*"I don't dislike you as I did half an hour ago, Gerald. In fact, in some odd way, I rather respect you more than I've ever done before."* 
End of Act II	The Inspector shows Sybil the photograph of the deceased woman – she lies and says that she does not know her. Sheila pleads with her to tell the truth. It emerges that Sybil refused to give the girl money in her role as a member of the Brumley Women's Charity Organisation, out of 'impudence.' She had pretended that she was called 'Mrs Birling.' The Inspector reveals that she was looking for money as she was pregnant (not Gerald's baby). The girl eventually admitted that she was not married, and couldn't take money off the father, as she knew it was stolen. Under pressure from the Inspector, Sybil contends that the man should bear the responsibility of the girl's subsequent death. It is at this point that the other characters realise that Eric must in fact be the father. Sybil pauses in shock, seemingly wishing to retract her past statements. Eric enters the room, with all staring at him.	*"If, as she said, he didn't belong to her class, and was some drunken young idler, then that's all the more reason why he shouldn't escape. He should be made an example of. If the girl's death is due to anybody, then it's due to him."* 
Beginning of Act III	Eric confesses that he was very drunk the night that he met the girl, and that he followed her home and convinced her to let him stay over. He began a relationship with her, and she fell pregnant. As she needed financial support, Eric swindled Arthur's company out of money. Arthur is extremely angry when he hears this. With the family now in a state of complete anguish, the Inspector goes through each of them, explaining that they all had a significant part to play in the girl's death. Before leaving, the Inspector states that all people should look out for one another if society is to survive. He notes that the Birlings and Gerald must now live with the repercussions of their actions for the rest of their lives, as recompense for Eva Smith/ Daisy Renton, who lost hers.	*"We don't live alone. We are members of one body. We are responsible for each other. And I tell you that the time will soon come when, if men will not learn that lesson, then they well be taught it in fire and bloody and anguish."* 
End of Act III	Arthur says that Eric is predominantly at fault for the death of the girl, and he worries about the public scandal that will be generated. Eric and Sheila criticise Arthur for worrying about his knighthood when someone has died. In light of what Arthur was discussing before the Inspector came, they begin to suspect that he was a hoax. To Sheila and Eric, this is not important (their actions were still terrible) but to Arthur, it means everything (no public scandal). These suspicions are confirmed, when Gerald returns, having bumped into a police officer on the street – there is no Inspector Goole. Arthur then phones the hospital, who confirm that there has been no suicide. Arthur and Sybil delight in this, whilst their children are horrified that they have forgotten their behaviour (despite no one having actually died) so quickly. Just as Arthur is reveling in the fact that the others were all 'bluffed', the phone rings. A girl has just been transported to hospital, dead. She has committed suicide. An inspector is on the way to the house.	*"Birling: (pointing to Eric and Sheila) Now look at the pair of them – the famous younger generation who know it all. And they can't even take a joke"*  *The telephone rings sharply. There is a moment's complete silence. Birling goes to answer it.//*

Priestley's Dramatic Devices

Dramatic Irony	Arthur Birling suggests that the *Titanic* is unsinkable, and yet the audience knows that it sank on its maiden voyage.
Cliffhangers	At the end of Act One, the Inspector appears and says 'Well?' to Gerald, leaving the audience to wonder how Gerald is implicated.
Stage Directions	The precise directions detailing Gerald 'gravely' stating his involvement with Daisy Renton adds more detail to aid the actor's delivery.
Dramatic Tension	The audience feels an increase in tension as they await information regarding how each character is implicated in Eva Smith's death.

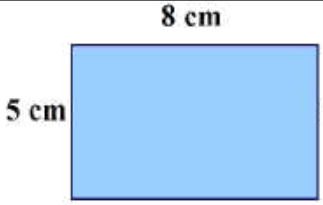
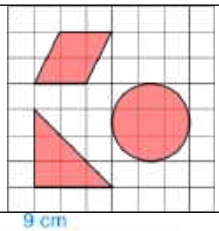
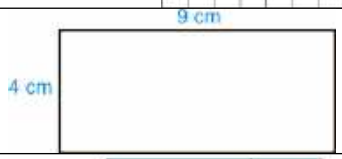
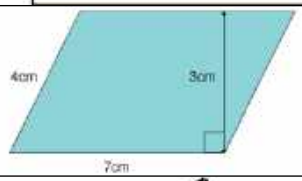
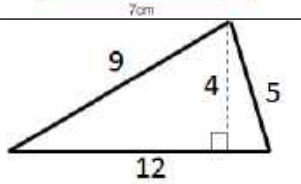
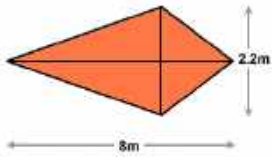
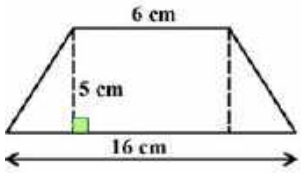
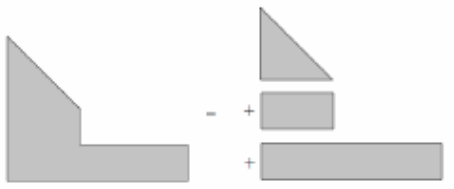
Form – The play fits into three possible forms.

Well-Made Play
-A popular type of drama from the 19th Century
-The events build to a climax
-Primarily concerned with events that happened before the play
-Plot is intricate and complex.

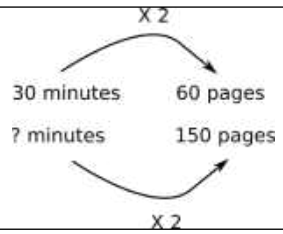
Morality Play
-These were most popular during the 15th and 16th centuries
-They taught the audience lessons that focused on the seven deadly sins.
-Characters who committed these sins were punished.

Crime Thriller
-As the name suggests, this involves a gripping tale based around a crime
-The audience receives clues and must guess what has happened before the end.
-All is revealed by the climax.

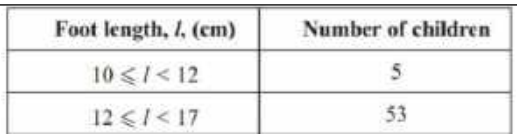
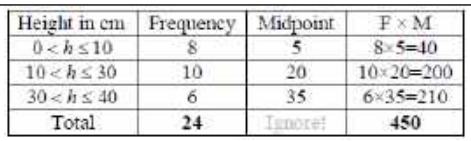
Subject: Maths **Topic: Perimeter and Area**

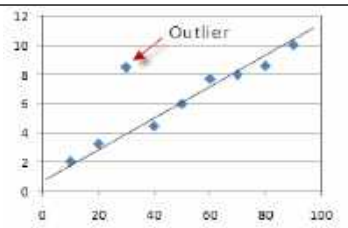
Topic/Skill	Definition/Tips	Example
1. Perimeter	The **total distance** around the **outside** of a shape. Units include: etc.	
2. Area	The amount of **space inside** a shape. Units include:	
3. Area of a Rectangle	**Length x Width**	
4. Area of a Parallelogram	**Base x Perpendicular Height** Not the slant height.	
5. Area of a Triangle	**Base x Height ÷ 2**	
6. Area of a Kite	Split in to **two triangles** and use the method above.	
7. Area of a Trapezium	"Half the sum of the parallel side, times the height between them. That is how you calculate the area of a trapezium"	
8. Compound Shape	A shape made up of a **combination of other known shapes** put together.	

Subject: Maths **Topic: Ratio**

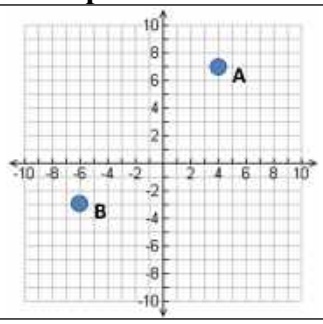
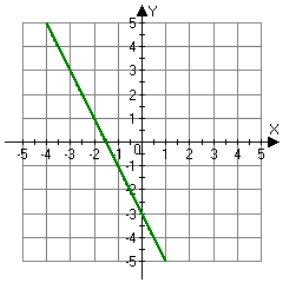
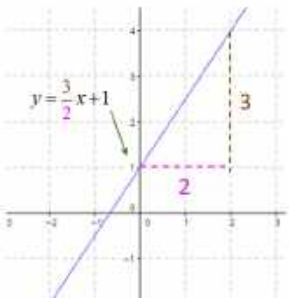
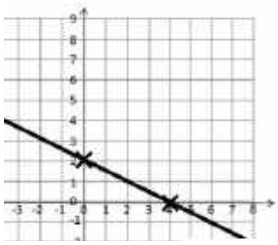
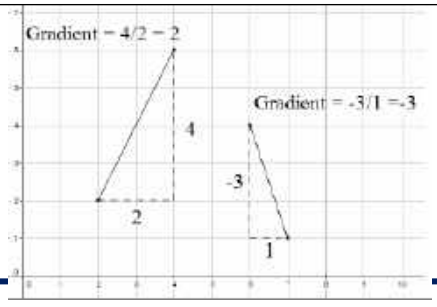
Topic/Skill	Definition/Tips	Example
1. Ratio	Ratio compares the size of **one part** to **another part**. Written using the ':' symbol.	
2. Proportion	Proportion compares the size of **one part** to the size of the **whole**. Usually written as a fraction.	In a class with 13 boys and 9 girls, the proportion of boys is and the proportion of girls is
3. Simplifying Ratios	**Divide** all parts of the ratio by a **common factor**.	5 : 10 = 1 : 2 (divide both by 5) 14 : 21 = 2 : 3 (divide both by 7)
4. Ratios in the form or	**Divide** both parts of the ratio by one of the numbers to make **one part equal 1**.	5 : 7 = 1 : in the form 1 : n 5 : 7 = : 1 in the form n : 1
5. Sharing in a Ratio	**1. Add** the total parts of the ratio. **2. Divide** the amount to be shared by this value to find the value of one part. **3. Multiply** this value by each part of the ratio. Use only if you **know the total**.	Share £60 in the ratio 3 : 2 : 1. 3 + 2 + 1 = 6 60 ÷ 6 = 10 3 x 10 = 30, 2 x 10 = 20, 1 x 10 = 10 £30 : £20 : £10
6. Proportional Reasoning	Comparing two things using **multiplicative reasoning** and applying this to a new situation. Identify one multiplicative link and use this to find missing quantities.	
7. Unitary Method	Finding the **value of a single unit** and then finding the necessary value by **multiplying** the single unit value.	3 cakes require 450g of sugar to make. Find how much sugar is needed to make 5 cakes. 3 cakes = 450g So 1 cake = 150g (÷ by 3) So 5 cakes = 750 g (x by 5)
8. Ratio already shared	Find what **one part** of the ratio is worth using the **unitary method**.	Money was shared in the ratio 3:2:5 between Ann, Bob and Cat. Given that Bob had £16, found out the total amount of money shared. £16 = 2 parts So £8 = 1 part 3 + 2 + 5 = 10 parts, so 8 x 10 = £80
9. Best Buys	Find the **unit cost** by **dividing** the **price by the quantity**. The **lowest** number is the best value.	8 cakes for £1.28 → 16p each (÷by 8) 13 cakes for £2.05 → 15.8p each (÷by 13) Pack of 13 cakes is best value.

Subject: Maths **Topic: Summarising Data**

Topic/Skill	Definition/Tips	Example
1. Types of Data	**Qualitative** Data – **non-numerical** data **Quantitative** Data – **numerical** data **Continuous** Data – data that can take **any numerical value** within a given range. **Discrete** Data – data that can take **only specific values** within a given range.	Qualitative Data – eye colour, gender etc. Continuous Data – weight, voltage etc. Discrete Data – number of children, shoe size etc.
2. Grouped Data	Data that has been **bundled in to categories**. Seen in grouped frequency tables, histograms, cumulative frequency etc.	 Foot length, l, (cm) | Number of children $10 \leqslant l < 12$ | 5 $12 \leqslant l < 17$ | 53
3. Primary /Secondary Data	**Primary** Data – **collected yourself** for a specific purpose. **Secondary** Data – **collected by someone else** for another purpose.	Primary Data – data collected by a student for their own research project. Secondary Data – Census data used to analyse link between education and earnings.
4. Mean	**Add** up the values and **divide** by how many values there are.	The mean of 3, 4, 7, 6, 0, 4, 6 is
5. Mean from a Table	1. Find the midpoints (if necessary) 2. Multiply Frequency by values or midpoints 3. Add up these values 4. Divide this total by the Total Frequency If **grouped** data is used, the answer will be an **estimate**.	 Height in cm | Frequency | Midpoint | F × M $0 < h \leq 10$ | 8 | 5 | 8×5=40 $10 < h \leq 30$ | 10 | 20 | 10×20=200 $30 < h \leq 40$ | 6 | 35 | 6×35=210 Total | 24 | Ignore! | 450 **Estimated** Mean height: 450 ÷ 24 = 18.75cm
6. Median Value	The **middle** value. Put the data in order and find the middle one. If there are **two middle values**, find the number half way between them by **adding them together and dividing by 2**.	Find the median of: 4, 5, 2, 3, 6, 7, 6 Ordered: 2, 3, 4, **5**, 6, 6, 7 Median = 5
7. Median from a Table	Use the formula to find the position of the median. is the total frequency.	If the total frequency is 15, the median will be the position
8. Mode /Modal Value	**Most** frequent/common. Can have more than one mode (called bi-modal or multi-modal) or no mode (if all values appear once)	Find the mode: 4, 5, 2, 3, 6, 4, 7, 8, 4 Mode = 4
9. Range	**Highest value subtract the Smallest value** Range is a 'measure of spread'. The smaller the range the more <u>consistent</u> the data.	Find the range: 3, 31, 26, 102, 37, 97. Range = 102-3 = 99
10. Outlier	A value that '**lies outside**' most of the other	

	values in a set of data. An outlier is **much smaller or much larger** than the other values in a set of data.	
11. Lower Quartile	**Divides** the **bottom half** of the data into **two halves**. **LQ = value**	Find the lower quartile of: 2, **3**, 4, 5, 6, 6, 7 value → 3
12. Lower Quartile	**Divides** the **top half** of the data into **two halves**. **UQ = value**	Find the upper quartile of: 2, 3, 4, 5, 6, **6**, 7 value → 6
13. Interquartile Range	The **difference** between the **upper quartile and lower quartile.** The **smaller** the **interquartile range**, the **more consistent** the data.	Find the IQR of: 2, 3, 4, 5, 6, 6, 7

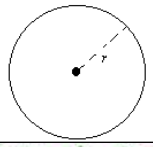
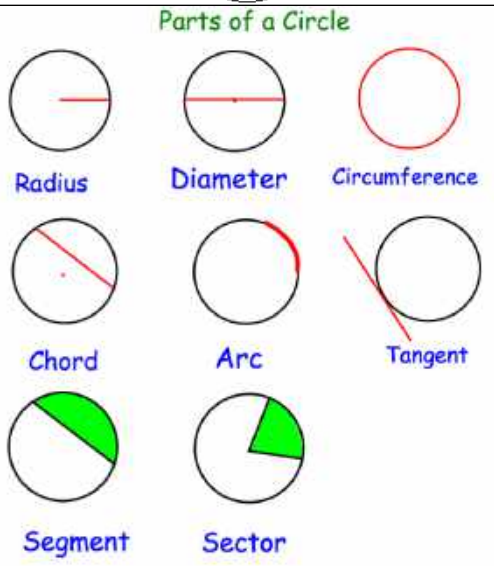
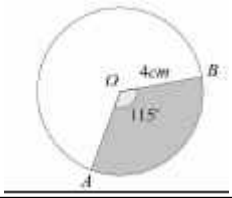
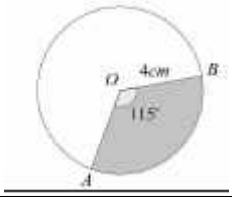
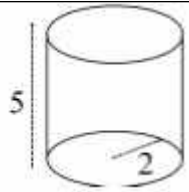
Subject: Maths **Topic: Coordinates and Linear Graphs**

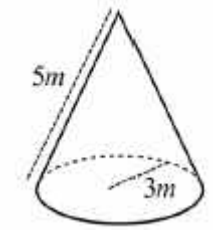
Topic/Skill	Definition/Tips	Example
1. Coordinates	Written in **pairs**. The **first** term is the **x-coordinate** (movement **across**). The **second** term is the **y-coordinate** (movement **up or down**)	 A: (4,7) B: (-6,-3)
2. Midpoint of a Line	Method 1: **add the x coordinates and divide by 2**, **add the y coordinates and divide by 2** Method 2: Sketch the line and find the values half way between the two x and two y values.	Find the midpoint between (2,1) and (6,9) and So, the midpoint is (4,5)
3. Linear Graph	**Straight line** graph. The general equation of a linear graph is where **is the gradient** and **is the y-intercept**. The **equation** of a linear graph can contain an **x-term**, a **y-term** and a **number**.	Example:  Other examples:
4. Plotting Linear Graphs	Method 1: **Table of Values** Construct a table of values to calculate coordinates. Method 2: **Gradient-Intercept Method** (use when the equation is in the form) 1. Plots the y-intercept 2. Using the gradient, plot a second point. 3. Draw a line through the two points plotted. Method 3: **Cover-Up Method** (use when the equation is in the form) 1. Cover the term and solve the resulting equation. Plot this on the 2. Cover the term and solve the resulting equation. Plot this on the 3. Draw a line through the two points plotted.	<table><tr><td>x</td><td>-3</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>y= x +3</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table>   $2x + 4y = 8$
5. Gradient	The gradient of a line is how **steep** it is. **Gradient =** The gradient can be positive (sloping upwards) or negative (sloping downwards)	

6. Finding the Equation of a Line <u>given a point and a gradient</u>	**Substitute** in the **gradient (m)** and **point (x,y)** in to the equation and **solve for c**.	Find the equation of the line with gradient 4 passing through (2,7).
7. Finding the Equation of a Line <u>given two points</u>	Use the two points to **calculate the gradient**. Then **repeat the method above** using the gradient and either of the points.	Find the equation of the line passing through (6,11) and (2,3)
8. Parallel Lines	If two lines are **parallel**, they will have the **same gradient**. The value of m will be the same for both lines.	Are the lines and parallel? Answer: Rearrange the second equation in to the form Since the two gradients are equal (3), the lines are parallel.
9. Perpendicular Lines	If two lines are **perpendicular**, the **product** of their **gradients** will always equal **-1**. The gradient of one line will be the **negative reciprocal** of the gradient of the other line. You may need to rearrange equations of lines to compare gradients (they need to be in the form	Find the equation of the line perpendicular to which passes through (6,5) Answer: As they are perpendicular, the gradient of the new line will be as this is the negative reciprocal of 3.

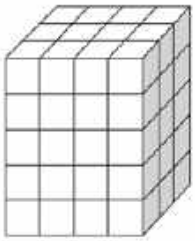
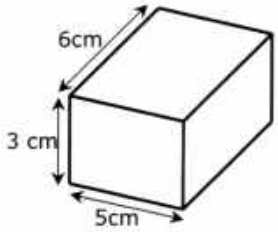
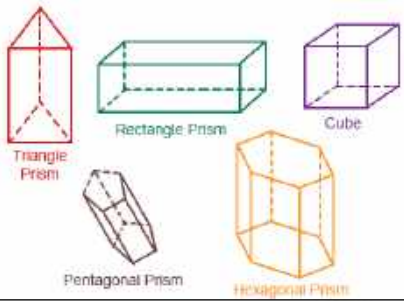
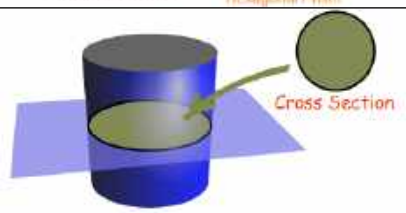
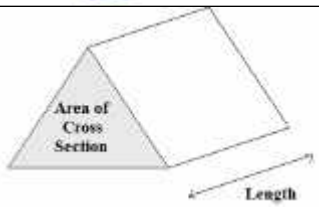
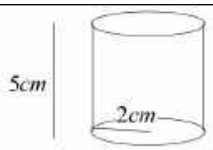
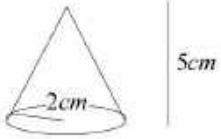
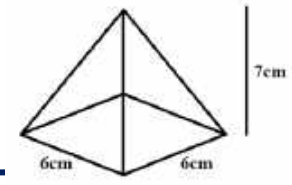
		Or

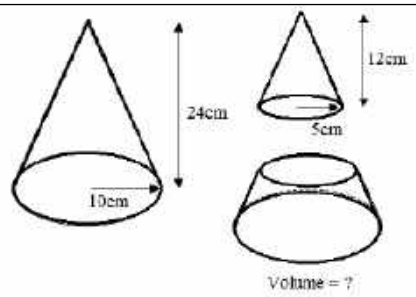
Subject: Maths **Topic: Circumference and Area**

Topic/Skill	Definition/Tips	Example
1. Circle	A circle is the locus of all points equidistant from a central point.	
2. Parts of a Circle	**Radius** – the **distance** from the **centre** of a circle to the **edge** **Diameter** – the total **distance** across the **width** of a circle **through the centre**. **Circumference** – the **total distance** around the **outside** of a circle **Chord** – a **straight line** whose **end points lie on a circle** **Tangent** – a **straight line** which **touches** a circle at exactly **one point** **Arc** – a **part of the circumference** of a circle **Sector** – the **region** of a circle enclosed by **two radii** and their intercepted **arc** **Segment** – the **region** bounded by a **chord** and the **arc** created by the chord	
3. Area of a Circle	which means 'pi x radius squared'.	If the radius was 5cm, then:
4. Circumference of a Circle	which means 'pi x diameter'	If the radius was 5cm, then:
5. ('pi')	Pi is the circumference of a circle divided by the diameter.	
6. Arc Length of a Sector	The arc length is part of the circumference. Take the **angle** given **as a fraction over 360°** and **multiply** by the **circumference**.	Arc Length = 
7. Area of a Sector	The area of a sector is part of the total area. Take the **angle** given **as a fraction over 360°** and **multiply** by the **area**.	Area = 
8. Surface Area of a Cylinder	**Curved Surface Area =** or **Total SA =** or	
9. Surface Area of a Cone	**Curved Surface Area =** where	
	Total SA =	

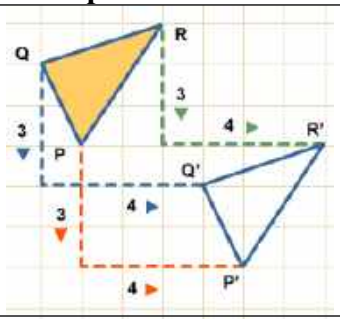
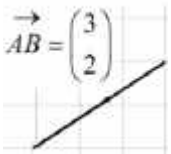
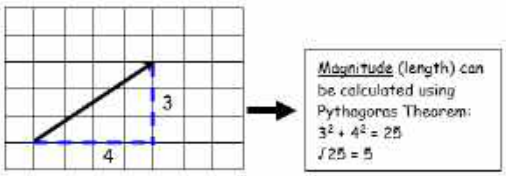
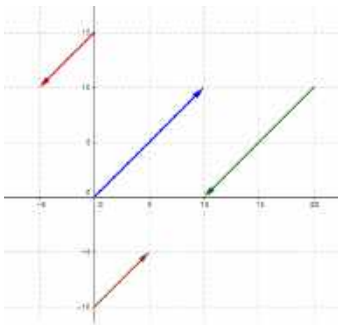
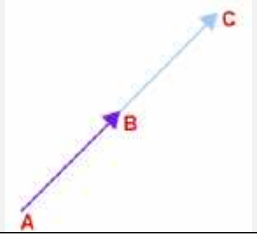
	You may need to use Pythagoras' Theorem to find the slant height	
10. Surface Area of a Sphere	Look out for hemispheres – halve the SA of a sphere and add on a circle	Find the surface area of a sphere with radius 3cm.

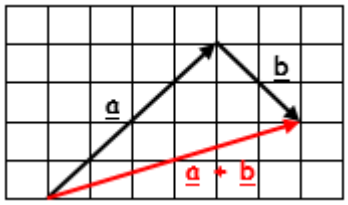
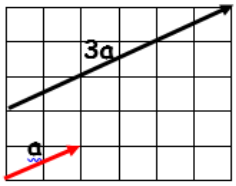
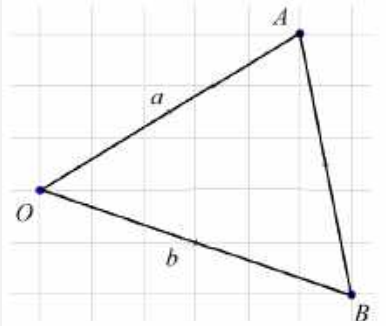
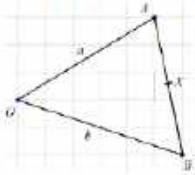
Subject: Maths **Topic: Volume**

Topic/Skill	Definition/Tips	Example
1. Volume	Volume is a measure of the amount of space inside a solid shape. Units: etc.	
2. Volume of a Cube/Cuboid	You can also use the Volume of a Prism formula for a cube/cuboid.	 volume = 6 x 5 x 3 = 90 cm^3
3. Prism	A prism is a 3D shape whose **cross section is the same** throughout.	
4. Cross Section	The **cross section** is the **shape** that **continues** all the way **through the prism**.	
5. Volume of a Prism		
6. Volume of a Cylinder		 $V = \pi(4)(5)$ $= 62.8cm^3$
7. Volume of a Cone		 $V = \frac{1}{3}\pi(4)(5)$ $= 20.9cm^3$
8. Volume of a Pyramid	where B = area of the base	

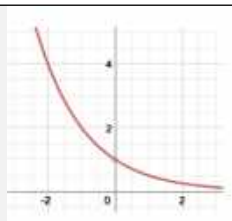
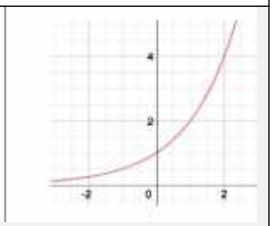
9. Volume of a Sphere	Look out for hemispheres – just halve the volume of a sphere.	Find the volume of a sphere with diameter 10cm.
10. Frustums	A frustum is a solid (usually a cone or pyramid) with the **top removed**. Find the volume of the whole shape, then take away the volume of the small cone/pyramid removed at the top.	

Subject: Maths **Topic: Vectors**

Topic/Skill	Definition/Tips	Example
1. Translation	**Translate** means to **move a shape**. The shape does not change **size** or **orientation**.	
2. Vector Notation	A vector can be written in 3 ways: **a** or or	
3. Column Vector	In a column vector, the **top** number moves **left (-) or right (+)** and the **bottom** number moves **up (+) or down (-)**	means '2 right, 3 up' means '1 left, 5 down'
4. Vector	A **vector** is a quantity represented by an arrow with both **direction** and **magnitude**.	
5. Magnitude	Magnitude is defined as the **length** of a vector.	
6. Equal Vectors	If two vectors have the **same magnitude and direction**, they are **equal**.	
7. Parallel Vectors	**Parallel** vectors are **multiples** of each other.	2**a**+**b** and 4**a**+2**b** are parallel as they are multiple of each other. 
8. Collinear Vectors	**Collinear** vectors are vectors that are on the **same line**. To show that two vectors are **collinear**, show that one vector is a **multiple** of the other (parallel) **AND** that both vectors **share a point**.	
9. Resultant Vector	The **resultant** vector is the vector that results from **adding** two or more vectors together.	if **a** = and **b** = then **a** + **b** = + =

	The resultant can also be shown by **lining up** the **head** of one vector with the **tail** of the other.	
10. Scalar of a Vector	A **scalar** is the **number** we **multiply** a vector by.	 Example: 3a + 2b = = 3 + 2 = + =
11. Vector Geometry	 $\overrightarrow{OA} = a \quad \overrightarrow{AO} = -a$ $\overrightarrow{OB} = b \quad \overrightarrow{BO} = -b$ $\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB} = -a + b = b - a$ $\overrightarrow{BA} = \overrightarrow{BO} + \overrightarrow{OA} = -b + a = a - b$	**Example 1:** X is the midpoint of AB. Find $\overrightarrow{OX}$ **Answer:** Draw X on the original diagram  Now build up a journey. You could use $\overrightarrow{OX} = \overrightarrow{OA} + \frac{1}{2}\overrightarrow{AB}$. This will give: $\overrightarrow{OX} = a + \frac{1}{2}(b-a)$. This will simplify to $\frac{1}{2}a + \frac{1}{2}b$ or $\frac{1}{2}(a+b)$

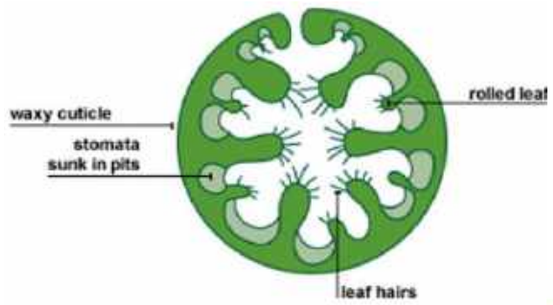
Subject: Maths **Topic: Growth and Decay**

Topic/Skill	Definition/Tips	Example
1. Exponential Growth	When we **multiply** a number **repeatedly** by the **same number** (, resulting in the number **increasing by the same proportion** each time. The original amount can grow very quickly in exponential growth.	is an example of exponential growth, because the numbers are being multiplied by 2 each time.
2. Exponential Decay	When we **multiply** a number **repeatedly** by the **same number** (, resulting in the number **decreasing by the same proportion** each time. The original amount can decrease very quickly in exponential decay.	is an example of exponential decay, because the numbers are being multiplied by each time.
3. Compound Interest	Interest paid on the **original amount and the accumulated interest**.	A bank pays 5% compound interest a year. Bob invests £3000. How much will he have after 7 years.
4. Exponential Graph	The equation is of the form **,** where is a number called the **base**. If the graph **increases**. If , the graph **decreases**. The graph has an **asymptote** which is the **x-axis**. The **y-intercept** of the graph is	 

Adaptations

- Large, flat feet to spread their weight on the sand.
- Thick fur on the top of the body for shade, and thin fur elsewhere to allow easy heat loss.
- A large surface area to volume ratio to maximise heat loss.
- The ability to go for a long time without water (they don't store water in their humps, but they lose very little through urination and sweating).
- The ability to tolerate body temperatures up to 42°C.
- Slit-like nostrils and two rows of eyelashes to help keep the sand out.

- a white appearance, as camouflage from prey on the snow and ice
- thick layers of fat and fur, for insulation against the cold
- a small surface area to volume ratio, to minimise heat loss
- a greasy coat, which sheds water after swimming.

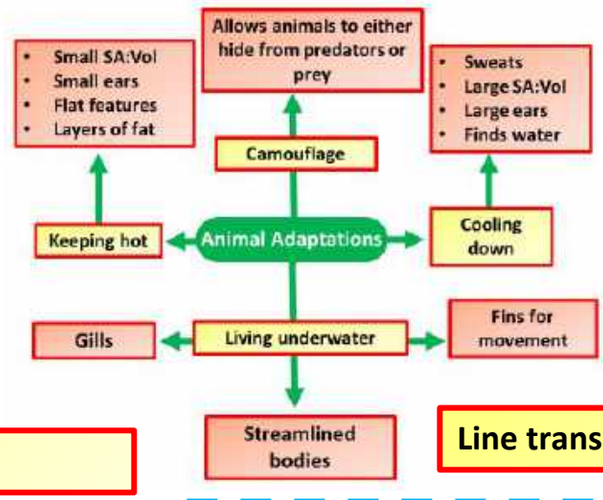


Cacti also have spines (the prickly thorn like things) in which replace leaves. These spines minimise the surface area of the cactus reducing water loss. The cacti's stem is also thick and fleshy allowing it to store a lot of water. The stem also has a waxy waterproof kind of coating to help retain more water.

Biotic & Abiotic Factors

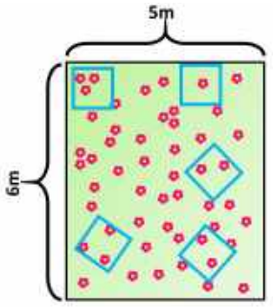
Biotic components are the living things that shape an ecosystem. Examples of biotic components include animals, plants, fungi, and bacteria

Abiotic factors are non-living. They include light intensity, temperature and moisture levels. The abundance and distribution of living organisms in an ecosystem are affected by abiotic factors. .



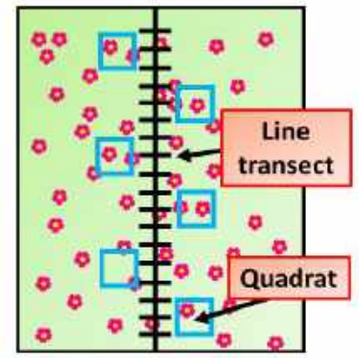
Using quadrats

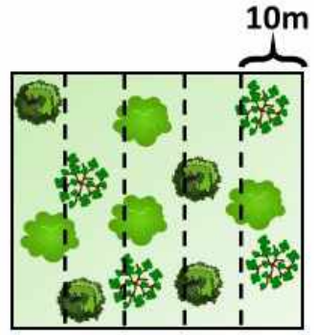
A quadrat is usually a square made of wire. It may contain further wires to mark off smaller areas inside, such as 5 × 5 squares or 10 × 10 squares. The organisms underneath, usually plants, can be identified and counted. Quadrats may also be used for slow-moving animals, eg slugs and snails.



Line transects

- choose a starting point on the school field in an area where the grass is often cut
- use random numbers to generate a set of coordinates to place your first quadrat
- count the number of different plant species within this quadrat (the species richness)
- return to your starting position and repeat steps two and three a further 14 times using different random numbers
- repeat steps one to four for a part of the school field which the grass is infrequently cut
- compare your results by calculating a mean for each location



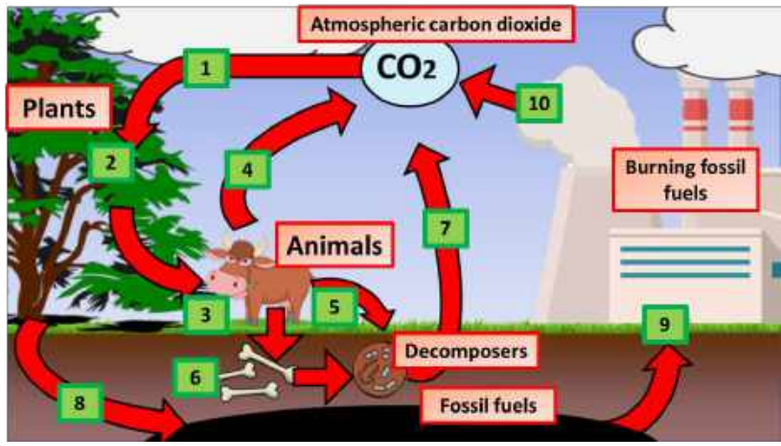


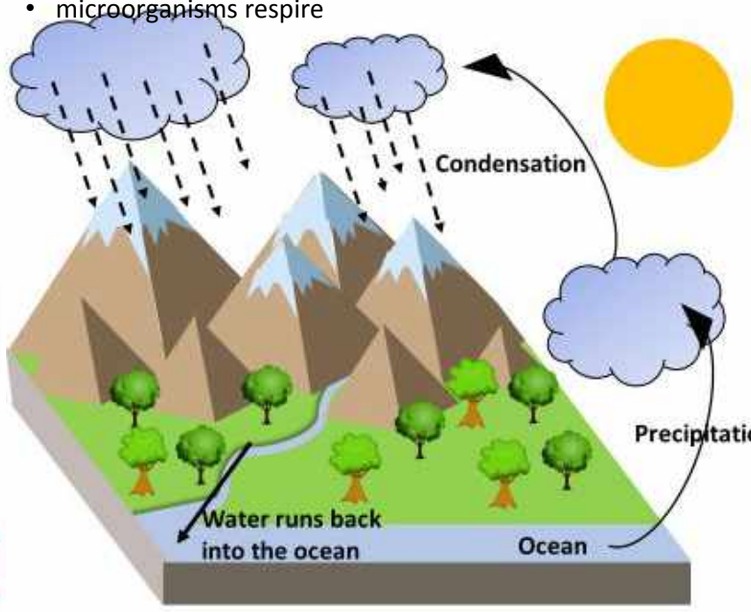
Belt transect

A transect is a line across a habitat or part of a habitat. It can be as simple as a string or rope placed in a line on the ground. The number of organisms of each species along a transect can be observed and recorded at regular intervals. The distribution of organisms in a habitat is affected by the presence of other living organisms

Carbon Cycle

- (green) plants photosynthesise
- photosynthesis takes in carbon dioxide
- (green) plants use carbon to make carbohydrate / protein / fat / organic compounds / named (e.g. enzymes / cellulose)
- animals eat (green) plants (and other animals)
- (green) plants respire
- animals respire
- respiration releases carbon dioxide
- (green) plants and animals die
- microorganisms decay / decompose / rot / break down / feed on dead organisms
- microorganisms respire



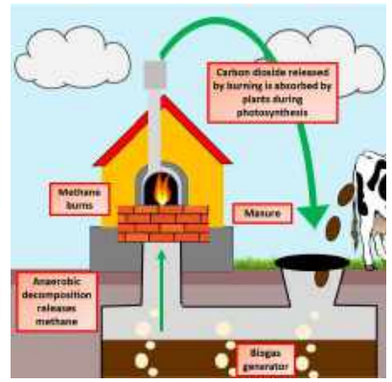


Water Cycle

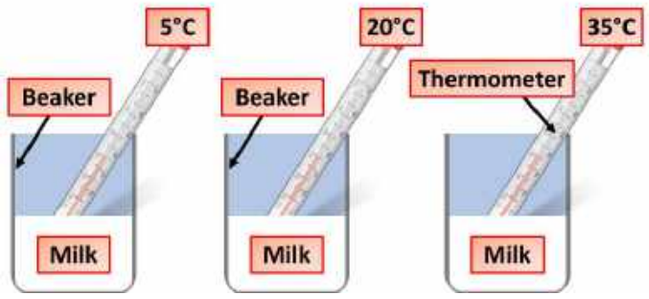
The water cycle is also known as the hydrological cycle. It describes how water moves on, above, or just below the surface of our planet. Water molecules move between various locations - such as rivers, oceans and the atmosphere - by specific processes. Water can change state

Decomposition

Decay is an essential life process, which helps to digest food and recycle materials. Bacteria and fungi are the main groups of decomposer. They release enzymes to break down compounds, so that they can absorb the nutrients. We can preserve our food, for example by freezing or canning, to remove the conditions needed for decay to happen.

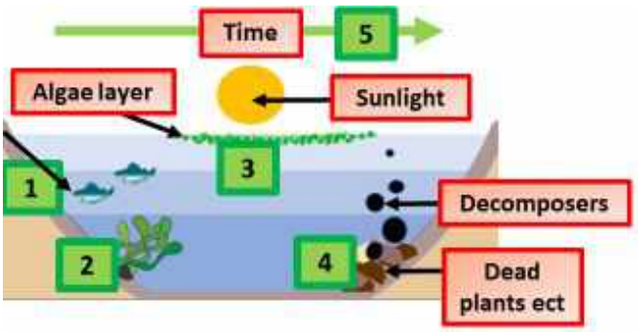


Decomposition investigation



- Place 20 cm^3 of fresh milk into three beakers
- Decide the three temperatures you will investigate. Write these onto the sides of the beakers. They may be 5, 20 and 35°C.
- Use universal indicator paper or solution to determine the pH of the milk in the three beakers
- Cover each beaker in cling film and incubate at the appropriate temperature
- Use universal indicator paper or solution to determine the pH of the milk in the three beakers after 24, 48 and 72 hours

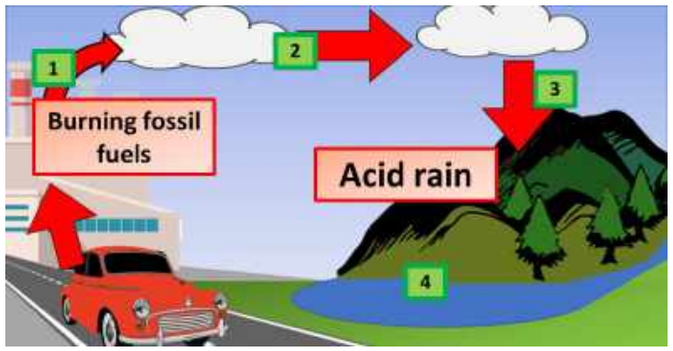
Water Pollution



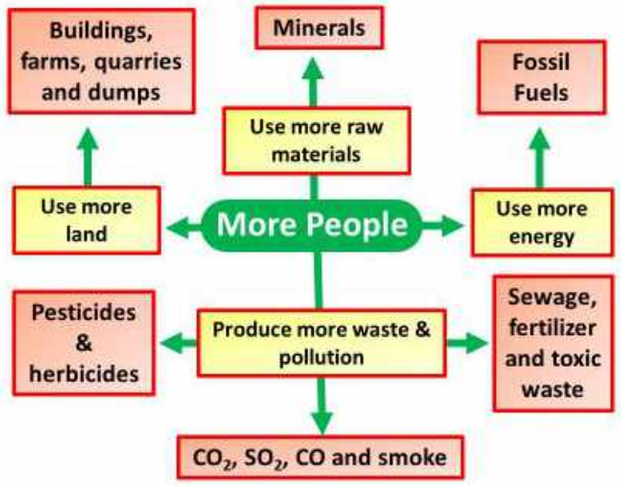
- Eutrophication - Natural eutrophication is the process by which lakes gradually age and become more productive.
- Eutrophication is a process whereby water bodies, such as lakes, estuaries, or slow-moving streams receive excess nutrients
- that stimulate excessive plant growth (algae, periphyton attached algae, and nuisance plants weeds).
- This enhanced plant growth, often called an algal bloom,
- reduces dissolved oxygen in the water when dead plant material decomposes and can cause other organisms to die.
- Nutrients can come from many sources, such as fertilizers applied to agricultural fields, golf courses, and suburban lawns; deposition of nitrogen from the atmosphere; erosion of soil containing nutrients; and sewage treatment plant discharges.

Acid Rain

Combustion of fossil fuels and other fuels releases carbon dioxide. This contributes to the greenhouse effect and leads to global warming. It also releases sulfur dioxide and nitrogen oxides which can cause acid rain. Air pollution can also be caused by tiny particulates from smoke which can cause smog.



Waste Management

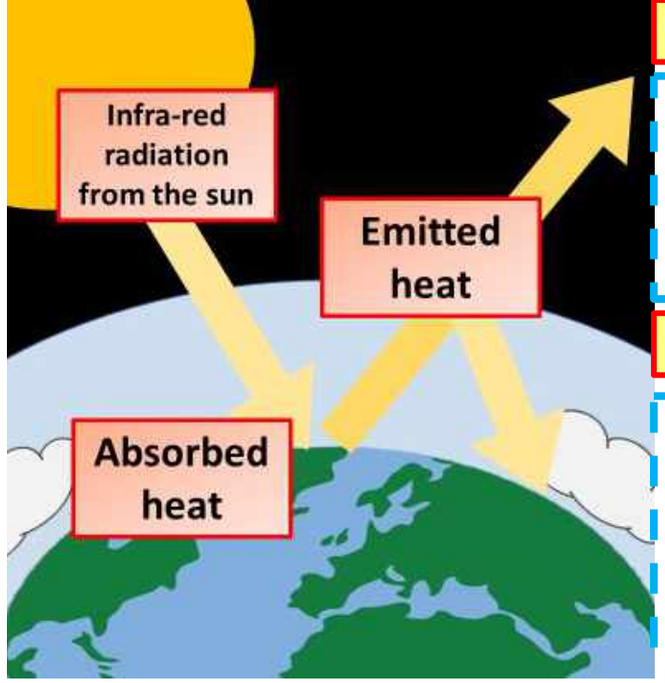


Biodiversity

'Biological diversity' means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems.

Deforestation

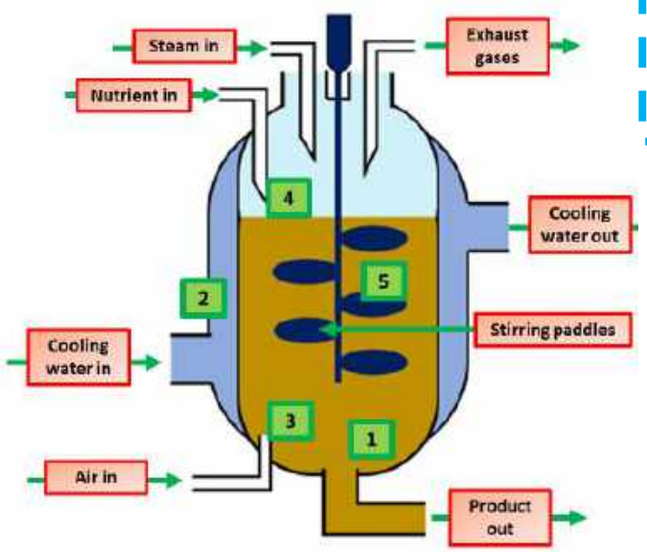
Deforestation has some important consequences: forest habitats are destroyed. soil erosion increases, causing barren land , flooding and land slides. air pollution is caused when trees are burned after felling.



Biotechnology

A good example of this is the fungus Fusarium which is used to produce mycoprotein. This is protein produced from a fungus. The fungus is grown in large containers called fermenters

- The pH and temperature are maintained at the optimum
- The temperature is controlled by a water jacket that surrounds the whole fermenter
- Sterile oxygen is added to make sure that aerobic respiration occurs
- A food source like glucose syrup is added
- The mixture inside is stirred to make sure all the oxygen and nutrients are equally distributed

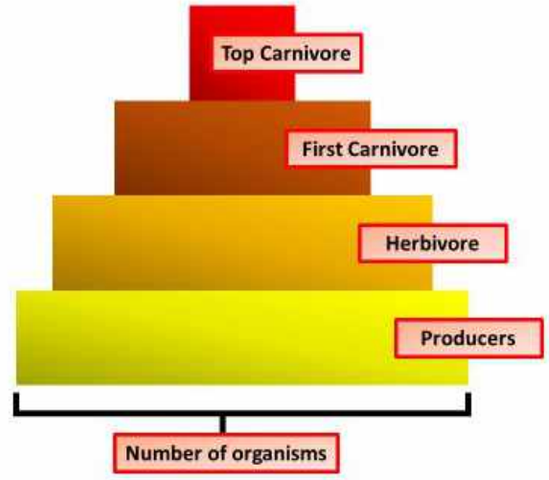


Global Warming

Global warming is projected to have a number of effects on the oceans. Ongoing effects include rising sea levels due to thermal expansion and melting of glaciers and ice sheets, and warming of the ocean surface, leading to increased temperature stratification.

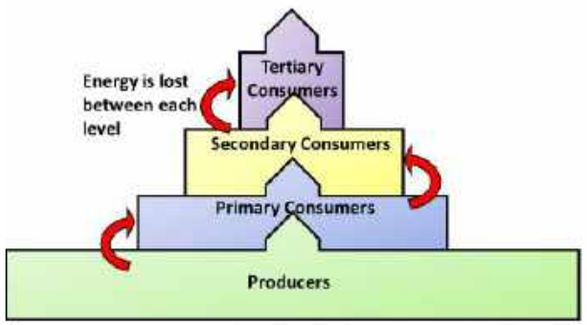
Tropic Levels

The trophic level of an organism is the position it occupies in a food chain. A food chain is a succession of organisms that eat other organisms and may, in turn, be eaten themselves. The trophic level of an organism is the number of steps it is from the start of the chain.



Pyramids of Biomass

A pyramid of biomass is a more accurate indication of how much energy is passed on at each trophic level. Biomass is the mass of living material in each organism multiplied by the total number of organisms in that trophic level



Pyramid of Biomass

Magnetic Poles

The opposite poles of two magnets attract. Therefore, when the red end of a magnet or compass is pointing north, it is because it is being attracted in that direction by the south end of another magnet (often coloured blue) – this is the imaginary magnet inside the Earth.

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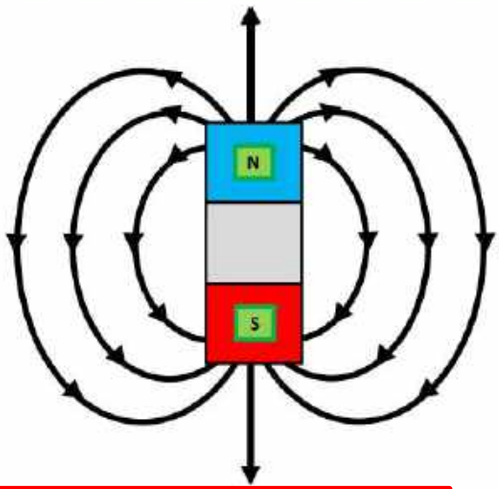
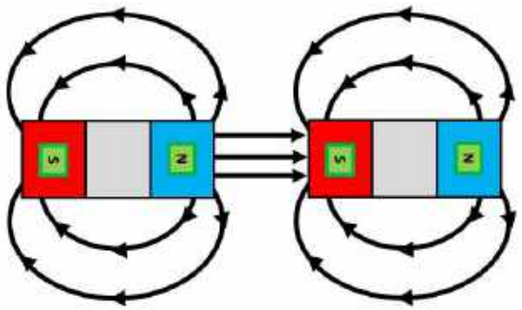




Magnetic Fields

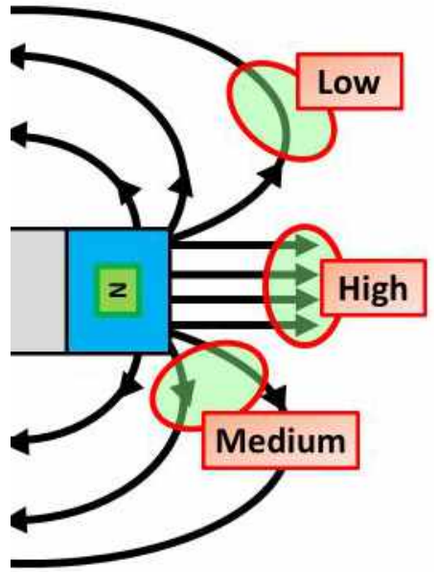
A magnetic field is invisible, but it can be detected using a magnetic compass. A compass contains a small bar magnet on a pivot so that it can rotate. The compass needle points in the direction of the Earth's magnetic field, or the magnetic field of a magnet.

The diagram shows these key features:

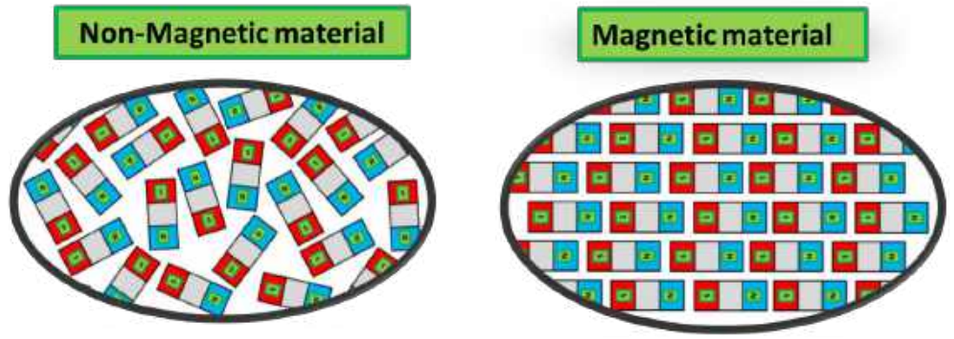
- the magnetic field lines never cross each other
- the closer the lines, the stronger the magnetic field
- the lines have arrowheads to show the direction of the force exerted by a magnetic north pole
- the arrowheads point from the north pole of the magnet to its south pole

Magnetic Flux Density

The magnetic field can be visualized as magnetic field lines. The field strength corresponds to the density of the field lines. The total number of magnetic field lines penetrating an area is called the magnetic flux. The unit of the magnetic flux is the tesla meter squared (T · m2, also called the weber and symbolized Wb)



Force = magnetic flux density x current x length



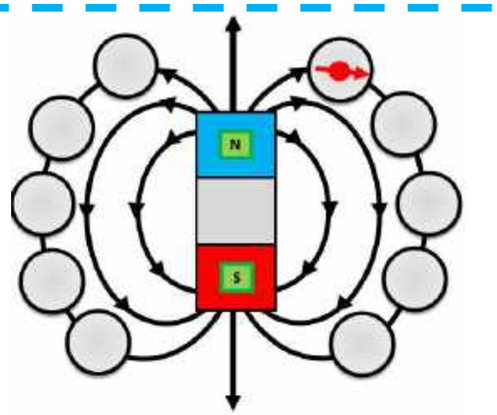
Magnetic & Non Magnetic Materials

A magnetic domain is region in which the magnetic fields of atoms are grouped together and aligned. In the experiment below, the magnetic domains are indicated by the arrows in the metal material. You can think of magnetic domains as miniature magnets within a material.

Plotting Fields

Magnetic fields can be mapped out using small plotting compasses:

1. place the plotting compass near the magnet on a piece of paper
2. mark the direction the compass needle points
3. move the plotting compass to many different positions in the magnetic field, marking the needle direction each time
4. join the points to show the field lines.

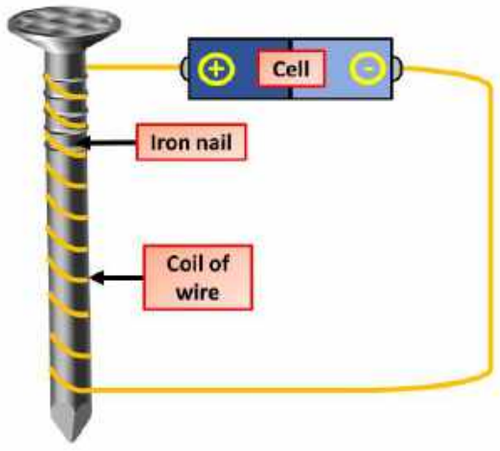


Electromagnets

When an electric current flows in a wire it creates a magnetic field around the wire. By winding the wire into a coil we can strengthen the magnetic field. Electromagnets are made from coils like this.

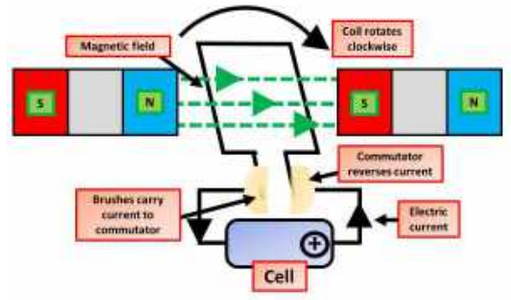
We can make an electromagnet stronger by:

- wrapping the coil around an iron core
- adding more turns to the coil
- increasing the current flowing through the coil



Electric Motors

A simple electric motor can be built using a coil of wire that is free to rotate between two opposite magnetic poles. When an electric current flows through the coil, the coil experiences a force and moves.The direction of the current must be reversed every half turn, otherwise the coil comes to a halt again. This is achieved using a conducting ring split in two, called a **split ring** or **commutator**. A coil of wire is used with lots of turns to increase the effect of the magnetic field



Motor Effect

A current-carrying wire or coil can exert a force on a permanent magnet. This is called the motor effect. The wire could also exert a force on another nearby current-carrying wire or coil.

If the current-carrying wire is placed in a magnetic field (whose lines of force are at right angles to the wire) then it will experience a force at right angles to both the current direction and the magnetic field lines.

Testing for magnetism

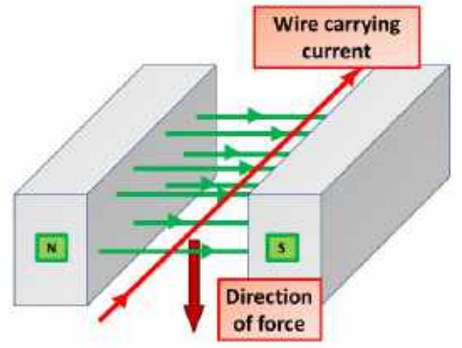
A permanent magnet can:

- attract or repel another permanent magnet
- attract a magnetic material (but not repel it)
- This means that you can only show that an object is a permanent magnet by checking if it repels another magnet.

Left Hand Rule

Use Fleming's left-hand rule to remember the direction of motion in an electric motor. It is shown in the following diagram.

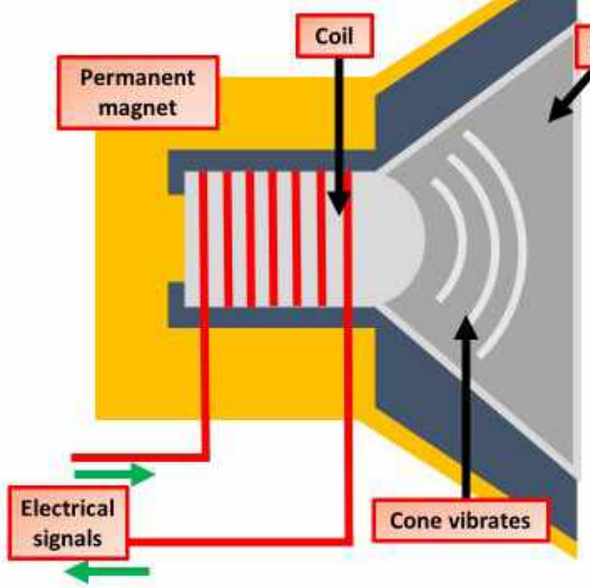
The **F**irst finger points in the direction of the magnetic **F**ield. The se**C**ond finger points in the direction of the **C**urrent and is at right angle to the field. The thu **M**b points in the direction of the **M**otion. Remember to use your left hand, not your right!

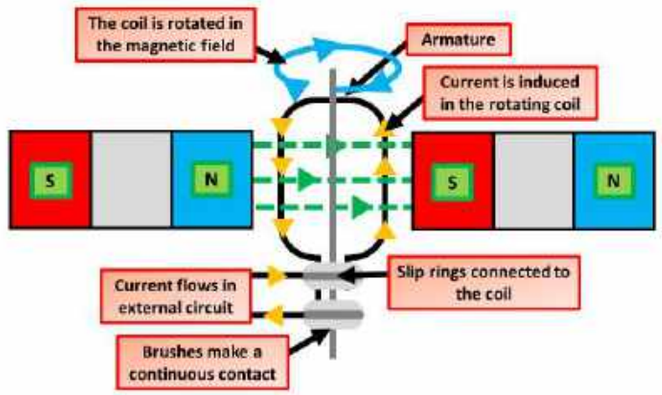


Speakers

In these devices, variations in an electric current cause variations in the magnetic field produced by an electromagnet. Alternating current supplied to the loudspeaker creates sound waves in the following way: the magnetic field interacts with the permanent magnet generating a force, which pushes the cone outwards.

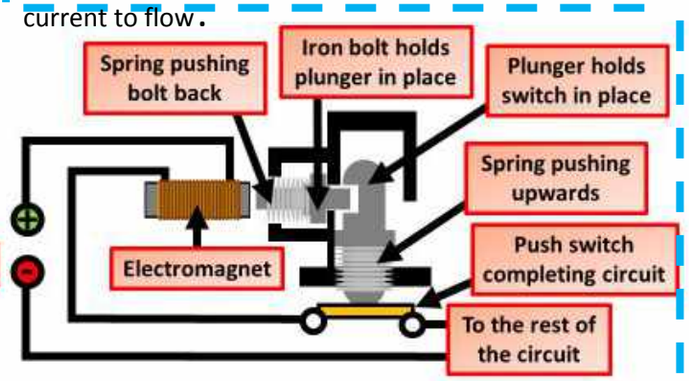
- the current in the electrical circuit is varying
- the current passes through the coil
- the coil experiences a force (inwards or outwards)
- reversing the current reverses the force
- the size of the current affects the size of the force
- the varying current causes the coil to vibrate
- the (vibrating) coil causes the cone to vibrate
- the vibrating cone causes the air molecules to move
- the movement of the air molecules produces the pressure variations in the air needed for a sound wave
- the air molecules bunch together forming compressions and spread apart forming rarefactions





Induced Potential

It is not practical to generate large amounts of electricity by passing a magnet in and out of a coil of wire. Instead, generators induce a current by spinning a coil of wire inside a magnetic field, or by spinning a magnet inside a coil of wire. As this happens, a potential difference is produced between the ends of the coil, which causes a current to flow.

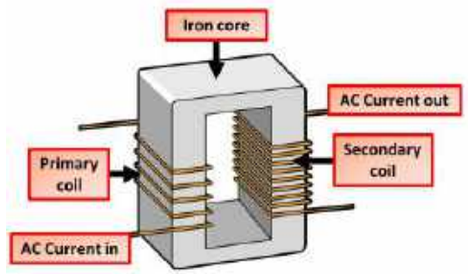


Relay Switch

1. A spring-loaded push switch is held in the closed position by a spring-loaded soft iron bolt.
2. An electromagnet is arranged so that it can pull the bolt away from the switch.
3. When the live wire carries the usual operating current, the electromagnet is not strong enough to separate the contacts.
4. If something goes wrong with the appliance and a large current flows
5. The electromagnet will pull hard enough to separate the contacts and break the circuit.

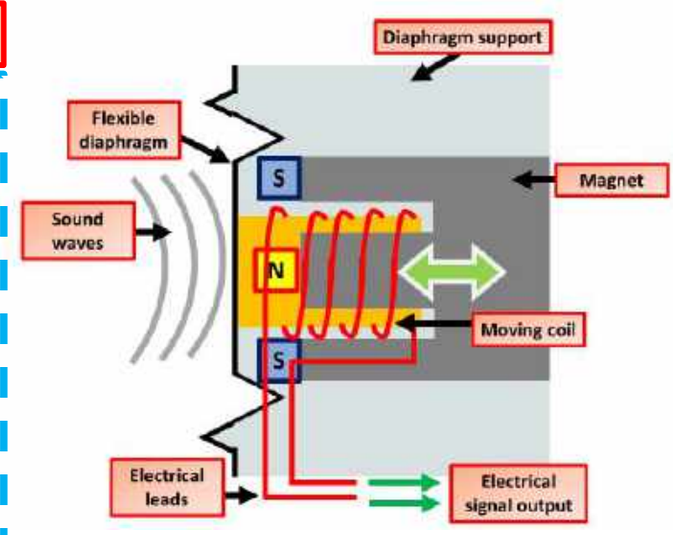
Transformers

The voltage of an alternating current can be changed using a device called a transformer. A transformer contains two coils that are wound around a soft iron core. The alternating current in the primary (input) coil produces an alternating magnetic field. This alternating magnetic field induces an alternating current in the secondary



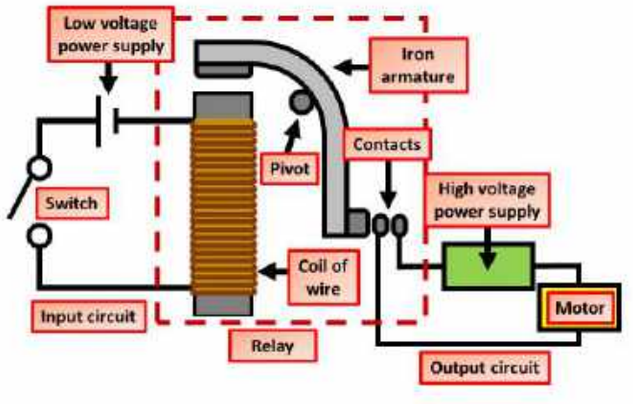
Microphones

- Pressure variations in sound waves cause the flexible diaphragm to vibrate
- The vibrations of the diaphragm cause vibrations in the coil
- The coil moves relative to a permanent magnet, so a potential difference is induced in the coil
- The coil is part of a complete circuit, so the induced potential difference causes a current to flow around the circuit
- The changing size and direction of the induced current matches the vibrations of the coil
- The electrical signals generated match the pressure variations in the sound waves



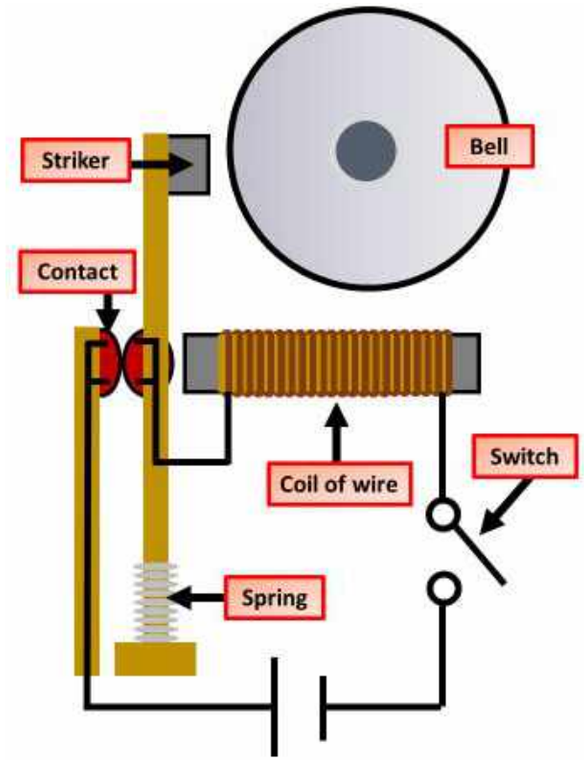
Relay Switch

1. The input circuit is switched off and no current flows through it until something turns it on. The output circuit is also switched off.
2. When a small current flows in the input circuit, it activates the electromagnet which produces a magnetic field all around it
3. The energized electromagnet pulls the metal bar in the output circuit toward it, closing the switch and allowing a much bigger current to flow through the output circuit.
4. The output circuit operates a high-current appliance such as a lamp or an electric motor.



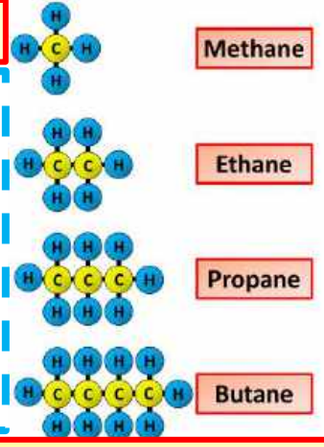
Door Bells

1. When the current flows through the circuit, the electromagnet makes a magnetic field.
2. The electromagnet attracts the springy metal arm.
3. The arm hits the gong, which makes a sound.
4. The circuit is broken now the arm is out of position.
5. The electromagnet is turned off and the springy metal arm moves back.
6. The circuit is complete again.
7. The cycle repeats as long as the switch is closed.



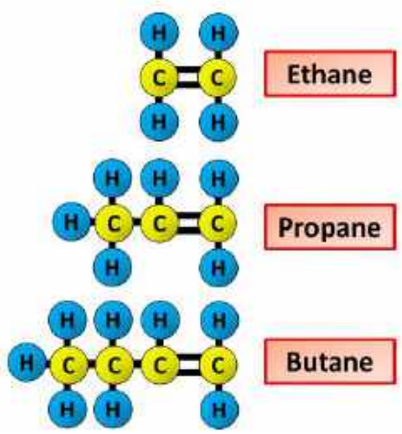
Alkanes

Alkanes are chemical compounds that consist of carbon (C) and hydrogen (H) atoms, so they are also called hydrocarbons. The chemical structure of alkanes only consists of single bonds. This illustration shows examples of the chemical structures of two alkanes: ethane and pentane.



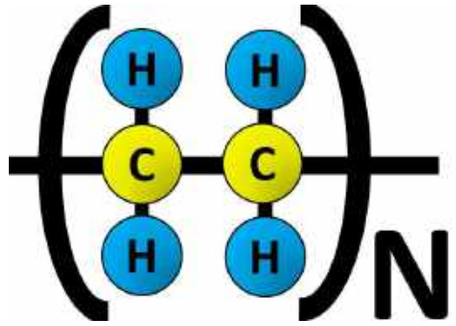
Alkenes

Alkenes are organic compounds that consist of carbon and hydrogen atoms with one or more carbon-carbon double bonds in their chemical structure. Alkenes are unsaturated hydrocarbons. They are hydrocarbons because they are made of only carbon and hydrogen atoms, and they are unsaturated because they have one or more double bonds in their chemical structure.



Polymers

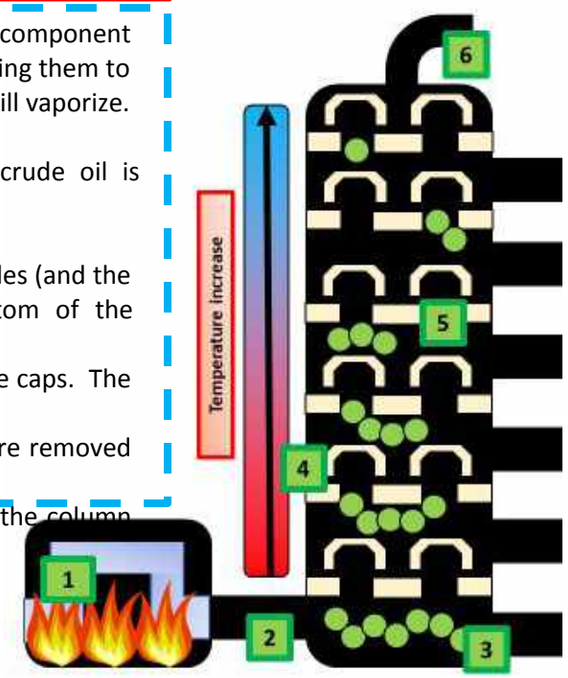
Alkenes can be used to make polymers. Polymers are very large molecules made when many smaller molecules join together, end to end. The smaller molecules are called monomers. In general: lots of monomer molecules → a polymer molecule.



Fractional Distillation

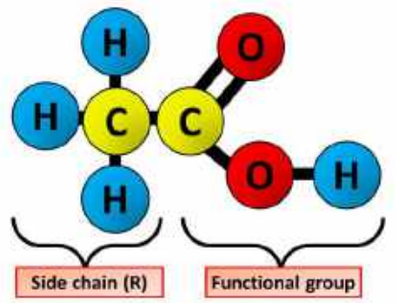
Fractional distillation is the separation of a mixture into its component parts, or fractions. Chemical compounds are separated by heating them to a temperature at which one or more fractions of the mixture will vaporize. It uses distillation to fractionate

1. The crude oil is heated to about 350 °C. All of the crude oil is vaporised.
2. The vaporised crude oil enters the fractionating column.
3. It has started to cool. The fraction with the longest molecules (and the highest boiling point) condenses and falls to the bottom of the column.
4. The remaining crude oil vapours rise up through the bubble caps. The higher up the column the cooler it gets
5. The remaining longest-chained molecules condense and are removed at the next level as a new fraction.
6. This process continues until the vapours reach the top of the column



Carboxylic Acid

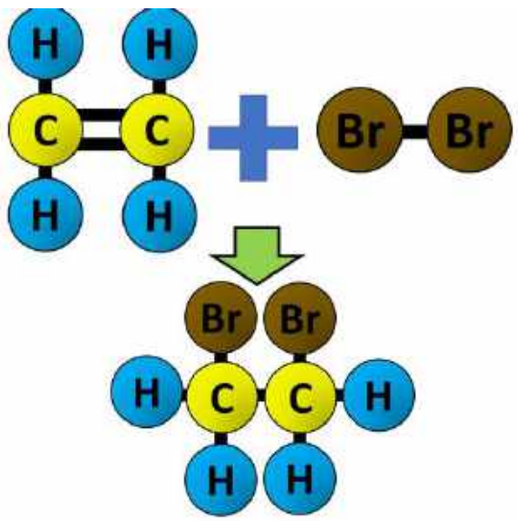
A carboxylic acid is an organic compound that contains a carboxyl group. The general formula of a carboxylic acid is R–COOH, with R referring to the rest of the molecule. Carboxylic acids occur widely. Important examples include the amino acids and acetic acid.



Alkenes & Bromide

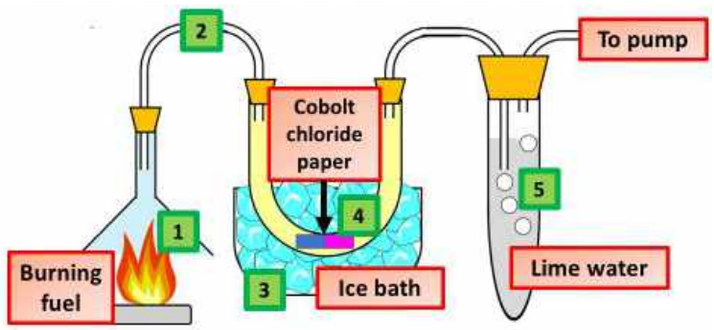
The **functional group** , C=C, allows alkenes to undergo addition reactions. For example, ethene reacts with bromine to form 1,2-dibromoethane:

$CH_2=CH_2 + Br_2 \rightarrow CH_2BrCH_2Br$



Combustion of Alkenes

Like the alkanes, the alkenes undergo combustion. However, alkenes are less likely to combust completely, so they tend to burn in air with a smoky flame due to incomplete combustion



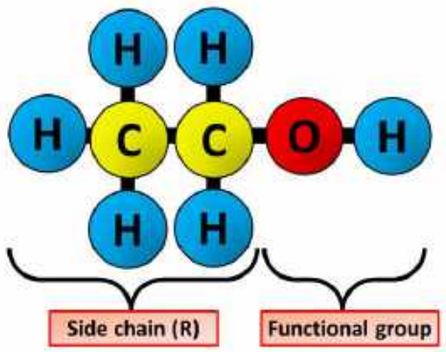
Cracking

Cracking is the breakdown of a large alkane into smaller, more useful alkenes. Simply put, hydrocarbon cracking is the process of breaking a long-chain of hydrocarbons into short ones. This process requires high temperatures and high pressure.

1. Long-chain hydrocarbons are heated until they turn into vapour. This 'feedstock' is pumped into the reaction vessel
2. A catalyst of zeolite crystals is added This lowers the temperature needed to break down the hydrocarbons
3. The long chain hydrocarbon molecules are broken down into smaller ones This reaction is called cracking The cracked hydrocarbons can have double bonds
4. The mixture of cracked molecules is pumped into a fractional distillation column where they are separated
5. During the reaction the catalyst becomes coated with carbon so is pumped into a regenerator where it is burnt off
6. The cleaned catalyst flows back into the reaction vessel to be reused

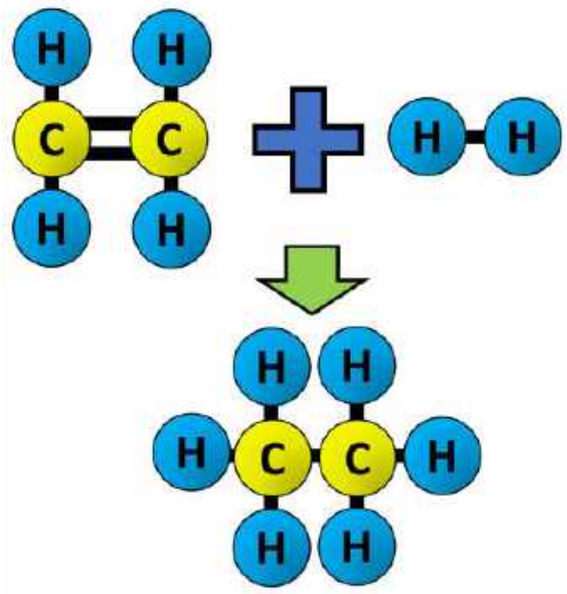
Alcohols

Alcohols are the family of compounds that contain one or more hydroxyl (-OH) groups attached to a single bonded alkane. Alcohols are represented by the general formula -OH. Alcohols are important in organic chemistry because they can be converted to and from many other types of compounds.



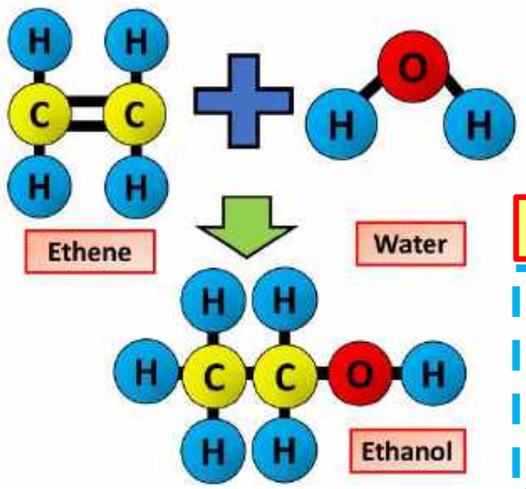
Hydration of Alkenes

Addition reactions involving alkenes are reactions in which the carbon–carbon double bond is converted to a single bond and atoms or groups are added to each of the two carbon atoms.



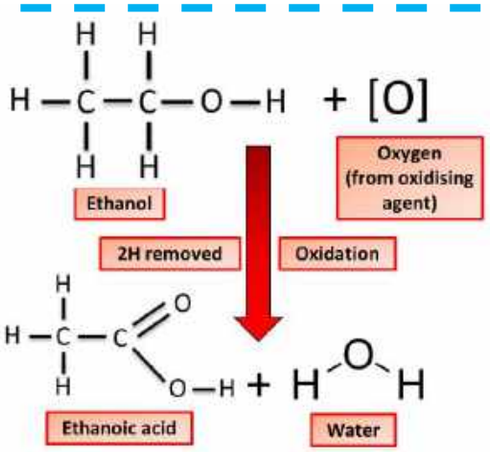
Alkenes & Water

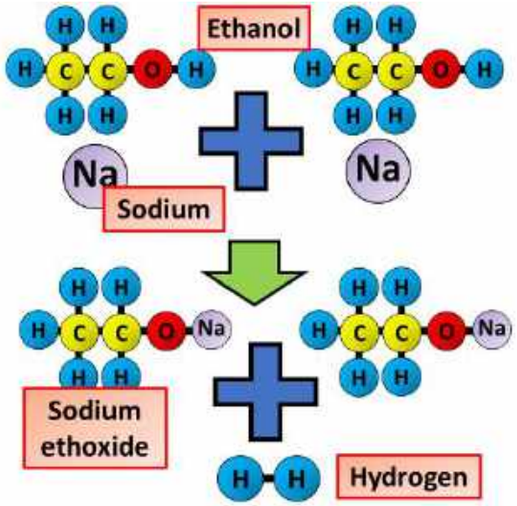
Addition reactions involving alkenes are reactions in which the carbon–carbon double bond is converted to a single bond and atoms or groups are added to each of the two carbon atoms. Alkenes undergo an addition reaction with water in the presence of a catalyst to form an alcohol.



Oxidation of Ethanol

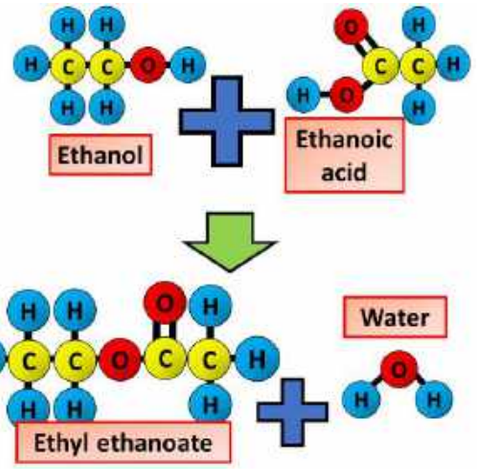
The alcohols can also be **oxidised** without **combustion** to produce **carboxylic acids**. For example, ethanol can be oxidised to ethanoic acid using an **oxidising agent**.
It is easier to understand what happens if ethanol is shown as CH_3CH_2OH in the balanced equation:
ethanol + oxidising agent → ethanoic acid + water





Ethanol & Sodium

If a small piece of sodium is dropped into ethanol, bubbles of hydrogen gas are produced and the liquid contains sodium ethoxide. The reaction is:
sodium + ethanol → sodium ethoxide + hydrogen



Producing Esters

Carboxylic acids can react with alcohols to make esters. Esters are organic compounds which all contain the functional group -COO-. Esters have fruity smells and can be used as solvents.
The general equation for the formation of an ester is:
alcohol + carboxylic acid → ester + water

Combustion of Ethanol

The alcohols undergo complete combustion to form carbon dioxide and water. For example, ethanol is used as a fuel:
ethanol + oxygen → carbon dioxide + water

Oxidation of Ethanol

The alcohols can also be oxidised without combustion to produce carboxylic acids. For example, ethanol can be oxidised to ethanoic acid using an oxidising agent.
It is easier to understand what happens if ethanol is shown as CH3CH2OH in the balanced equation:
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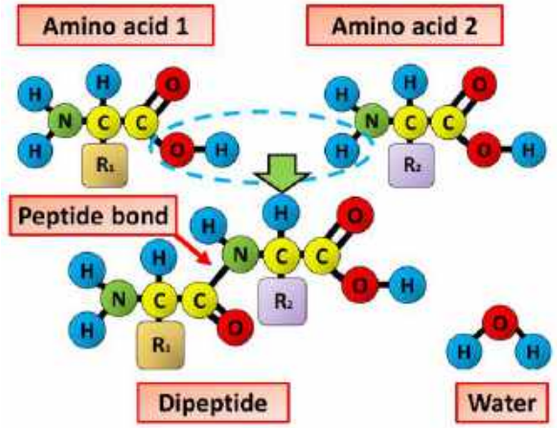
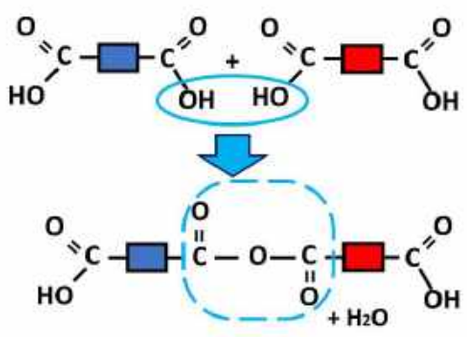


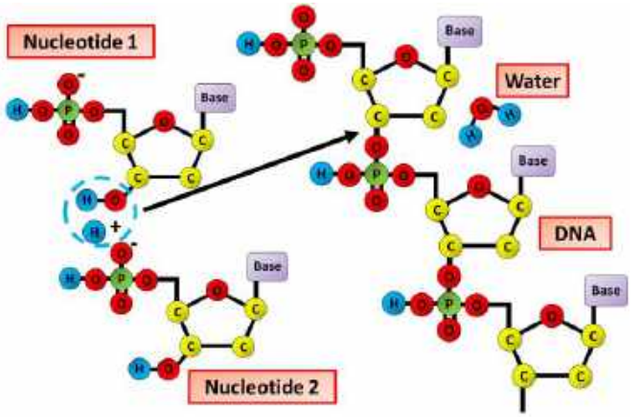
Proteins

Proteins are biological polymers made inside cells. They are made from amino acid monomers and have a huge range of roles inside living things. For example, all enzymes are made from proteins.

Condensation Polymerisation

The alcohols can also be oxidised without combustion to produce carboxylic acids. For example, ethanol can be oxidised to ethanoic acid using an oxidising agent.
It is easier to understand what happens if ethanol is shown as CH3CH2OH in the balanced equation:
ethanol + oxidising agent → ethanoic acid + water



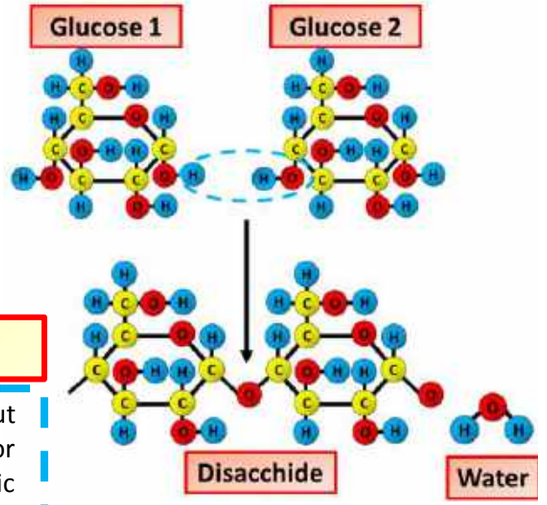


DNA

DNA (deoxyribonucleic acid) is a polymer which is essential for life. Most DNA is a double helix, where two polymer chains are lined up and then twisted around each other. The DNA polymer is made from four different types of monomer, which are called nucleotides.

Starch & Cellulose

Starch and cellulose are biological polymers which are made by plants. The monomers for both starch and cellulose are sugar molecules. Starch is used by plants as a way of storing energy as a complex carbohydrate. Cellulose is used to make the strong cell wall which gives plant cells (and therefore plants) strength.



Amino Acids

Amino acids are molecules which have at least two functional groups. All amino acids contain the -NH2 group and also the carboxylic acid group -COOH. Amino acids are polymerised in cells to make polypeptides and proteins.

Amino acids react by condensation polymerisation so for every monomer which is added to the growing polymer chain, one molecule of water is also produced.

Producing Ethanol

Fermentation is an anaerobic process: glucose → ethanol + carbon dioxide. Yeast , a type of single-celled fungus , provides the enzymes needed for fermentation. If the yeast cells become too cold, fermentation happens very slowly, or may not happen at all.
Ethanol can also be made by reacting ethene with steam. This process is called hydration. Mixture of ethene and steam is passed over a phosphoric acid catalyst at a temperature of 300°C and 60-70 atmospheres of pressure. The ethene required for this reaction is obtained from crude oil.

Polyester

Polyesters occur naturally as biological polymers, but can also be made artificially.
Man-made polymers are often used in clothing. Polyesters are an example of a condensation polymer. A simple polyester can be made from a monomer which has two hydroxyl groups (-OH) and another monomer which has two carboxylic acid groups (-COOH).

Year 11 GCSE History - Knowledge Organiser: Weimar and Nazi Germany 1918-39
KT1: The Weimar Republic, 1918-29

Time line of Key events

1918 World War One ended. The Kaiser **abdicated** and Germany became a country without a monarch (a **Republic**).
1919 January Spartacist Uprising
1919 June Signing of the Treaty of Versailles
1919 August Weimar Constitution finalised
1920 Kapp Putsch
1923 French occupation of the Ruhr and hyperinflation
1924 Dawes Plan
1925 Locarno Pact
1926 Germany joins League of Nations
1928 Kellogg Briand Pact
1929 Young Plan

Key Concepts

The Weimar Republic
This was the name given to Germany after the Kaiser had abdicated in November 1918. This was a time of despair and hope for Germany. At first, the country faced lots of chaos but under Gustav Stresemann, there was some stability.

The Treaty of Versailles caused many problems for Germany. The German people disliked the politicians for signing it and it caused political problems and economic problems.

Gustav Stresemann helped to bring about recovery in Germany after 1924. He solved economic problems by making friends with other countries. However, historians have very different views about the extent of this recovery**.**

The Golden Agewas the period from 1924-29 and it saw significant changes in culture, the standard of living and the position of women.




Key vocab and events

Abdication	When a monarch leaves the throne
Armistice	An agreement to end war
Article 48	The President could use this to ignore the Reichstag and rule as he saw fit
Coalition	A government of two or more political parties
Constitution	This is an agreement about how the country would be ruled
Dawes Plan	1924 - An agreement where the USA would lend Germany money
Dolchstoss	"stab in the back" -
Ebert	The first President of the Republic
Freikorps	Ex military soldiers who wanted to overthrow the Republic
Hyperinflation	When money loses its value
Kaiser	King
Kellogg Briand Pact	65 counties including Germany agreed to resolve conflict peacefully
Locarno Pact	An agreement on borders signed by Britain, France, Italy and Belgium
Reichstag	German parliament
Rentenmark	The currency of Germany after November 1923
Republic	A country without a King or a Queen
Spartacists	
Stresemann	The Chancellor of Germany from the Summer of 1923
Treaty of Versailles	1919 -This decided how Germany was going to be treated after WW1
Weimar	The new government could not meet in Berlin as it was so dangerous, so they met here instead
Young Plan	1929 -This lowered the reparations payment and gave Germany longer to pay

Unit 2b

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.

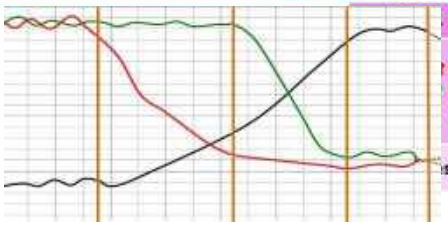
Consequences of Uneven Development

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 2	STAGE 3	STAGE 4	STAGE 5
	BR Low Declining DR Very High	*Rapidly falling DR Low BR High*	*Low DR Low BR Zero*	*Slowly Falling DR Low BR Negative*
s	**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 Kenya

Location and Background
Kenya is a LIC in Africa. Location makes Kenya an attractive place for visitors to explore the tropical blue seas, safari and grasslands

Tourist economy
-12% of GDP is from tourism
-600,000 employed by tourism (10% of populaiton)
24 national parks
-HDI increased from 0.45 to 0.55 in 10 years.

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 which means the TNCs keep the money
- Maasai tribespeople are forced form their land
- Environment damaged by tourist vehicles

Case Study: Economic Development in India

Location & Importance
India is a NEE in Southern Asia.
-It was a British colony until 1947
-HDI is 0.64 which is medium
-There are large inequalities between the wealtby and poor
-20% of people live in poverty
-2nd largest population in the world, soon to be the largest

Influences upon India's development

Political
Suffared instability after gaining independence in 1947
More stable since and rapid economic growth
Stability has encouraged global investment from China and USA

Social
India is a multi-cultural, multi-faith society.
Although mostly a strength, diversity has caused regional conflicts from groups

Cultural
India's diversity has created rich and varied artistic culture.
The country has a rich music, literacy and film industry (i.e. Bollywood).
A successful national cricket side.

Industrial Structures
Primary employs 50% and makes up 17% of GDP
Secondary has grown to 22% of employment
Tertiary employs 29% and has grown significantly to 53% of GDP.

The role of TNCs
TNCs such as Unilever have played an important role in its economy.
Project Shakti, 16,000 jobs, nationwide hygiene
- Profits move to HICs.
- Pollution in Kodikanal

Changing Relationships
India is reducing barriers to trade and receiving FDI
Working with neighbours to transport natural gas from other countries. TAPI pipeline
Increasing trade with foreign businesses. Asia-Pacific trade agreement

Environmental Impacts
Unilever factory in Kodaikanal sent mercury to a waste dump which caused health problems for locals. Unilever removed it and cleaned the area up but caused damage initially.

Aid & Debt relief
+ Emergency aid from EQs
+ £200m a year from the UK for poverty
+ Wateraid trains locals in using handpumps
- Corruption means some aid is lost

Effects of Economic Development
GDP has increased (40 rupees per day), HDI increase by 0.15. More fossil fuels burnt therefore more pollution.

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: Torr Quarry
Unicorn group:
- Solar panels
- 100% renewable
- Energy efficient lighting

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.
+ 50 Enterprise zones – encourage business in north.

AQA Religious Studies A – Theme A: Relationships and Families

Key Words			
	Having sex with someone who is not your husband or wife, outside of marriage		Holding biased opinions about people based on their gender
	Methods of preventing pregnancy e.g. condoms, the pill, the coil		Sexual attraction to the opposite gender
	Living and starting a family with someone who you are not married to		Sexual attraction to the same gender
	The legal ending of a marriage		A legal and religious ceremony joining two people together in love
	Using a woman's natural cycle of fertility to try and avoid pregnancy		Bringing babies into the world
	Acting against people based on their gender		Marrying someone else after divorce

Key Ideas		
Religious Views on Sexuality 	**Sexual Orientation** - The Roman Catholic church teaches that sex between people of the same gender is 'disordered' - They argue that **homosexual** relationships are banned by the Bible - Liberal Christians teach that Jesus wanted people to love each other and show **mercy** and that we should be accepting of homosexuals - **Gay marriage** is banned in the Catholic Church and Church of England *"Do not have sexual relations with a man as one does with a woman"* – Leviticus 18:22	**Adultery and Sex Outside Marriage** - Roman Catholics argue that all **sex before marriage** and after a divorce is unacceptable. Sex should only take place inside a marriage which is a lifelong, loving relationship. - **Adultery** means the act of having sex with someone who is not your husband or wife. - It is prohibited by the Bible and Christians argue it is wrong as it undermines marriage involves lies and secrecy. *"You shall not commit adultery"* - Exodus 20:14
Artificial Contraception 	- **Artificial contraception** means using something to stop yourself from getting pregnant. This could be a condom, the pill or a device like the coil. - **Family planning** means using the natural cycle of fertility which women go through to predict when a woman would be least fertile. It is much less effective than artificial contraception. - God tells Adam and Eve (the first couple) to "*be fruitful and multiply*" (Genesis 1:2) which encourages them to have children. ☒ The ***Catholic Church*** argues that all sexual acts inside marriage must be open to **procreation** (having babies) and that a baby is a gift from God. They may use family planning as it is a natural method. ☑ The ***Church of England*** argues that contraception should be allowed so that couples can take time and consider if they want to have children.	
Marriage and Divorce 	- **Marriage** is a religious and legal ceremony in which two people make **vows** (promises) in front of their friends and family and (if in a church) in front of God - During the ceremony you agree to be **together for life** saying "*til death do us part*" (Marriage Ceremony) - **Divorce** is the legal break-up of a marriage. It is **legal** in the UK and many marriages currently end in divorce. - Many Christians do not like it as it is seen to **break the promises** made in a marriage. ☒ The ***Catholic Church*** do not support divorce. They believe that sex after divorce is a form of adultery and you cannot get remarried in a Catholic Church once you have been divorced. Jesus says *"if a man divorces his wife [...] he involves her in adultery"* (Matthew 5:32) ☑ The ***Church of England*** accepts divorce, especially if it is for reasons of abuse but you have to receive special permission to get remarried in a church. They might see it as a merciful option.	
Family 	**Types of Family** - **Nuclear Family** is a family with a mother, father and children – some Christians argue this is the ideal - **Extended Family** is a family where grandparents and other relatives are involved - **Single Parent Family** this is a family where one parent brings up the child	**Purpose of the Family** - **Procreation** – the family should be for the purpose of having and bringing up children - **Stability** – the family should be for providing a secure, stable environment for children - **Faith** – the family should be a way of bringing children up as good Christians
Gender 	- **Gender equality** means that men and women should be equal and given the same rights and opportunities as each other -In the UK women can face gender **prejudice and discrimination** where they are not treated equality - The **Catholic Church** argues that women have a special role as mothers and they do not allow women to be priests - The **Church of England** has allowed women priests since 1994	

Knowledge Organiser

COMPONENT 2 – Planning for and Pitching an Enterprise Activity

Aims
Goods and Services

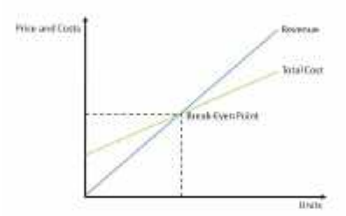
A

- **Learning Aim A** Explore ideas and plan for a micro-enterprise activity

Financial Aims

Plans that involve money based targets are financial aims because they involve the enterprises finances.

Examples are 'to make a profit' and to 'achieve break even'.



Non-financial Aims

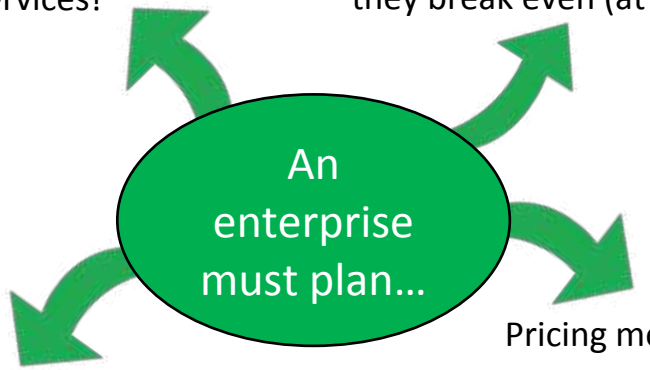
These are not linked money based targets, but are linked to other aspects of the enterprise such as strengthening brand image, building relationships with customers and suppliers or operating ethically.

All aims should be SMART:
Specific, Measurable, Achievable, Realistic and Time-bound.

All entrepreneurs need to know what goods and services they're going to sell and be sure they're going to meet their customers wants and needs (market research is a must here!)

The features, benefits and USPs of all its products and services!

The costings (fixed & variable) and pricing carefully to make sure they break even (at least!)



Around their competitions.

- What are their competitors?
- What do they offer?
- What are their prices?
- How will we compete?

Pricing models to encourage potential customers!

- ✔ Skimming
- ✔ Penetration
- ✔ Cost Plus
- ✔ Competition based

Knowledge Organiser

COMPONENT 2 – Planning for and Pitching an Enterprise Activity

Target Markets

A

- **Learning Aim A** Explore ideas and plan for a micro-enterprise activity

Geographic Target customers based on a predefined geographic boundary. Differences in interests, values, and preferences vary dramatically throughout cities, states, regions, and countries.	**Demographic** The process of dividing a market through variables such as age, gender, education level, family size, occupation, income, and more. This is one of the most wildly used strategies amongst marketers.
Psychographic Focus on the intrinsic traits the target customer has. Psychographic traits can range from values, personalities, interests, attitudes, conscious and subconscious motivators, lifestyles, and opinions.	**Behavioral** Break down the way customers go through their decision making and buying processes. Attitudes towards the brand, the way they use it, and their knowledge base are all behavioral examples.

Market segmentation is dividing your customers into groups based on them having similar characteristics!

- Geographic example: Young adults who have an interest in football
- Demographic example: People who live and work in the countryside
- Psychographic example: Adults who are interested in a healthy life
- Behavioural example: Those who only purchase certain brands.

You have got to **appeal** to your target market.

This will help you to know where to sell the product, what price your customers are willing to pay and how best to attract the interest of the target market (promotions)

To do this successfully you'll need to complete some market research.

Now you have appealed to the target market, you must know how to reach them (i.e. sell the goods and services to them!).

Once you get to know your customers wants, needs and habits you'll be able to attract new customers and work on gaining repeat customers!

Knowledge Organiser

COMPONENT 2 – Planning for and Pitching an Enterprise Activity

Aims
Goods and Services

A

- **Learning Aim A** Explore ideas and plan for a micro-enterprise activity

Key Words	Definition
Financial Objectives	Targets expressed in money terms such as making a profit, earning income or building wealth.
SMART	Specific, measurable, achievable, realistic and time-constrained.
Determination	The drive to succeed in business. To show commitment to an idea or setting up a business.
Initiative	To work independently and be able to make the first move in business.
Taking Risks	A skill shown by entrepreneurs. It can be risky to own your own business.
Making Decisions	To be in charge of making a good judgement. An entrepreneur will listen and take in information to ensure they make the right decision.
Planning	Planning is essential to any successful business. Clear objectives have to be set for the long term and how these objectives will be met in the short term.
Persuasion	A skill of an entrepreneur. To be able to convince a customer they should buy the product/ service. Or it could also mean negotiating with a supplier to lower their prices.
Showing Leadership	Entrepreneurs should have a vision of where the business is heading, be good at planning and have self-confidence. These are all leadership skills to succeed.

Module 2 Le temps des loisirs – free time

The verb faire

faire (*to do/make*)
je fais
tu fais
il/elle/on fait
nous faisons
vous faites
ils/elles font

(*perfect tense*) **j'ai fait**

The verb vouloir > Page 212

Vouloir is an irregular verb.

vouloir (*to want/want to*)
je veux
tu veux
il/elle/on veut
nous voulons
vous voulez
ils/elles veulent

Negatives > Page 206

Negatives come in two parts, which go **around** the French verb.

ne … pas (not) *Je* ***ne*** *lis* ***pas*** *beaucoup.*
ne … jamais (never) *Elle* ***ne*** *lit* ***jamais.***
ne … plus (no longer/not any more) *Je* ***ne*** *lis* ***plus.***

If the negative is followed by a noun, you usually put ***de*** afterwards.

Je ne lis pas ***de*** *romans.* I don't read novels.
Je ne lis jamais ***de*** *mangas.* I never read mangas.

But *aimer* is an exception.

Je n'aime pas ***les*** *livres d'épouvante.* I don't like horror novels.

depuis + the present tense > Page 234

Use ***depuis*** + **the present tense** to say how long something has been happening.

Je joue au tennis ***depuis*** *cinq ans.*
I have been playing tennis for five years.

The position of adjectives > Page 224

Most adjectives come after the noun:

C'est un sport ***rapide****.*

However, some adjectives come in front of the noun, e.g. ***beau*** and ***bon***:

C'est un ***beau*** *sport.*
Cela demande … *une* ***bonne*** *coordination.*
de ***bons*** *réflexes.*

Refer to page 224 for a list of other adjectives that come before the noun.

Comparative adjectives > Page 226

You use comparative adjectives to compare things:

plus + **adjective** + ***que***	more … than
plus simple que	more simple than
moins + **adjective** + ***que***	less … than
moins arrogant que	less arrogant than

The superlative > Page 226

The superlative is formed as follows:

- the most … ***le/la/les plus*** + adjective
  l'acteur ***le plus*** *talentueux* — the most talented actor
  l'actrice ***la plus*** *élégante* — the most elegant actress
  les réalisateurs ***les plus*** *connus* — the best known directors
- the best … ***le*** *meilleur/****la*** *meilleure/****les*** *meilleurs/****les*** *meilleures*
  les meilleures *photos* the best photos
- the least … ***le/la/les moins*** + adjective
  la série ***la moins*** *intéressante* the least interesting series

Note that the superlative comes before or after the noun, depending on where the adjective would normally come:

le festival le ***plus célèbre*** the most famous festival
les ***plus grandes*** *stars* the biggest stars

The perfect tense > Pages 208 and 210

You use the perfect tense to say what you did in the past. You form it using ***avoir*** or ***être*** plus **a past participle**.

J'ai mangé *une pizza.* **I ate** a pizza.

Some past participles are irregular:

faire (to do/make)	*j'ai* ***fait***	*prendre* (to take)	*j'ai* ***pris***
voir (to see)	*j'ai* ***vu***	*mettre* (to put)	*j'ai* ***mis***

For verbs that take *être*, like *aller* and *sortir*, the past participle must agree.

je suis *sorti(e)* ***on est*** *sortis* (boys or a mixed group)
tu es *sorti(e)* ***on est*** *sorties* (girls)
il est *sorti*
elle est *sortie*

Irregular verbs in the present tense > Page 202

Most verbs, like *télécharger*, *jouer*, *regarder* and *créer*, are regular **-er** verbs.

However, not all verbs follow this pattern. You're already familiar with the irregular verbs *avoir*, *être*, *aller* and *faire*. Here are four more that you need to know.

lire (*to read*)	**écrire** (*to write*)	**prendre** (*to take*)	**mettre** (*to put*)
je lis	j'écris	je prends	je mets
tu lis	tu écris	tu prends	tu mets
il/elle/on lit	il/elle/on écrit	il/elle/on prend	il/elle/on met
nous lisons	nous écrivons	nous prenons	nous mettons
vous lisez	vous écrivez	vous prenez	vous mettez
ils/elles lisent	ils/elles écrivent	ils/elles prennent	ils/elles mettent

The imperfect tense > Page 216

The imperfect tense is used to describe what things **were like** in the past or what **used to** happen.

Avant, ***je lisais*** *des livres, maintenant je lis sur mon écran.*

Dans le passé, ***nous lisions*** *les journaux, maintenant nous lisons la presse sur ordi.*

The relative pronoun que > Page 232

Que means 'who', 'which' or 'that', when 'who', 'which' or 'that' is the object of a verb. It is very useful for creating longer, more complex sentences:

J'y mets toutes les photos ***que*** *j'aime et* ***que*** *je veux partager avec les autres.*

I put all the photos **which** I like and **which** I want to share with other people there.

Direct object pronouns > Page 230

A direct object pronoun replaces a noun that is the object in a sentence. It comes directly before the verb.

masc ('it')	*Je regarde* ***un documentaire.***	*Je* ***le*** *regarde.*
fem ('it')	*Je regarde* ***une série.***	*Je* ***la*** *regarde.*
pl ('them')	*J'aime* ***les documentaires.***	*Je* ***les*** *aime.*

Mon émission préférée est ***un jeu télévisé****.*
Je ***le*** *regarde tous les samedis.*
My favourite TV programme is a game show.
I watch **it** every Saturday.

J'adore ***cette émission****.*
Je ***la*** *regarde toutes les semaines.*
I love this programme.
I watch **it** every week.

J'ai horreur ***des émissions de télé-réalité****.*
Je ***les*** *trouve totalement nulles.*
I hate reality TV shows.
I find **them** totally rubbish.

Do You Spit Diamonds?

If so, complete these tasks

1.) Phonics – try and say these key words, can you make sure that you pronounce them properly remembering your phonics.
Deux fois par semaine, ennuyeux, un film d'arts martiaux, deux billets, des reseaux sociaux, euro, je ne rate jamais des émissions de sport .

2.) Translation – translate the following paragraph.
Hier, je suis sortie pour voir trois chanteurs belges en concert. D'habitude, j'écoute de la musique sur mon portable mais quand on voit un groupe en concert, c'est plus passionnant. Ce soir, on va télécharger leur musique!

3, Read the same paragraph aloud, how many words can you say without making a mistake, think about your phonics as mentioned above.

4. Grammar – answer these questions –
a.) What does depuis mean and can you write this in a sentence?
b.) Write out the verbs faire and jouer out in French and English. Which would you use for tennis and which would you use for horse riding?
c.) "Mon soeur Mariam fais de l'escalade depuis ans 2" is wrong. Explain why. (3 mistakes)
d.) Give three other examples of a negative excluding ne…pas in sentences (French).

5.) Writing task – can you adapt the paragraph above to discuss what you did yesterday and what you usually do. Can you also add what you will do this evening?

Module 3 jours ordinaires, jours de fête –ordinary days, celebration days

The partitive article ('some', 'any')

You use the partitive article (**de** + the definite article) to say 'some':

de + *le* → **du** *de* + *l'* → **de l'**
de + *la* → **de la** *de* + *les* → **des**

But after a negative, or with containers and quantities, just use **de/d'**:

Je ne mange pas **de** *viande.*
un kilo **de** *bananes/une bouteille* **d'***eau*

The irregular verbs boire and prendre Page 208

boire (*to drink*)	**prendre** (*to take*)*
je bois	je prends
tu bois	tu prends
il/elle/on boit	il/elle/on prend
nous buvons	nous prenons
vous buvez	vous prenez
ils/elles boivent	ils/elles prennent
(*perfect tense*) j'ai bu	(*perfect tense*) j'ai pris

* French people often use *prendre* with food or drink, to mean 'have':

Parfois, je **prends** *du pain grillé.* Sometimes, I **have** toast.

Subject and object pronouns (it, they, them) Pages 206 and 23

	subject	**object**
masculine	***Il*** *est trop petit.*	*Je* ***le*** *prends.*
feminine	***Elle*** *est trop petit**e**.*	*Je* ***la*** *prends.*
plural	***Ils/Elles*** *sont trop petit(**e**)**s**.*	*Je* ***les*** *prends.*

ce, cet, cette, ces Page 220

To say 'this …' or 'these …' you use the following:

masculine singular	**masculine singular before a vowel or 'h'**	**feminine singular**	**plural**
ce *chapeau* (this hat)	**cet** *imperméable* (this raincoat)	**cette** *montre* (this watch)	**ces** *boucles d'oreille* (these earrings)

quel, quelle, quels, quelles Page 204

To ask 'which …?' you use *quel, quelle, quels* or *quelles* followed by a noun.

masc singular	**fem singular**	**masc plural**	**fem plural**
quel pull? (which jumper?)	*quel**le** veste?* (which jacket?)	*quel**s** gants?* (which gloves?)	*quel**les** chaussures?* (which shoes?)

Adjectives of colour Page 224

Adjectives of colour go **after the noun**. Most follow the same patterns of agreement as other adjectives.

But remember that *blanc* is irregular:
*blanc**he*** (fem sg)
*blanc**s*** (masc pl)
*blanc**hes*** (fem pl)

Marron and *orange* are invariable (never change).

If you add *foncé* (dark) or *clair* (light), the adjective does not agree:
une jupe vert foncé (a dark green skirt)
des gants bleu clair (light blue gloves)

Il faut… Page 220

You use ***il faut*** to say 'I/you/we need to' or 'must'. It is normally followed by the infinitive:

Il faut *acheter du jambon.*
I/You/We need to buy some ham.

The pronoun en Page 230

The pronoun *en* is often used to replace a partitive article. It can mean 'some', 'of it' or 'of them'. It goes in front of the verb.

On mange **du** *gâteau. J'**en** garde une tranche pour toi.*
We're eating cake. I'm keeping a slice (of it) for you.

Il y a **des** *champignons dedans. Tu **en** veux?*
There are mushrooms in it. Do you want some?

Asking questions using est-ce que …? and qu'est-ce que …? Page 204

- ***Est-ce que …?*** turns a statement into a question, like 'do' or 'does' in English.
  Tu fêtes Noël. → ***Est-ce que*** *tu fêtes Noël?*
  You celebrate Christmas. → **Do** you celebrate Christmas**?**
- It is also used with question words.
  Comment *est-ce que tu fêtes Noël?* **How** do you celebrate Christmas?
- ***Qu'est-ce que …?*** means 'What …?'
  Qu'est-ce que *tu manges à Noël?* **What** do you eat at Christmas?

Modal verbs (pouvoir and devoir) Page 220

pouvoir (*to be able to/can*)	**devoir** (*to have to/must*)
je peux	je dois
tu peux	tu dois
il/elle/on peut	il/elle/on doit
nous pouvons	nous devons
vous pouvez	vous devez
ils/elles peuvent	ils/elles doivent

The present and near future tenses

Use the **present tense** to say what you **normally or usually do.**	Use the **near future tense** to say what you **are going to do.**
Je mange/danse (etc.)	*Je **vais** manger/danser* (etc.)
On mange/danse (etc.)	*On **va** manger/danser* (etc.)

The perfect and imperfect tenses Pages 208 and 217

- You use the **perfect tense** to describe completed actions in the past.
  – Some verbs have irregular past participles:
  *avoir – j'ai **eu*** (I had)
  *boire – j'ai **bu*** (I drank)
  *prendre – j'ai **pris*** (I took)
  *recevoir – j'ai **reçu*** (I received)
  – Some verbs take *être* in the perfect tense:
  *aller – je **suis** allé(e)* (I went)
  *naître – je **suis** né(e)* (I was born)
- You use the **imperfect tense** to say 'was' or 'were'.
  The imperfect of *c'est* is ***c'était*** (it was).
  The imperfect of *il y a* is ***il y avait*** (there was/were).

Find examples of both tenses in exercise 1.

The verbs porter and mettre Pages 236 and 239

	porter (to wear)	***mettre*** (to put/put on)
present tense	*je porte*	*je mets*
perfect tense	*j'ai porté*	*j'ai mis*
near future tense	*je vais porter*	*je vais mettre*

Forming questions in the tu and vous forms Page 210

- Use ***vous*** with people you don't know well or with more than one person.
- Use ***tu*** with younger people, or when someone invites you to call them ***tu***.

You can use inversion to form questions: put the verb before the subject pronoun, with a hyphen in between:

*Que **fais-tu** pendant ton temps libre?*
What do you in your spare time?

With *il/elle* questions, if the verb ends with a vowel, put ***t*** in between:

*A-**t**-il des tatouages?*
Does he have tattoos?

venir de + infinitive Page 228

You use the present tense of ***venir*** + ***de*** + an infinitive to say what has **just** happened:

*Je **viens de** fêter mon anniversaire.*
I've just celebrated my birthday.

*Ils **viennent de** se marier.*
They've just got married.

To see *venir* in full, refer to page 239.

Do You Spit Diamonds?

If so, complete these tasks

1.) Phonics – try and say these key words, can you make sure that you pronounce them properly remembering your phonics.
Des oeufs, le petit déjeuner, du yaourt, des biscuits, des boules d'oreille, la taille, c'est mieux d'essayer les vêtements dans un magasin.

2.) Translation – translate the following paragraph.
L'année dernière, j'ai fêté mon anniversaire avec mes copains. D'habitude, on va au cinema ou à la piscine. Mais cette fois, on est allés au bowling et ensuite, on a mangé un hamburger-frites au fast-food. Je me suis bien amuse et j'ai reçu beaucoup de cadeaux.
Cette année, je vais avoir seize ans, doc je vais inviter mes amis à une fête chez moi. On va manger des sandwichs, des chips et un gros gâteau au chocolat!

3, Read the same paragraph aloud, how many words can you say without making a mistake, think about your phonics as mentioned above. (be careful with cognates!)

4. Grammar – answer these questions –
a.) What does est-ce que and qu'est-ce que mean and can you write this in a question?
b.) Write out the verbs devoir and pouvoir out in French and English. Can you give an example of these in another tense also? E.g. should
c.) "Nous est musulmans, alors on fête pas Noël mais on fête L'Aïd-el-Fitr" is wrong. Explain why. (2 mistakes)
d.) Write in French an example of what you wear using 3 adjectives in the correct place and agreed correctly.

5.) Writing task – can you adapt the paragraph above to discuss how you celebrated your birthday last year and how you are going to do it this year?

30% of your overall grade

Coursework: Composition

Year 11

General information

You must compose **two original pieces of music**.

One is a free composition, which you can complete at any time in the course.

The other must be written in response to a brief released by Eduqas on the 1st September 2020

They can both be in a similar style as long as the actual musical content is different.

You will have to hand in an audio file of each piece – either a live recording (of you or someone else performing your piece) or an output from software. You will need a score with a detailed description of each piece.

You have to complete a composing log as well which is signed by you and your teacher to authenticate your work. This explains how you completed your work, if you used any ideas which were not your own (like drum loops) and if anyone else helped you.

Tips!

There are a number of different ways to approach composing:

- Using notation software, such as Musescore, Noteflight or Sibelius;
- Using a DAW such as Cubase, Garageband, Logic or Soundtrap;
- Using an instrument and noting down ideas on paper;
- A combination of these approaches.

Composition 1 must be a response to a brief set by Eduqas, released on September 1st 2020. There will be a choice of four briefs, and they will all be quite open and allow for a variety of different responses, but you must do what is asked! (For example if it says write a pop song, you must write a pop song!)

Composition 2 is a free composition. **You must write your own brief**, which should include a context for the music. It's OK to change your brief before you submit your work.

MARKING CRITERIA

You will be **assessed** on

- the quality of your **original ideas**
- how well you **develop** them
- how well you use the **elements of music**
- the overall **structure**, **style** and **coherence** of your pieces

Ask yourself if your ideas are "highly effective," "generally effective," "simple," or "limited."

To secure top marks you need to aim for "highly effective" as your answer!

30% of your overall grade

Coursework: Performance

Year 11

General information

You must perform at least 2 pieces: One piece must be an ensemble*, the other(s) can be ensembles or solos. You can sing or play any instrument.

You can have an accompanist or use a backing track, or perform unaccompanied. **Backing tracks and accompaniments must not contain the part you are playing/singing.**

*An ensemble in this course is described as a group of 2-8 live performers. You must not be performing the tune all the way through while the other performers accompany you. You must also be the only person performing your part.

Each piece must be recorded in the same school year you take the exam, and your teacher must be present.

Performing more difficult pieces (grade 3+) can boost your marks. Playing an easier piece well could result in a better mark than playing a harder piece badly!

You will need to hand in a score of each piece so your teacher can assess how accurately you perform.

If your performances last less than 4 minutes in total, you will lose marks.

Tips!

- Choose pieces as soon as possible
- Practice regularly
- Perform and record at every opportunity
- Scan your sheet music every time you record a performance (there are apps for your phone) and send it to your teacher by email.
- Check that you have at least four minutes of performance.

MARKING CRITERIA

Accuracy – this means playing the right notes, at the right time, but also following all the other performance directions, such as dynamics, tempo markings, articulation etc.

Your accuracy is judged by comparing what you play to the sheet music or lead sheet, so make sure that if you intend to do something different it is clearly marked on. This could be for example an altered melody line in the second verse of a song or a section which is cut out or repeated. If you are a singer if it not enough just to submit the lyrics – you need the melody line too.

Technical control – this means how well you control your instrument or voice, and could include breath control, intonation or tone quality.

Expression and interpretation – this is how well you communicate in your performance. It includes playing in time and in a balance with other people in an ensemble, or an accompanist, as well as how you communicate the style of the music. Think about the pieces you have chosen. Have you mastered them well enough to be able to communicate them to the audience? If you are singing, are you conveying the mood or meaning of the lyrics?

Category 1 – PERFORMANCE & TECHNICAL SKILLS	
1. Emphasis	**1.Status**
2. Projection	**2.Staging** – choosing and using the appropriate staging
3. Focus	**3.Character/** use of both vocal and physical characteristics
4. Accurate interpretation	4.Using the **space/ physical contact/movement/ Spatial awareness**/audience
5. Use of space	**5.Coordination**
6. Appreciation of sound accompaniment	**6.Voice** – manipulation/ pitch/tone/rhythm/pace/volume/choral/soundscape
7. Musicality	**7.Blocking/ /Choral work**
10. Facial expression	**8.Stamina**
11. Quality	**9.Emotional Engagement**
12. Timing	**10.Stage Combat/** safely performing physical actions.
13. Body Language	11.The ability to **reproduce movement** accurately
	12.Whole body participation and/or **isolation** **13.Gestures** or traits to a character. 14.Awareness of, and **relationship** to other characters and performers **/proxemics**

Category 2 – Keywords	
1.Stimulus	Your starting point and approach to artistic development
2.Social skills	Compromise, share ideas etc
3.Research	Independent research to bring to rehearsal
4.Lighting	Create an atmosphere of your performance
5.Sound	Sound effects -Live & Pre-recorded
6.Health & Safety	Rehearsal space & performance space
7.Set Design	Backdrops & props
8.Advertising	Promoting your performance e.g media
9.Costume	Selecting appropriate performance clothing
10.Staging	Types of stages and performance space
11.Rehearsal Schedules	Planning & working to deadline
12.Professional Conduct	Punctuality, attendance

Category 3 – STYLES	
1. Naturalism	***'The language of the body is the key that can unlock the soul'*** Konstantin Stanislavski 1863- 1938
2. Epic Theatre	***'Show the character; don't be the character'*** *BERTOLT BRECHT 1898- 1956*
3. Physical Theatre	DV8, Ghecko, PUSH
4. Musical Theatre	**Musical theatre combines music, songs, spoken dialogue and dance to entertain an audience**

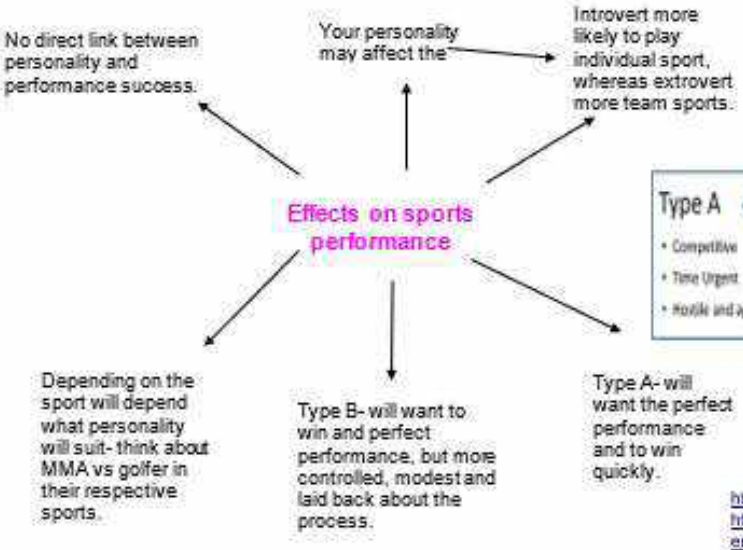
BTEC Sport: Personality and Sports Performance

Definition: the sum of characteristics that makes a person unique.

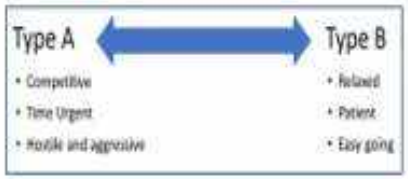
Structures of Personality

- Psychological core
  - 'The real you'
  - Includes beliefs, attitudes, values and interests.
  - Seen as constant/ stable and do not change.
- Typical responses
  - The usual ways you respond to situations/ environment.
  - Good indicators of psychological core.
- Role- related behaviour
  - Behaviour is determined by circumstances- changeable aspect of personality.
  - Personality changes as perception of environment changes.

Approach	Definition
Trait	*These are characteristics that don't change. People are characterised as introvert (e.g. shy and quiet) and extrovert (outgoing and social).*
Situational	*The sporting situation or environment affects behaviour more than personality. Performers will learn how to react in sporting situations above their traits.*
Interactional	*Mix of both **Trait** and **Situational**; however in competition or stressful situations, the situation will normally take over the personality traits of an individual.*



Measures of Personality



Eysneck Personality Inventory

This measures your character and how you present yourself through a questionnaire with yes or no answers.

Observation

Watch people in different environments with different people and note down how they react.

Profile of Mood States (POMs)

The questionnaire contains 65 words/statements that describe feelings people have. The test requires you to indicate for each word or statement how you have been feeling in the past week or including today.

https://www.teamtalk.com/news/how-does-personality-affect-sports-performance
https://learnzone.loucoll.ac.uk/sportres/CourseGenie/Sport/2010spec/AASELevel2/L2PsychologyForSportsPerformance/L2PsychologyForSportsPerformance_03Mod/index.htm

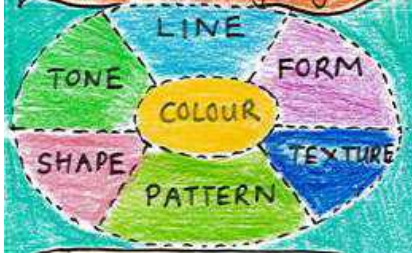
NATURAL FORMS

YEAR 11 KNOWLEDGE ORGANISER

GCSE FINE ART

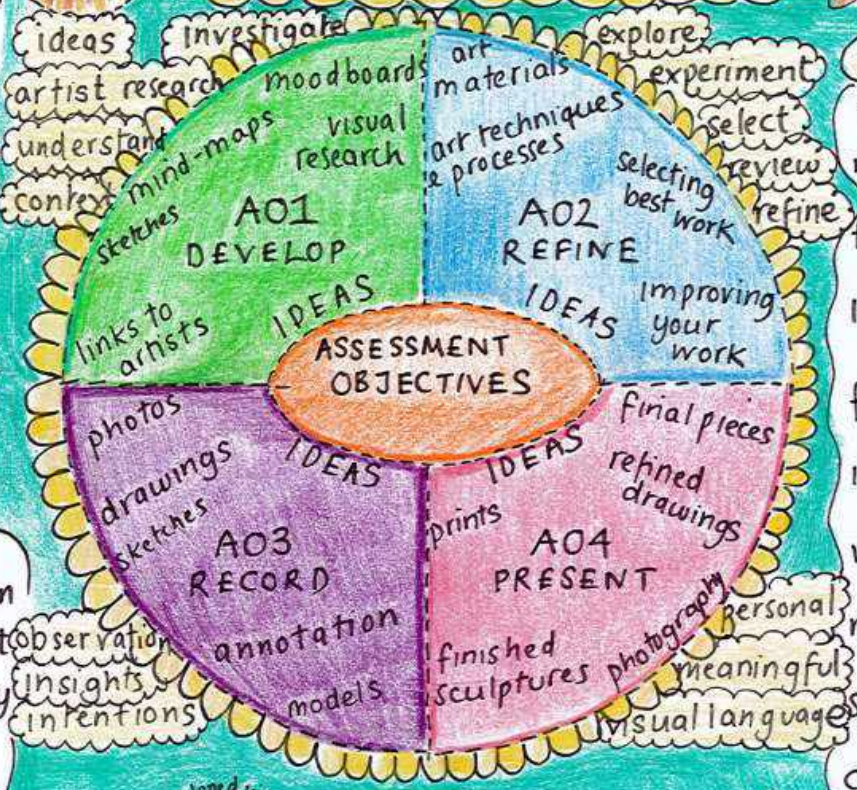
In this project you will develop practical artmaking skills, learn about artists and gain confidence in creating sustained projects.

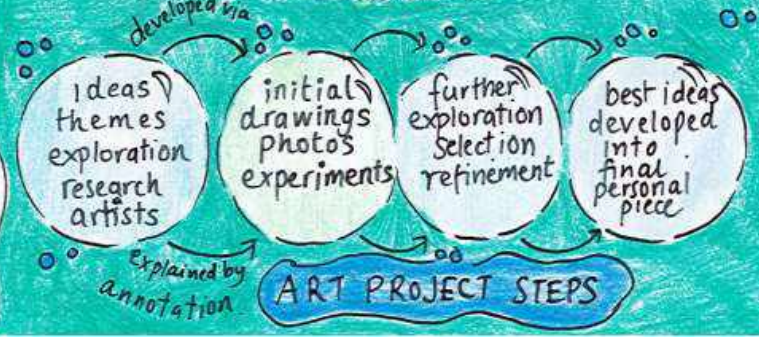
FORMAL ELEMENTS visual language



KEY VOCABULARY

abstract	interpretation
art movement	impressionist
colour field	contemporary
context	modern
evocative	proportion
expressive	perspective
experiment	realism
formal qualities	subject matter
graphic	thumbnail
installation	tessellation
annotate	conceptual





ART TECHNIQUES & PROCESSES

- drawing & tracing / sketching
- mark making
- tonal drawing - chalk & charcoal
- line drawing - biro on torn newspaper (collaged background)
- fine line pen & wash
- ink washes / drips / splattering
- watercolour & line
- mono-printing
- sgraffito drawing
- collage
- lino carving / lino printing
- acrylic painting
  - mono chrome
  - limited palette
  - flesh tones
- clay & wire sculpture
- photography

GCSE Computer Science J277 – Computer Systems – 1.2.1 Primary and Secondary Storage, Data Units

MEMORY

Difference between RAM and ROM:
Random Access Memory is volatile, Read Only Memory is non-volatile. User doesn't normally use the ROM. ROM is slower.

What is SRAM / DRAM (where are they used?):
Static RAM is very fast, used in the cache. Dynamic RAM is less expensive and used for main memory (eg: RAM)

What is the purpose of RAM:
Stores currently in-use programs and data, as well as the loaded operating system

What is the purpose of ROM:
Stores the instructions the computer needs to boot

What is Virtual Memory and why is it needed:

Virtual Memory is a space on the secondary storage of the computer (HDD or SSD) and is used when RAM is full. This is so programs can continue to be opened, but it is slower than RAM and can cause HDD thrashing

What are cache and registers:
Fast areas of primary storage (memory) on the CPU to store frequently used instructions

What is Flash Memory:
Can be written to like RAM, but is non-volatile (stores data when power is off)

STORAGE

Three storage types:
1. Magnetic
2. Optical
3. Solid State

Why do we need secondary storage:
To permanently store data – RAM is low capacity (eg: 16GB on a good computer) and is volatile (it would be wiped when the computer shuts down!)

Example characteristics of storage devices:
1. Hard Disk Drive (HDD): large capacity, cheap, reliable, relatively slower than solid state
2. Solid State Drive (SSD): very fast, reliable, durable, expensive, low capacity
3. USB Memory Stick: fast, portable, reliable, durable, cheap but low capacity
4. DVD-ROM: very cheap, portable, but not durable or high capacity
5. Magnetic Tape: very high capacity, very cheap, very slow

Characteristics to define:
- Reliability
- Durability
- Portability
- Cost
- Capacity
- Speed

FILE SIZES

Bit – 1 binary digit (0 or 1)
Nibble – 4 bits
Byte – 8 bits
KB – 1024 bytes
MB – 1024 kilobytes
GB – 1024 megabytes
TB – 1024 gigabytes
PB – 1024 terabytes (1 petabyte)

Most files are MB or GB in size eg: a photo is typically around 5MB. An HD video could be 25GB+. Games are often around 70-100GB and so on. A very compressed image might only be 200KB, or 0.2MB.

Formulae needed to calculate file sizes:
Watch the following video series which explains how to calculate file sizes for: text files, images, sounds

Exam Questions

Links: https://bbc.in/2zBUexE | https://bbc.in/2OpMEP3 | http://shorturl.at/aklE6

What type of memory is described as volatile? [1]

What memory stores the boot up instructions? [1]

What type of storage is best for an e-book reader? [1]

Describe what is meant by virtual memory and why it is needed: [3]

Calculate the size of an image that is 100 x 240 pixels, with 2 bytes per pixel. Write your answer in KB. Show your method: [2]

KEY WORDS: RAM, ROM, flash, cache, virtual, memory, volatile, boot up, BIOS, firmware, optical, magnetic, solid state, speed, durability, portability, capacity, reliability, cost, bit, byte

GCSE Computer Science J277 – Computer Systems – 1.2.2 Data Storage and Units 2

Sound

Sample - Measure of the analogue signal at a given point in time

Sample rate - number of samples taken per second and is measured in Hertz.

Sample resolution - number of bits used to represent each sample

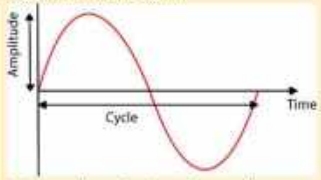
The size of sound files can be calculated using:

size of file = length (seconds) x sample rate x sampling resolution

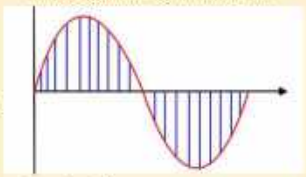
For sound to be stored digitally on a computer it needs to be converted from its continuous analogue form into a discrete binary values. The steps are:

1. Microphone detects the sound wave and converts it into an electrical (analogue) signal
2. The analogue signal is sampled at regular intervals
3. The samples are approximated to the nearest integer (quantised)
4. Each integer is encoded in binary with a fixed number of bits

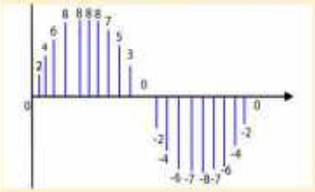
Original analogue signal



Sample signal at regular intervals



Integer values give to each sample



Encode as binary

0 2 4 6 8 8 8 8 7 5 3 0 ->

00000 00010 00100 01000

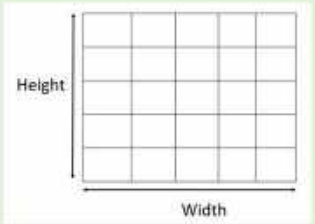
01000 01000 01000 00111

00101 00011 ...

Images

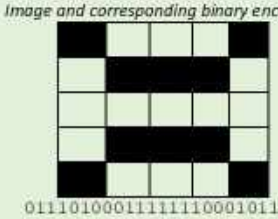
Bitmap images are made up from tiny dots called **pixels**. Each pixel will have a colour associated with it. An image can then be constructed from many of pixels which will have different colours arranged in rows and columns.

Total number of pixels in image = width in pixels x height in pixels



Colour depth is the number of bits used to represent each pixel in an image. If we have a black and white image it has two colours. Each pixel can be represented by a single pixel because a bit value of 0 is black and 1 is white.

Image and corresponding binary encoding



0111010001111111000101110

To represent more colours we can use more bits. For instance if we have 2-bits per pixel we can represent 4 colours because we know have 4 binary code combinations (00, 01, 10 11) where each code represents a different colour

Pixilation occurs when the image is overstretched. In these situations, the image looses quality and has a blocky and blurred appearance. This arises when the image is presented at too large a size and there are not enough pixels to reproduce the details in the image at this larger size.

Calculating the size of a bitmap image

File size in bits = width in pixels x height in pixels x colour depth

File size in bytes = width in pixels x height in pixels x colour depth / 8

Data Compression

The purpose of data compression is to make the files smaller which means that:

- Less time / less bandwidth to transfer data
- Take up less space on the disk

Given that there are 7 bits per ASCII character, the uncompressed size of an ASCII phrase is:

size = number of characters (including spaces) x 7

Run Length Encoding (RLE) is a compression method where sequences of the same values are stored in pairs of the value and the number of those values. For instance, the sequence:

0 0 0 1 1 0 1 1 1 1 0 1 1 1 1

would be represented as:

3 0 2 1 1 0 4 1 1 0 4 1

Huffman coding is a form of compression that allows us to use fewer bits for higher frequency data. More common letters are represented using fewer bits than less common letters. For instance, "a" and "e", which occur in many words would be represented with fewer bit than "z" which occurs rarely.
This allows for much more effective compression than RLE.

The steps involved in Huffman encoding as are follows:

1. Do frequency table
2. Order table
3. Create the tree
4. Add 1, 0 to the branches
5. Encode letters
6. Encode message

Worked Example: How much smaller is the phrase henry horse encoded using Huffman encoding compared with its uncompressed size.

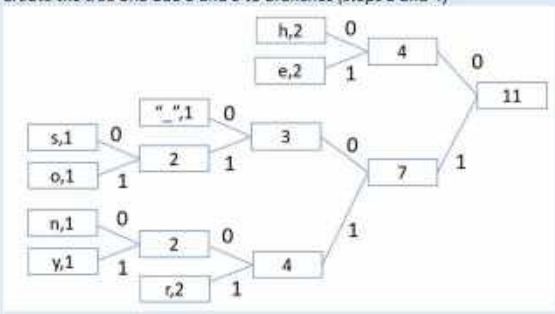
Calculate the uncompressed size

In the phrase *henry horse* there are 11 characters (including the space). Therefore the uncompressed size is 11 x 7 = 77 bits

Generate ordered frequency table (steps 1 and 2)

letter	frequency
e	2
h	2
r	2
<space>	1
o	1
s	1
y	1
n	1

Create the tree and add 1 and 0 to branches (steps 3 and 4)



Encode letters

Letter	encoding
e	01
h	00
r	111
<space>	100
o	1011
s	1000
n	1100
y	1101

Encode message

00 01 1100 111 1101 100 00 1011 111 1000 01 = 33 bits

Therefore by using compression we have reduced the size from 77 bits to 33 bits a saving of 44 bits.

Scan me for videos to support this unit

GCSE Computer Science J277 – Computer Systems – 1.2.2 Data Storage and Units 1

Data Representation

Number bases

Denary (or decimal) is base-10 and is the number system we are most familiar with. We have the columns of units, tens, hundreds, thousands and so on. Base-10 means that we have 10 possible values (0, 1, 2, 3, 4, 5, 6, 7, 8, 9) in each column.

Binary is base-2 and has 2 values, 0 and 1. It requires a greater number of digits in binary to represent a number than denary. This is how data and instructions are stored in a computer.

To calculate the maximum value for a given number of bits we use 2^n-1 where n is the number of bits. For example for 4 bits we have 2^4-1 which is 15.

Bits	Max value binary	Max value denary
1	1_2	1_{10}
2	11_2	3_{10}
3	111_2	7_{10}
4	1111_2	15_{10}
5	11111_2	31_{10}
6	111111_2	63_{10}
7	1111111_2	127_{10}
8	11111111_2	255_{10}

Hexadecimal is base-16. To make up the 16 values we use the ten denary numbers in addition to 6 letters (A, B, C, D, E, F).

Denary	Hex.	Binary
0_{10}	0_{16}	0000_2
1_{10}	1_{16}	0001_2
2_{10}	2_{16}	0010_2
3_{10}	3_{16}	0011_2
4_{10}	4_{16}	0100_2
5_{10}	5_{16}	0101_2
6_{10}	6_{16}	0110_2
7_{10}	7_{16}	0111_2

Denary	Hex.	Binary
8_{10}	8_{16}	1000_2
9_{10}	9_{16}	1001_2
10_{10}	A_{16}	1010_2
11_{10}	B_{16}	1011_2
12_{10}	C_{16}	1100_2
13_{10}	D_{16}	1101_2
14_{10}	E_{16}	1110_2
15_{10}	F_{16}	1111_2

Hexadecimal is used a lot in computing because it much easier to read than binary. There are far fewer characters than binary. So hexadecimal is often used in place of binary as a shorthand to save space. For instance, the hexadecimal number 7BA3D456 (8 digits) is 01111011101000111101010001010110 (32 digits) in binary which is hard to read.

Hexadecimal is better than denary at representing binary because hexadecimal is based on powers of 2.

Converting between number bases

Denary to binary conversion

1. Create a grid:

128	64	32	16	8	4	2	1

2. Add a 1 to the corresponding cell if number contributes to target number and 0 to all the other cells

Worked example: convert 24_{10} to binary.

128	64	32	16	8	4	2	1
0	0	0	1	1	0	0	0

$16_{10} + 8_{10} = 24_{10}$

The binary value is $\underline{11000_2}$ (we can ignore the preceding zeros)

Binary to denary conversion

Worked example: Convert 01011001_2 to denary

1. Create the grid:

128	64	32	16	8	4	2	1
0	1	0	1	1	0	0	1

2. Add up the cells that have a corresponding value of 1:
   $64 + 16_{10} + 8_{10} + 1 = \underline{89_{10}}$

Hexadecimal to denary conversion

1) Convert the two hex values separately to denary value
2) Multiply the first value by 16
3) Add the second value

Worked example: Covert $A3_{16}$ to denary

$A_{16} = 10_{10}$

$3_{16} = 3_{10}$

$(10_{10} \times 16_{10}) + 3_{10} = \underline{163_{10}}$

Denary to hexadecimal conversion

1) Integer divide the denary number by 16
2) Take the modulus 16 of the denary number
3) Convert the two numbers to the corresponding hex values.

Worked example: Convert 189_{10} to hex

$189_{10} / 16_{10} = 11_{10}$ remainder 15_{10}

$11_{10} = B_{16}$

$15_{10} = F_{16}$

$189_{10} = \underline{BF_{16}}$

Hexadecimal to binary conversion

1. Find the corresponding 4-bit binary number for the two numbers
2. Concatenate the two binary values to give the final binary value

Example: convert $C3_{16}$ to binary

$C_{16} = 12_{10} = 1100_2$

$3_{16} = 3_{10} = 0011_2$

$\underline{11000011_2}$

Binary to hexadecimal conversion

1. Split the binary number into groups of 4 bits: 1110_2 1010_2
2. Find the corresponding Hex value for each of the 4-bit groups

Worked example: Convert 11101010_2 to hexadecimal

1110_2 | 1010_2

$1110_2 = 14_{10} = E_{16}$

$1010_2 = 10_{10} = A_{16}$

$\underline{EA_{16}}$

Units of Information

Unit	Symbol	Number of bytes
Kilobyte	KB	10^3 (1000)
Megabyte	MB	10^6 (1 million)
Gigabyte	GB	10^9 (1 billion)
Terabyte	TB	10^{12} (1 trillion)

A bit is the fundamental unit of binary numbers. A bit is a binary digit that can be either 0 or 1.

1 byte = 8 bits

1 nibble = 4 bits

Character Encoding

Character coding schemes allows text to be represented in the computer. One such coding scheme is **ASCII**. ASCII uses 7 bits to represent each character which means that a total of 128 characters can be represented.

Lower case letters	26
Upper case letters	26
Numbers	10
Symbols (e.g. comma, colon)	33
Control characters	33

ASCII encoded values for some characters

A	1000001_2	65_{10}
B	1000010_2	66_{10}
a	1100001_2	97_{10}
b	1100010_2	98_{10}
"0"	0110000_2	48_{10}
"1"	0110001_2	49_{10}

- ASCII has a limited character set (7 bits, 128 characters), but **Unicode** has 16 bits and allows many more (65K) characters.
- Unicode provides a unique character for different languages and different platforms.
- It allows us to represent different alphabets for instance Greek, Mandarin, Japanese, Emojis etc.
- Unicode and ASCII are the same up to 127.

Binary addition

Binary addition rules

$0_2 + 0_2 = 0_2$

$0_2 + 1_2 = 1_2$

$1_2 + 0_2 = 1_2$

$1_2 + 1_2 = 10_2$ (carry 1)

$1_2 + 1_2 + 1_2 = 11_2$ (carry 1)

Example

$$\begin{array}{rl} & 10101001_2 \\ & 00001001_2 \\ + & \underline{00010101_2} \\ & \underline{11000111_2} \\ \text{carry} & 111 \quad 1 \end{array}$$

Binary Shift

The binary shift operator is used to perform multiplication and division of numbers by powers of 2

multiply/divide	x 16	x 8	x 4	x 2	/ 2	/ 4	/ 8
shift	<<4	<<3	<<2	<<1	>>1	>>2	>>3

Example: Apply shift operator to 1101_2 (13_{10})

Shift	Result	denary
<<1	11010_2	$13_{10} \times 2_{10} = 26_{10}$
<<2	110100_2	$13_{10} \times 4_{10} = 52_{10}$
>>1	110	$13_{10} // 2_{10} = 6_{10}$

Note that odd numbers are rounded down to the nearest integer when the right shift operator is applied.

GCSE Computer Science J277 – Computer Systems – 1.1 Systems Architecture

COMPUTER SYSTEMS:

What is a Computer System: a combination of computing hardware and software to allow it to calculate and carry out user instructions
Hardware is: the physical components of the computer system such as the computer itself, a monitor, a keyboard etc
Software is: the programs on the computer which carry out the instructions of the user, such as PowerPoint, Windows etc
Firmware is: software specifically design to run the hardware
General Purpose: computers capable of being used for a variety of jobs. IE: a 'normal' computer, phone, laptop etc
Embedded Systems: computers that are built into other devices, for example the computer microprocessor and board that would control how a dishwasher works, an MP3 player, Sat Nav etc. They are **dedicated purpose** machines.

CPU ARCHITECTURE:

3 Key Components of a CPU:
Arithmetic Logic Unit – ALU – operations take place here eg: adding two binary numbers together.
Control Unit – CU – decodes machine code instructions for the ALU, monitors input and output
Immediate Access Store – known as the registers, storing data for the CPU

Von Neumann Architecture: is the **stored program** concept, where program instructions and the data to be processed can be stored in the same memory.

Registers: Common Instruction Register (**CIR**), Memory Data Register (**MDR**), Memory Address Register (**MAR**)

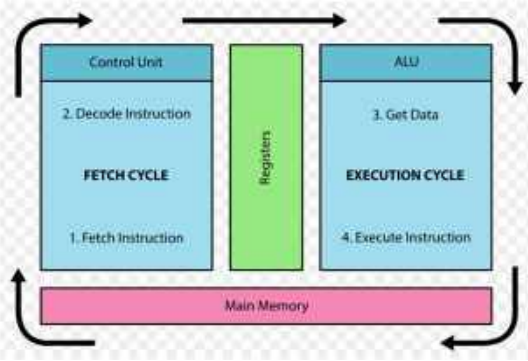
Buses: Wires through which data and instructions are transferred between computer components. For example, the address bus and the data bus

FDE CYCLE:

The FDE cycle is the Fetch, Decode, Execute cycle which repeats to work through the instructions sent to the processor.

1. Instructions are loaded into memory
2. Processor fetches the instruction from the main memory
3. Instruction is decoded so the CPU knows what to do with the instruction
4. Processor then executes the instruction
5. Result of the instruction can be stored in memory
6. Next instruction is then fetched from main memory and the cycle repeats itself.

This is a simple diagram to show where this takes place on the CPU:



CPU PROPERTIES / PERFORMANCE:

What is a CPU: The Central Processing Unit. The area of the PC that calculates all instructions
Clock Speed: how fast the CPU operates at in cycles per second. 1GHz is 1 billion instructions, 1MHz is 1 million. Current PCs can be as fast as 4GHz (as of 2020)
Cores: a Core is essentially a processing area. CPUs have multiple Cores, eg: dual core is 2x4GHz, a potential 8GHz processing power.
Cache: a very fast area of storage on the CPU to store the most frequently used instructions for efficiency. Stored in MB. There are 3 levels, L1 is the fastest.

Scan me for videos to support this unit

Exam Questions

Links: http://shorturl.at/stGLN | https://bbc.in/2AtvNCU | https://bbc.in/2AtvNCU | https://bbc.in/2R0PUhk | https://bbc.in/2Atnffa | https://bbc.in/2PtlB5W

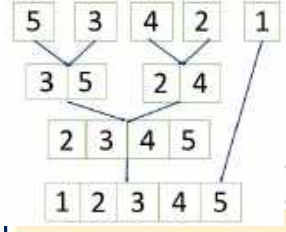
Gareth has a satellite navigation system (Sat Nav) which contains an embedded system. Define what is meant by an 'embedded system'. **[1]:**

Give one reason why a 4 Core 1GHz PC would likely run faster than a 2 Core 1.4 GHz PC **[1]**:

Identify four events that take place during the fetch-execute cycle. **[4]:**

Describe the benefits of a dual core processor over a single core processor **[2]:**

KEY WORDS: Processor, hardware, software, firmware, embedded, purpose, dedicated clock, hertz, core, cache, registers, buses, Von Neumann, fetch, decode, execute



:SE Computer Science – Unit 2.1: Algorithms 2

ing Algorithms

earch Algorithm

- The purpose of the linear search algorithm is to find a target item within a list.
- Compares each list item one-by-one against the target until the match has been found and returns the position of the item in the list.
- If all items have been checked and the search item is not in the list then the program will run through to the end of the list and return a suitable message indicating that the item is not in the list.
- The algorithm runs in linear time. If *n* is the length of the list, then at worst the algorithm will make *n* comparisons. At best it will make 1 comparison and on average it will make *(n+1)*/2 comparisons.
- The performance of the algorithm will be improved if the target item is near the start of the list.

Example

Find the position of letter "Z" within the following list. Assume we do not have visibility of the list

Index position	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Value	V	A	S	Z	X	R	T	G

We compare it with the value in index position 0. We find that the value is "V" so we need to move on to the next index position. At index position 1 and 2 we still have not found Z. However, we get to index position 3 and we compare the target with the value and we find that they match, so the algorithm returns the index position and stops.

Pseudocode

```
i ← 0
x ← len(listOfItems)
pos ← -1
found ← False
WHILE i < x AND NOT found
 IF listOfItems[i] == itemSearch THEN
  found ← True
  pos ← i + 1
 ENDIF
 i=i+1
ENDWHILE
OUTPUT pos
```

Binary Search Algorithm

- The binary search algorithm works on a sorted list by identifying the middle value in the list and comparing it with the search item.
- If the search item is smaller the mid element becomes the new high value for the search area.
- If the search item is larger the mid element becomes the low value for the search area.
- The keeps repeating until the search item is found.
- When the search item is found the index position of the item is returned.
- At each iteration the search are halved in size consequently this is an efficient algorithm.

Example: Binary search in operation to find 81

	Low				Mid						High
Iteration 1 L=1,h=11 mid=6	0	5	13	19	22	41	55	68	72	81	98
						Low		Mid			High
Iteration 2 L=6,H=11 mid=8	0	5	13	19	22	41	55	68	72	81	98
								Low	Mid		High
Iteration 3 L=8, H=11 mid=9	0	5	13	19	22	41	55	68	72	81	98
										Low	Mid	High
Iteration 4 L=9, H=11 mid=10	0	5	13	19	22	41	55	68	72	81	98

Pseudocode

```
low ← 1
high ← LENGTH(arr)
mid ← (low + high) DIV 2
WHILE val ≠ arr[mid]
 IF  arr[mid] < val THEN
  low ← mid
 ELIF arr[mid] > val THEN
  high ← mid
 ENDIF
  mid ← (low + high) DIV 2
  ENDWHILE
OUTPUT mid
```

Bubble sort Pseudocode

```
A=[5,3,4,1,2]
sorted ← False
WHILE not sorted
 sorted ← True
 FOR I TO LEN(A)-1:
  IF A[i] > A[i+1]:
   temp ← A[i]
   A[i] ← A[i+1]
   A[i+1] ← temp
   sorted ← False
  ENDIF
 ENDFOR
ENDWHILE
OUTPUT A
```

Sorting Algorithms

Bubble Sort

- The purpose of sorting algorithms is to order an unordered list. Item can be ordered alphabetically or by number.
- Bubble sort steps through a list and compares pairs of adjacent numbers. The numbers are swapped if they are in the wrong order. For an ascending list if the left number is bigger than the right number the items are swapped otherwise the numbers are not swapped.
- The algorithm repeatedly passes through the list until no more swaps are needed.

Example

Sort the following sequence in ascending order using bubble sort: 5,3,4,1,2.

Pass 1	**5**	**3**	**4**	**1**	**2**	
	3	5	4	1	2	Compare 5 and 3 – swap
	3	4	5	1	2	Compare 5 and 4 – swap
	3	4	1	5	2	Compare 5 and 1 – swap
	3	4	1	2	5	Compare 5 and 2 – swap; end of pass 1
Pass 2	3	4	1	2	5	Compare 3 and 4 – no swap
	3	1	4	2	5	Compare 4 and 1 – swap
	3	1	2	4	5	Compare 4 and 2 – swap
	3	1	2	4	5	Compare 4 and 5 – no swap; end of pass 2
Pass 3	1	3	2	4	5	Compare 3 and 1 – swap
	1	2	3	4	5	Compare 3 and 2 – swap
	1	2	3	4	5	Compare 3 and 4 – no swap
	1	2	3	4	5	Compare 4 and 5 – no swap; end of pass 3
	1	**2**	**3**	**4**	**5**	

Scan this QR code for videos for all of Unit 2.1: Algorithms

GCSE Computer Science – Unit 2.1: Algorithms 1

Algorithms

An **algorithm** is a sequence of ordered instructions that are followed step-by-step to solve a problem. This does *not* need to be on a computer.

Decomposition is the breaking down of a complex problem into smaller more manageable problems that are easier to solve.

Abstraction allows us to remove unnecessary detail from a problem leaving us with only the relevant parts of a problem thereby making it easier to solve.

Algorithm Efficiency More than one algorithm can be used to solve the same problem. Normally we use the algorithm that solves the problem in the quickest time with the fewest operations or makes use of the least amount of memory.

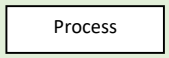
Dry run testing is carried out using **trace tables**. The purpose of the trace tables is for the programmer to track the value of the variables and outputs at each step of the program and to track how they change throughout the running of the program.

Flowchart Symbols

We can represent algorithms using flowcharts

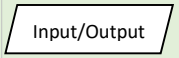
Start and Stop

Process – An operation that the algorithm performs

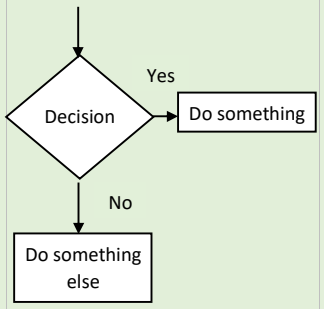


Connector – Links all the other symbols together

Input and Output of data that is read in and written out



Decision is the same as a selection (if then … else)




```
IF answer is "yes" THEN
      do something
ELSE IF answer is "no"
      do something else
ENDIF
```

Pseudocode

Pseudocode is 'fake' code. It's designed to be easy to follow by any programmer, but does not look like any specific programming languages.

It's another way to represent algorithms

Examples of pseudocode syntax and explanations	
`x = 5`	Declares a new variable called x and gives it a numerical value of 5
`name = "Bob"`	Creates a new variable called name and sets its value to "Bob"
`str(x)`	Casts the value in x to be a string value
`int(x)`	Casts the value in x to be an integer value
`float(x)`	Casts the value in x to be a float value
`print(name)`	Prints a variable to the screen
`print("Hello")`	Prints the given string in quotes to the screen.
`name = input("Please enter your name")`	An input from the user which asks them for their name and stores in a variable.

`for i = 0 to 7`
`  print("Hello")`
`next i`
	A count controlled loop which will print "Hello" 8 times (0-7 inclusive).

`while answer != "Computer"`
`  answer = input("What is the password?")`
`endwhile`
	A condition controlled loop which asks a user for a password until they correctly guess with "Computer".

`do`
`  answer = input("What is the password?")`
`until answer == "Computer"`
	A condition controlled loop which asks a user for a password until they correctly guess with "Computer".

`entry = input("Enter a selection")`
`if entry == "a" then`
`  print("You selected a")`
`elseif entry == "b" then`
`  print("You selected b")`
`else`
`  print ("Unrecognised selection")`
`endif`
	Selection can be carried out to identify certain situations within a program. The program here takes an input and prints different statements for the A and B selection.

`function triple(number)`
`return number * 3`
`endfunction`
	Creates a simple function to triple a number given as an input.

`array names[3]`
`names[0] = "Ahmad"`
`names[1] = "Ben"`
`names[2] = "Catherine"`
	Creates an array called names, the length is set to 3. Names are then added to the positions in the array.

Searching and Sorting Algorithms

Searching algorithms
These are used to find target items in lists. The two main types are **linear search** and **binary search**

	Advantages	Disadvantages
Linear Search (one by one search)	• Very simple algorithm and easy to implement • No sorting required • Good for short lists	• slow because it searchers through the whole list • very inefficient for long lists
Binary Search (halve the list)	• Much quicker than linear search, halving the search each step	• Only works on ordered lists

Sorting algorithms
These are used to sort list items to make finding data within easier or faster

Bubble Sort – compare values in a list, swapping them to let the largest 'bubble' rise to the top. Takes multiple passes to achieve this.
Merge Sort – works by dividing then combining to order the list. Divide the list until there is only one item in each list – there will be lots of lists. Re-combine them back in order, until only the final list remains.
Insertion Sort – this is a very simple way to order a list, like we do with a set of cards:

Knowledge Organiser – Design Technology
KS4 GCSE

1. Woods

Man-Made Woods

	Description	Uses
Medium density fibreboard (MDF)	•Has a smooth, even surface •Easily machined and painted •Available in water and fire-resistant form •Often veneered or painted to improve its appearance	•Furniture and interior panelling
Chipboard	•Made from chips of wood glued together with urea formaldehyde (glue) •Usually veneered with an attractive hardwood or covered in plastic laminate	•Kitchen and bedroom furniture •Shelving and general DIY Work
Plywood	•A very strong board, constructed of layers of veneer or plies, which are glued together with the grains at 90° to each other •Interior and exterior grades available.	•Furniture making •Boat building and exterior work
Hardboard	•A very cheap particle board •Can have a laminated plastic surface.	•Kitchen units and furniture back panels

Hard Woods

	Description	Uses
Oak	•A very strong, light-brown wood •Open grained •Very hard, but quite easy to work with	•High quality furniture •Beams used in building •Veneers
Mahogany	•Reddish-brown in colour •Easy to work with	•Indoor furniture •Shop fittings •Bars •Veneers
Beech	•A straight- grained hardwood with a fine texture •Light in colour •Very hard but easy to work with •Can be steam bent	•Furniture •Toys •Tool handles
Ash	•Open grained •Easy to work with •Pale cream colour, often stained black •Can be laminated (i.e. sliced into veneers which are glued together)	•Tool handles •Sports equipment •Furniture •Ladders •Veneers

Soft Wood

	Description	Uses
Pine	•Pale yellow coloured with dark lines and a fine, even texture. •Medium in weight •Stiff and stable •Inexpensive	•Readily available for DIY work •Mainly used for constructional work and simple joinery •Furniture

2. Plastics

Acrylic		Properties: • Hard wearing • Will not shatter • Can be coloured • Bathtubs, School Projects, Display signs
Polypropylene		Properties: •High impact strength •Softens at 150°C •Can be flexed many times without breaking •School chairs, Crates
High Impact Polystyrene (HIPS)		Properties: •Light but strong •Widely available in sheets •Used for casings of electronic products
Polythene (LDPE)		Properties: • Weaker and softer than HPDE. • Lightweight • Carrier Bags + Squeezy Bottles
Polythene (HDPE)		Properties: •Stiff strong plastic •Used for pipes and bowls •Buckets
Urea formaldehyde		Properties: •Colourless plastic •Can be coloured •Door and cupboard handles, Electrical fittings

3. Material Properties

Strength
The ability of a material to stand up to forces being applied **without it bending, breaking, shattering or deforming in any way**.

Elasticity
The ability of a material to **absorb force and flex in different directions, returning to its original position.**

Ductility
The ability of a material to **change shape (deform) usually by stretching along its length.**

Malleability
The ability of a material to be **reshaped in all directions without cracking.**

Hardness
The ability of a material to **resist scratching, wear and tear and indentation.**

Toughness
A characteristic of a material that **does not break or shatter when receiving a blow or under a sudden shock.**

3. Metals

Aluminium	Properties: •Light Weight •Light grey in colour •Can be polished to a mirror like appearance •Rust resistant	
Mild Steel	Properties: •Heavy •Dark grey in colour •Rusts very quickly if exposed	
Stainless Steel	Properties: •Heavy •Shiny appearance •Very resistant to wear / rust.	
Cast Iron	Properties: •An melted pig iron with some quantities of other metals •Strong in compression. •Brittle	
Copper	Properties: •Reddish brown metal. •Soft •Excellent conductor of heat and electricity	
Brass	Properties: •Yellow metal •Hard •Alloy	

4. Composites

Carbon Fibre	GRP Fibreglass
Expensive in comparison to other materials. Very good strength to weight ratio. Used in the manufacture of high end sports cars and sports equipment. 	GRP is composed of **strands of glass which are woven to form a flexible fabric. The fabric is normally placed in a mould and <u>polyester resin</u> is added.** **Glass reinforced plastic is lightweight** and has **good thermal insulation properties**. It has a **high strength to weight ratio** 

Knowledge Organiser AQA Design & Technology 8552

1: Joining Methods

Wood joints can be either permanent of temporary depending on the type and if glue is used.

Permanent:	Temporary:
When we do not want to take the pieces apart again	When we will, or might need to take pieces apart again
Glues, welding, rivets	Screws, bolts, nails

1.1Wood joints

Lap Joint

Mortise + Tennon Joint

Dovetail Joint

Finger Joint

Dowel Joint

2. Scales of Production

<u>One off</u>: when you make a unique item

<u>Batch</u>: when you make a few/set amount

<u>Mass</u>: when you make thousands

<u>Continuous</u>: open ended production

3. Adhesives

<u>P.V.A.</u> – Poly Vinyl Acetate – best for joining 2 pieces of wood together

<u>Epoxy</u> – a *thermosetting* resin that can be used to bond most types of material

<u>Contact Adhesive</u> – a glue type that creates a tacky bond on both surfaces to be joined. It can be used with most materials.

4: Materials

4.1 Woods:

Hardwoods:	Softwoods:
Beech Oak Ash	Scots Pine Cedar Spruce

4.2 Engineered Boards

Engineered boards are manmade materials usually made by mixing wood chips and glues to make wooden sheets.

Examples:
Medium Density Fibreboard (MDF)
Chipboard, Plywood and Hardboard

4.3 Plastics

Plastics are made of polymers, and are mostly refined from oil. There are 2 main categories:

Thermoplastics	Thermosetting plastics
Acrylic	Urea Formaldehyde
Polypropylene (PP)	Melamine Formaldehyde
High Impact Polystyrene (HIPS)	Epoxy Resin

4.4 Metals

Metals are hard and usually shiny, containing one or more elements dug and refined from the ground

Ferrous metals are any metal that contains iron and will rust	Non-Ferrous metals do not contain iron and will not rust

Alloys are metals made from a mix of 2 metals – brass is made of copper and zinc.

***Composite** materials* are a mix of 2 different types of material to get the best qualities from each – eg: GRP (Glass Reinforced Plastic)

5: TOOLS

Try square

Bench Hook

Vice

PVA Glue

Router Table

Mallet

Chisel

Laser Cutter

Tenon Saw

6: Surface Finishes

Finishing is usually one of the last stages of making a project. It will usually involve sanding and applying a surface coating to **protect** your material and **improve its visual appearance.**

<u>Some examples:</u>
Paint, Stain, Varnish, Oil, Danish Oil, Wax, Polish & Dip Coating.

7: KEY WORD FOCUS

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

CAD	Computer Aided Design
CAM	Computer Aided Manufacture
CNC	Computer Numerical Control

Knowledge Organiser – Design Technology
KS4 GCSE

1. Paper

Type	Description and uses
Layout paper	• lightweight, thin white paper • used for initial ideas • takes colour media well • low cost
Tracing paper	• thin, translucent paper • making copies of drawings • high cost
Cartridge paper	• good quality white paper • available in different weights • general purpose work • can be used to make simple models • medium cost
Bleedproof paper	• smooth, hard paper • used with water-based and spirit-based felt-tip pens • medium cost
Grid paper	• printed square and isometric grids in different sizes • a guide for quick sketches and working drawings • low cost

2. Selection of materials or components

When selecting materials and components considering the factors listed below:

- Functionality: application of use, ease of working
- Aesthetics: surface finish, texture and colour.
- Environmental factors: recyclable or reused materials, product mileage.
- Availability: ease of sourcing and purchase.
- Cost: bulk buying.
- Social factors: social responsibility.
- Cultural factors: sensitive to cultural influences.
- Ethical factors: purchased from ethical sources such as FSC.

What is the FSC? http://www.fsc-uk.org/en-uk/about-fsc/what-is-fsc/fsc-principles

3. Boards

Type	Description and uses
Corrugated card	• strong and lightweight • used for packaging protection and point of sale stands • available in different thicknesses
Duplex board	• large foam-based board • different finishes available including metallic and hologrammatic • used for food packaging, e.g. take-away pizza boxes
Foil lined board	• quality cardboard with a aluminium foil lining • ideal for ready made meals or take away meal cartons • The foil retains the heat and helps keep the food warm
Foam core board	• very light, very stiff and very flat. • It has a white, rigid polystyrene foam centre, with smooth white paper laminated onto both faces. • It is easy to cut with a knife, a mount cutter or on a wall cutter • great for modelling
Ink jet card	• Has been treated so that it will give a high quality finish with inkjet ink • available in matt and gloss
Solid white board	• top quality cardboard made from quality bleached wood pulp. • used for hard backed books and more expensive items • excellent print finish

4. Paper and Boards- Stock sizes and weights

Paper and board is available in sizes from A0 (biggest) to A7 (smallest). The most common size is A4.
Each size is half the one before, eg A4 is half the size of A3.
They are also sold by weight: GSM – grams per square metre.

Card thickness or calliper is traditionally measured in **Microns**. 1000 **Microns** = 1mm, so the higher the value, the thicker the **card** or paper.

5. Properties of paper and boards.

Type	Weight or thickness	Uses	Relative cost (10= high)
Newsprint	50gsm	Newspapers	1
Layout Paper	60gsm	Sketches and tracing	3
Tracing Paper	70 gsm	Tracing	4
Sugar Paper	90gsm	Cheap mounting work	2
Inkjet/Photo paper	150-230gsm	Photos/Presentations	9
Board (Card)	230-750 microns	Model-making	5
Mount Board	230-1000 microns	Model-making, High picture quality mounting	9
Corrugated Card	3000-5000 microns	Packaging protection	5

7: KEY WORD FOCUS

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

GSM	Grams per Square Metre
Microns	Thickness of paper or card. 1000microns =1mm thickness

Knowledge Organiser – Design Technology KS4 GCSE

1. Fabrics

Natural Fabrics

Cotton	Soft, good absorbency, prints well, machine washable, strong breathable	Origins from the Cotton Plant.	Uses: Jeans, towels, Shirts, dresses, underwear
Wool	High UV protection, flameproof, breathable, durable insulating	Origins from Sheep.	Uses: Jumpers, Coat, blankets
Silk	Smooth, Soft, Strong	Origins from the silk worm.	Uses: Wedding dresses, lingerie.
Linen	Strong, cool in hot weather	Origins from the flax plant	Uses: Trousers, tops.
Leather/Suede	Strong, hardwearing, durable.	Origins from the skin of animals, mainly cows.	Uses: Jackets, Trousers, Shoes.

Synthetic fabrics

Polyester	Durable, wrinkle resistant, stain resistant	Uses: Shirts, jackets. Also used in safety belts, conveyor belts and tyre reinforcement.
Polyamide (Nylon)	Durable, high abrasion resistance	Uses: Sportswear, carpets.
Elastane (Lycra)	Stretchy, durable, high stain resistance	Uses: Sportswear, Swimwear, tights.
Viscose	Soft, comfortable, absorbent, easily dyed.	Uses: Dresses, linings, shorts, shirts, coats, jackets and outerwear.
Acrylic	Absorbent, retains shape after washing, easily dyed, resistance to sunlight.	Uses: Jumpers, tracksuits, linings in boots.

1. Fabrics

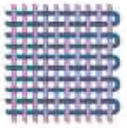
Blended and mixed Fabrics

These fabrics take on the positive characteristics of their combinations

Cotton/Polyester	Easy care and crease resistant	Uses: School shirts.

2. Fabric Construction

Woven

Plain Weave	Extremely strong and hard wearing	
Twill Weave	Extremely high strength and abrasion resistant.	

Knitted

Knitted fabrics	Stretchy, soft and comfortable.	

Non-Woven

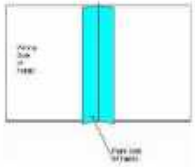
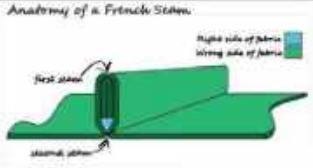
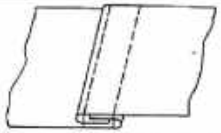
Bonded Fabrics	These are webs of fibres held together by glue or stitches.	
Felted Fabrics	Felt is made by combining pressure, moisture and hear to interlock a mat of wool fibres.	

3. Care Labels

- Washing Label- will usually have a max. temp number included
- Hand Wash only
- Do not wring out
- Tumble Dry
- Iron on low heat. The more dots the higher the heat setting
- Do not bleach

Knowledge Organiser – Design Technology KS4 GCSE

1. Construction Techniques

Open seam	This is used as the main method for constructing textile products. It is normally finished with overlocking to neaten the edges and prevent fraying.	
French Seam	This seam is used on delicate fabrics that can not be overlocked. It is generally used within lingerie.	
Machine and Fell Seam	Very strong double stitched seam for heavy fabrics. Commonly used on jeans.	
Overlocking	Used to neaten seams to prevent fraying. Generally hidden on the inside of a product.	
Binding	Used to finish a curved edge on a product, where over-locking is not suitable.	

2. Decorative Techniques


Applique


Hand Embroidery


Beads & Sequins


Heat Transfer


Buttons


Gathers

Tucks


Tie Dye

Batik


Pin Tucks

3. Equipment

Quick unpick


Pins


Fabric Shears

Sewing Machine


Ironing Board


Tape Measure

Overlocker

Sewing threads

Needle

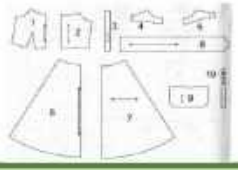
Iron

Embroidery Scissors

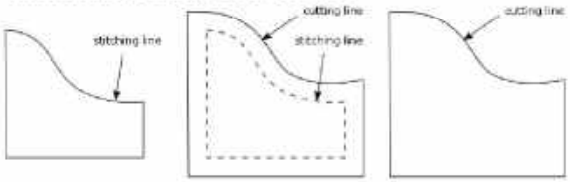

Pinking Shears

4. Key Terminology

Pattern
This is the term given to a paper template to aid in the cutting out of fabric for accurate construction.



Seam Allowance
This is usually a 1cm 'boarder' around your pattern to allow for construction to be the correct size.



Right Side
This is the 'correct' side of the fabric that you wish to see.

Wrong Side
This is the side of the fabric that you do not wish to see.

Pressing
This is the term given when ironing your product; e.g. press your seams open, would refer to when an open seam is sewn and they need to pressed outwards to give a flat finish.

Knowledge Organiser – Design Technology
KS4 GCSE

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
CAD software can process complex stress testing	

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.

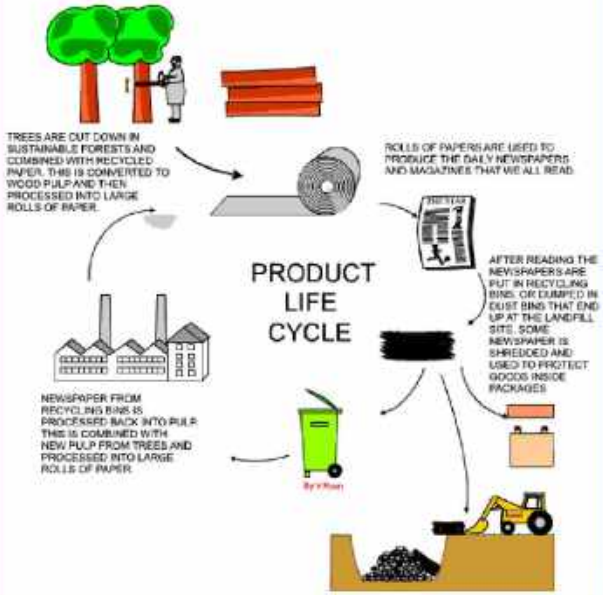
Advantages of JIT	Disadvantages of JIT
No warehousing costs	Reliant on a high quality supply chain
Ordered secured before outlay on parts is required	Stock is not available immediately off-the-shelf
Stock does not become obsolete, damaged or deteriorated	Fewer benefits from bulk purchasing

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

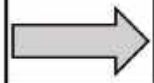
You should be able to explain the meaning of each of these words by the end of this rotation.

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

Knowledge Organiser – Design Technology KS4 GCSE

1: Mechanical Devices - Motion

There are four types of motion:

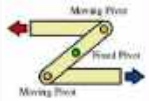
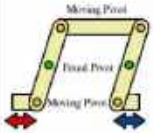
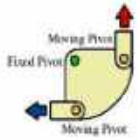
Linear Motion is movement in one direction along a straight line.		
Oscillating Motion This motion is similar to reciprocating motion, but the constant movement is from side to side along a curved path.		
Rotary Motion Examples of circular motion include a ball tied to a rope and being swung round in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

2: Mechanical Devices – Levers

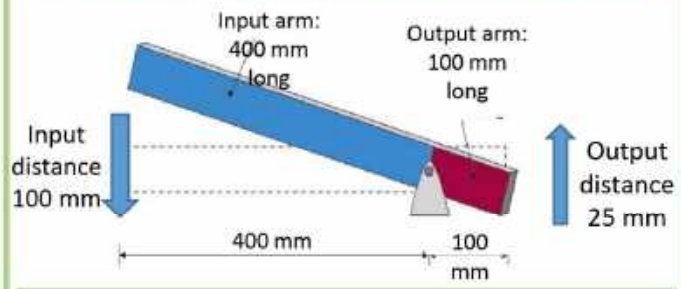
There are three classes of levers.

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 = 300N = 3
Effort 100N 1

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

Knowledge Organiser – Design Technology KS4 GCSE

1: Forces and Stresses

Force	Description	A fair test for each force/stress.	How a material / object can be adapted to resist	Examples
Tension	Forces pulling in opposite directions.	Apply the same weight to each material and suspended in the same manner.	Concrete can have steel bars inserted to reinforce.	
Compression	Forces that are trying to crush or shorten.	Insert materials into a vice/clamp and apply the same amount of twists to the handle.	Composite panels can have a honeycomb structure sandwiched in the middle to resist.	
Bending	Flexing force	Apply the same weight to the material.	Steel beams have an I profile to resist bending.	
Torsion	Twisting force.	Use clamps & stands to hold the materials and turn in opposite directions at the same angle.	The diagonals on a tower crane help the structure against torsion.	
Shear	A strain produced when an object is subjected to opposing forces.	Place the material between a tool that works in opposite directions. e.g. Shears	Bolts are hardened and have unthreaded shanks to help stop shearing.	

2. Improving functionality of materials

Process	Description	Result	Example	Visual Example
Lamination	Layering of thin materials	Depending on the direction of lamination it can make boards stiffer or actually more flexible	Plywood: Laminations at 90 degrees to each other - Rigid Flexi-ply: laminations all the same direction - Bendy	
Bending / Folding	Folding a 90 degree edge on sheet metal / plastic	Makes the panel more rigid	Body panels on cars	
Webbing	Modern polymer fabrics woven together	Extremely strong and durable fabric	Seat belts	
Fabric interfacing	A strengthening material added to the unseen face of a fabric	Adds strength / shape	Shirt collars	

1: The Modification of properties for specific purposes

Process	Material	Purpose
Seasoning	Timber	Removes the moisture content so that the timber will not shrink, warp and twist
Annealing (heating)	Copper	Softens the copper to make it more malleable
Addition of Stabilisers	PVC	Stops plastic become brittle with exposure to the sun

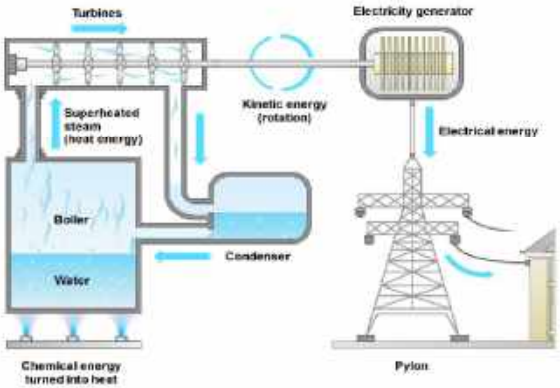
Timber being seasoned in a kiln

Copper bowl being annealed

Metal compounds (stabilisers) are added to PVC for UV protection

Knowledge Organiser – Design Technology
KS4 GCSE

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.

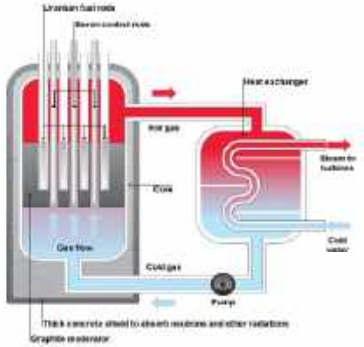
- this heat is used to change water into steam in the boiler.
- the steam drives the turbine - heat to kinetic energy
- this drives the generator to produce electricity - kinetic to electrical energy.

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.

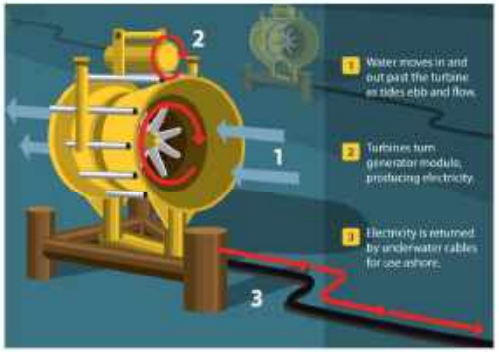
Energy Types
8.Batteries

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.

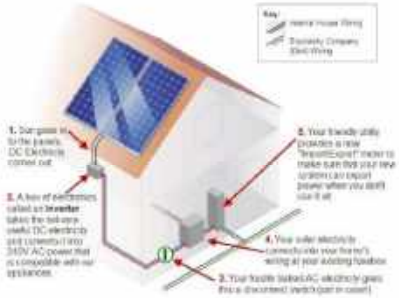
Rechargeable batteries are better for the environment and more economical in the long run (High initial purchase price). Their lifespan decreases with every charge.

Energy Types
4. Wind Energy – Renewable Energy

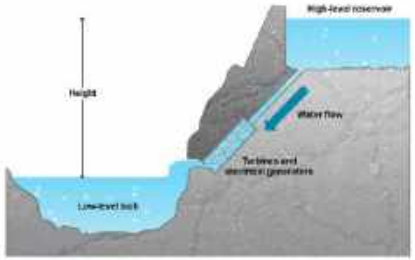
6. Tidal Energy – Renewable Energy



5. Solar Energy – Renewable Energy



7. Hydroelectricity – Renewable Energy

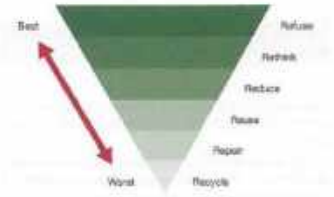


- In a hydroelectric power station water is stored behind a dam in a reservoir. This water has gravitational potential energy.
- The water runs down pipes (potential to kinetic energy) to turn the turbine
- The turbine is connected to a generator to produce electricity (kinetic to electrical energy).

Knowledge Organiser – Design Technology KS4 GCSE

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

2. Rethink

- Not eating (or using) products that are overfarmed, over-fished or on the endangered list.

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.

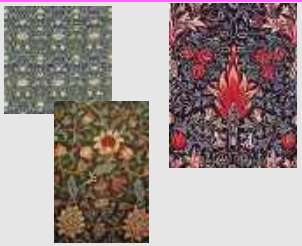
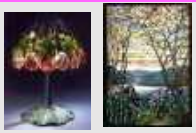
7. Sustainability

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.

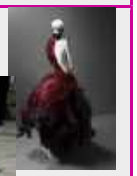
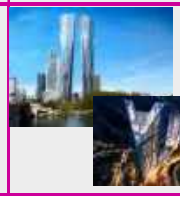
8. Recyclable materials

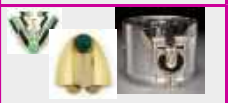
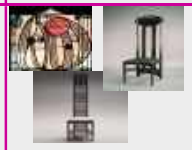
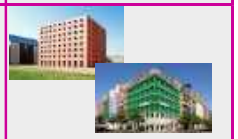
Once all useful and recyclable materials are removed, the majority of the remaining waste is organic matter and can be processed in one of two ways; **'Recover'** or **'Rot'**. Food waste and garden waste can be processed at a high temperature and turned into compost. The waste can also be buried in **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.

Knowledge Organiser – Design Technology
KS4 GCSE

Designer Name	Facts	Logo	Examples
Marcel Breuer	**Marcel Lajos Breuer** (22 May 1902 – 1 July 1981) was a Hungarian-born modernist, architect, and furniture designer. Breuer extended the sculptural vocabulary he had developed in the carpentry shop at the Bauhaus into a personal architecture		
Sir Alec Issigonis	**Sir Alexander Arnold Constantine Issigonis**; 18 November 1906 – 2 October 1988) was a British-Greek designer of cars, widely noted for the ground-breaking and influential development of the Mini, launched by the British Motor Corporation (BMC) in 1959.		
William Morris	**William Morris** (24 March 1834 – 3 October 1896) was an English textile designer, poet, novelist, translator, and socialist activist. Associated with the British Arts and Crafts Movement, he was a major contributor to the revival of traditional British textile arts and methods of production.		
Mary Quant	**Dame Barbara Mary Quant, Mrs Plunket Greene**, (born 11 February 1934) is a Welsh fashion designer and British fashion icon She became an instrumental figure in the 1960s London-based Mod and youth fashion movements.		
Louis Comfort Tiffany	**Louis Comfort Tiffany** (February 18, 1848 – January 17, 1933) was an American artist and designer who worked in the decorative arts. He is best known for his work in stained glass.		

Knowledge Organiser – Design Technology
KS4 GCSE

Designer Name	Facts	Logo	Examples
Philippe Starck	**Philippe Starck** (born January 18,. 1949) is a French designer known since the start of his career in the 1980s for his interior, product, industrial and architectural design including furniture	S+ARCK	
Coco Chanel	**Gabrielle Bonheur "Coco" Chanel** (19 August 1883 – 10 January 1971) was a French fashion designer and businesswoman. She was the founder and namesake of the Chanel brand.	CHANEL	  
Alexander McQueen	**Lee Alexander McQueen**, CBE (17 March 1969 – 11 February 2010), known professionally as **Alexander McQueen**, was a British fashion designer and couturier. He is known for having worked as chief designer at Givenchy from 1996 to 2001 and for founding his own Alexander McQueen label.	MQ	  
Vivienne Westwood	**Dame Vivienne Isabel Westwood** DBE RDI (born 8 April 1941) is a British fashion designer and businesswoman, largely responsible for bringing modern punk and new wave fashions into the mainstream.	Vivienne Westwood	  
Harry Beck	**Henry Charles Beck** (4 June 1902 – 18 September 1974), known as **Harry Beck**, was an English technical draughtsman best known for creating the present London Underground Tube map in 1931.	HARRY BECK 1902 - 1974 Designer of the London Underground map was born here	
Norman Foster	**Norman Robert Foster, Baron Foster of Thames Bank**, OM, HonFREng (born 1 June 1935) is a British architect whose company, Foster + Partners, maintains an international design practice famous for hightech architecture.	NORMAN FOSTER	 

Designer Name	Facts	Logo	Examples
Raymond Templier	**RAYMOND TEMPLIER** (1891 - 1968) like many of his contemporaries in jewelry, was born to a family with a long tradition as jewelers.		
Gerrit Rietveld	**Gerrit Thomas Rietveld**; 24 June 1888 – 25 June 1964) was a Dutch furniture designer and architect. One of the principal members of the Dutch artistic movement called De Stijl, Rietveld is famous for his Red and Blue Chair.		
Charles Rennie Macintosh	**Charles Rennie Mackintosh** (7 June 1868 – 10 December 1928) was a Scottish architect, designer, water colourist and artist. His artistic approach had much in common with European Symbolism. His work was influential on European design movements such as Art Nouveau and Secessionism.		
Aldo Rossi	**Aldo Rossi** (3 May 1931 – 4 September 1997) was an Italian architect and designer who achieved international recognition in four distinct areas: theory, drawing, architecture and product design. He was the first Italian to receive the Pritzker Prize for architecture.		
Ettore Sottsass	**Ettore Sottsass** (14 September 1917 – 31 December 2007) was an Italian architect and designer during the 20th century. His work included furniture, jewellery, glass, lighting, home objects and office machine design, as well as many buildings and interiors.		

Company Name	Facts	Logo	Examples
Alessi	**Alessi** is a housewares and kitchen utensil company in Italy, producing everyday items from plastic and metal, created by famous designers.	ALESSI	
Apple	**Apple Inc.** is an American multinational technology company headquartered in Cupertino, California that designs, develops, and sells consumer electronics, computer software, and online services.		
Braun	**Braun GmbH** formerly **Braun AG**, is a German consumer products company based in Kronberg. From 1984 until 2007, Braun was a wholly owned subsidiary of The Gillette Company, which had purchased a controlling interest in the company in 1967.	BRAUN	
Dyson	**Dyson Ltd.** is a British technology company established by James Dyson in 1987. It designs and manufactures household appliances such as vacuum cleaners, hand dryers, bladeless fans, heaters and hair dryers.	dyson	
GAP	**The Gap, Inc.** commonly known as **Gap Inc.** or **Gap**, (stylized as **GAP**) is an American worldwide clothing and accessories retailer.	GAP	
Primark	**Primark** known as **Penneys** in the Republic of Ireland) is an Irish clothing and accessories company which is a subsidiary of AB Foods, and is headquartered in Dublin.	PRIMARK	
Under Armour	**Under Armour, Inc.** is an American company that manufactures footwear, sports and casual apparel.		
Zara	**Zara** is a Spanish clothing and accessories retailer based in Arteixo, Galicia. It is the main brand of the Inditex group,3 the world's largest apparel retailer.	ZARA	

Year 11 Food Unit 2 Hospitality & Catering Knowledge Organizer.

1 – Menus

Customers?
Styles of eating?

2 – Customer nutritional needs

Everyone over the **age of 5** should follow the **Eatwell guide** to get all the **5 nutrients** (Protein, Fat, Carbohydrates, Vitamins and minerals) as well as **fibre** and **water** needed for a **balanced diet**..

They should also balance their **energy needs** (from carbohydrate rather than fat)with how **active** they are.

There are some **gender** differences, **women** need more **iron, men** need slightly more **energy.**

3 – Customer nutritional needs-Children

Children need- A balanced diet containing the **5 nutrients** with **fibre** and **water,** follow the **Eatwell guide** and **have appropriate portion sizes.**

They **especially need-**

Protein for **growth**

Starchy **carbohydrates** for **energy**

Calcium and **Vit D** for developing **Bones** and **teeth**

Iron to form **red blood cells**

Drink **water**

Children don't need too much **sugar** (**tooth decay, obesity, diabetes**) too much **fat** (**obesity, CHD**) They need to be **active** (**obesity**)

4 – Customer nutritional needs- Teenagers

Teenagers need- A balanced diet containing the **5 nutrients** with **fibre** and **water**, and following the **Eatwell guide.**

They **especially need**

Protein for rapid **growth** spurts. Boys have higher protein needs as they have more muscle growth.

Starchy **carbohydrates** for **energy** (**Boys** have higher **energy** needs than girls).

Active, sporty teenagers need more Starchy **carbohydrate** and **vitamin B** which helps the body to release the energy.

Calcium and **Vit D** for developing **bones** and **teeth**

Iron to form **red blood cells** with **Vitamin C** to help the body **absorb** the **iron.(**especially **girls** who might become **anaemia** once their periods/ menstruation start)

Drink **water! Not high caffeine/sugar** drinks**!**

Teenagers don't need too much **sugar** (**tooth decay, obesity, diabetes in** later life) too much **fat** (**obesity, CHD** in later life)

They need to be **active** and exercise regularly (**obesity**)

Eat **regular meals** and **avoid fatty, sugary snacks** and **drinks**

Eat breakfast! Preferably **wholegrain cereals** eg porridge, cereal bars, wholemeal bread as it releases **energy slowly** and increases concentration

Some teenagers might choose to become **Vegetarian** or **Vegan** so need to get **protein** from vegetable sources, eg nuts, soya, beans. If they are **Vegan** they needs to get calcium from green vegetables, dried fruit, soya milk, nuts)

5 – Customer nutritional needs-Adults

Adults need- A balanced diet containing the **5 nutrients** with **fibre** and **water**, following the **Eatwell guide.**

Starchy **carbohydrates (not sugar)** should be eaten for **energy** (**Men** have higher **energy** needs than women).

Adults who have active jobs or who are really sporty need more energy and protein.

Calcium and **Vit D** are still important as the adult skeleton starts to lose minerals especially calcium.

Iron to form **red blood cells** with **Vitamin C** to help the body **absorb** the **iron.(**especially **women** who might become **anaemic** through blood loss/menstruation**.**)

Drink **water! Not high caffeine/sugar** drinks**!**

Less energy dense foods (especially from fatty and sugary foods) should be eaten as **metabolism** slows down as adults age which could lead to **weight gain/obesity**

Type 2 diabetes is a risk for adults who are **obese** or have had a **high sugar** diet over many years**.**

CHD (**Coronary Heart Disease** or heart disease) is a risk in older adults, especially men who are **obese**, have a high fat diet, especially **saturated (animal) fat**

Too much **salt** (sodium) is linked to **high blood pressure** which can then lead to heart disease (**CHD**).

Adults need to be **active** and exercise regularly to prevent **obesity** and maintain **bone strength**.

Eat **regular meals** and **avoid fatty, sugary snacks** and **drinks**

Some adults might choose to become **Vegetarian** or **Vegan** so need to get **protein** from vegetable sources, eg nuts, soya, beans. If they are **Vegan** they needs to get calcium from green vegetables, dried fruit, soya milk, nuts)

6– Customer nutritional needs-Elderly

The elderly need- A balanced diet containing the **5 nutrients** with **fibre** and **water**, following the **Eatwell guide.**

Calcium and **Vit D** are still important as the adult skeleton starts to lose minerals especially **calcium** and **osteoporosis** is a risk

Less energy dense foods (especially from fatty and sugary foods) should be eaten as **metabolism** slows down as adults age which could lead to **weight gain/obesity**

Type 2 diabetes is a risk for older adults who are **obese** or have had a **high sugar** diet over many years**.**

CHD (**Coronary Heart Disease** or heart disease) is a risk in older adults, especially men who are **obese**, have a high fat diet, especially **saturated (animal) fat**

Too much **salt** (sodium) is linked to **high blood pressure** which can then lead to heart disease (**CHD**).

Appetite may reduce so regular small meals should be eaten

Assessment Criteria :

Year 11 Food Unit 2 Hospitality & Catering Knowledge Organizer.

7 – Customer needs- Lactose Intolerance

A **Lactose intolerance** is where the body cannot digest the lactose (a simple sugar) in **milk and dairy products** (yogurt, cream, cheese, butter and other products made from milk eg pizza, chocolate).

Symptoms include diarrhoea, pain and bloating of the abdomen, feeling sick, weakness, muscle and joint pains.

What to do

Avoid any products made from milk, read **food labels** carefully, check the **ingredients** as allergens like **Milk (lactose)** are often printed in **bold**, ask when buying **takeaway or restaurant meals**

What to have instead

You can buy 'lacto free' milk, yogurt, cheese. You can use soya milk products instead eg milk, yogurt, cheese, cream.

8 – Customer needs- Nut allergy

An **allergy** means an allergic or bad reaction to a food. A **nut allergy** can cause a rash, itchy skin, or more seriously swollen lips, eyelids and even an **anaphylactic** shock which can cause death.

What to do

Avoid nuts eg peanuts, almonds, cashew nuts etc as well as oil made from nuts and nut products eg peanut butter, chocolate with nuts in, nut cookies etc. Read **food labels** carefully, check the **ingredients** as allergens like **nuts** are often printed in **bold**, ask when buying **takeaway or restaurant meals.** Nuts do provide protein and a range of vitamins and fibre. Other foods can be eaten instead.

9 – Customer needs- Vegetarian

There are different types of vegetarian

Lacto/Ovo don't eat meat or fish or products eg gelatine, but still eat eggs and milk and products made from milk eg cheese, chocolate

A **Vegan** won't eat any foods associated with an **animal**. So, as well as not eating meat or fish they do not eat animal products like milk, cream, yogurt, cheese, butter, chocolate or even honey (as it is the product of bees).

Protein and calcium are nutrients that might be lacking in a Vegan diet. For protein, vegans can eat nuts, beans and products made from soya beans eg veggie sausages, soya yogurt, cheese, milk. Calcium is found in nuts and green leafy vegetables, it might also be added to some 'milk' products eg rice milk, oat milk.

Ingredient labels need to be checked and many vegan products might have a Vegan symbol.

There are many vegan friendly foods eg carob (milk free chocolate)

10 – Customer needs- Coeliac

Coeliac disease is a condition where your immune system attacks your own tissues when you eat gluten. This damages your gut (small intestine) so you are unable to take in nutrients.

Coeliac disease can cause a range of symptoms, including diarrhoea, abdominal pain and bloating.

Coeliac disease is caused by an adverse reaction to gluten, which is a dietary protein found in 3 types of cereal:

wheat
barley
rye

Gluten is found in any food that contains those cereals, including:

pasta
cakes
breakfast cereals
most types of bread
certain types of sauces
some ready meals

In addition, most beers are made from barley.

11 – Customer needs- Food Provenance

Food provenance means: knowing where (and when, **seasonality**) **food** was grown, caught or raised; knowing how **food** was produced; knowing where a food or dish might come from and why.

12– Customer needs-Moral and Environmental Ingredient choice

RSPCA's farm animal welfare assurance scheme - the only farm assurance scheme in the UK dedicated solely to improving farm animal welfare.
It covers the whole of an animal's life, from their health and diet to environment and care. This includes things like space, light, bedding, transport and humane slaughter.

Fair trade is a worldwide movement that aims to help farmers and producers in developing countries receive a **fair** price for the goods eg coffee, bananas, cocoa, that they produce.

The word "organic" refers to how a food is grown. Farmers who grow organic foods have to follow specific farming practices which reduce pollution (air, water, soil), conserve water, reduce soil erosion, increase soil fertility, and use less energy. Organically raised animals aren't given antibiotics or growth hormones, and they're also given more room to move around with access to a natural outside environment.

Red Tractor is the largest food assurance scheme in the United Kingdom. It claims to ensure the food is traceable, safe to eat and has been produced responsibly. The Union Flag in the **Red Tractor logo** indicates the food has been farmed, processed and packed in the United Kingdom.

Free range is where the animals, for at least part of the day, can roam freely outdoors, rather than being confined in an enclosure for 24 hours each day eg chickens must have a **defined** amount of space (no more than 13 birds a square metre), be 56 days old before they are slaughtered and have continuous daytime access to **open**-air runs, with vegetation, for at least half their lifetime

Assessment Criteria :

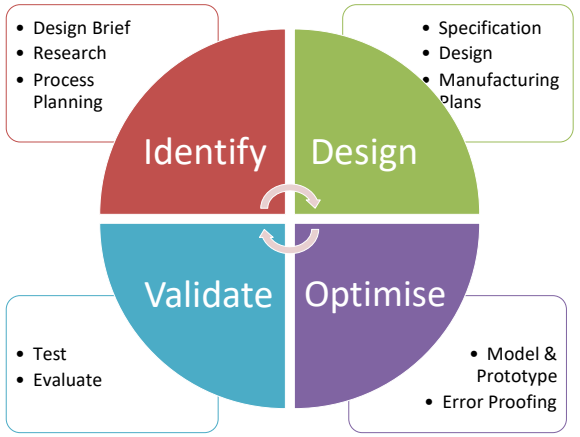
Engineering design

R105 - LO 1 (to understand the design cycle and the relationship between design briefs and deign specifications.)

You will find out more about R105 by using this QR code. You will also find past papers and mark schemes.

- The **design brief** should show the needs of the clients and the purpose of the new product.
- **Research** is carried out to look at and investigate existing products;
Primary research – this is new information
Secondary research - the is looking at existing products
- Process planning is the point where you design how the product will be made.

The **design cycle** is the steps which are usually used when designing and creating a new product.



- The **specification** provides a designer with guidelines and boundaries, eg, materials, function and size etc.
- Once the specification has been set out, the designer will begin to **design** and explore ideas.
- Once the design has been agreed a **manufacturing plan** will be produced. This might include tools, time etc.

- It is important that **tests** are carried out to check the product functions as intended and that it is reliable.
- The product is then **evaluated** against the design brief and specification. This is really important because when a product goes into production it cant be changed.

- **Models** are produced as a way of visually representing the design.
- **Prototypes** are mock ups of the design and are fully functional and the full-size.
- **Error proofing** involves testing the prototype and identifying potential defects and things which could become an issue when it goes in to manufacturing.

The needs of a **design brief** come from the client and is a way of them telling the designer what they want the end product to look like. It may include information concerning the clients situation, their needs, what the purpose of the product is and the function of the product. These needs will then feed the **specification** which is a 'check list' of success criteria that the product needs to meet in order to be successful.

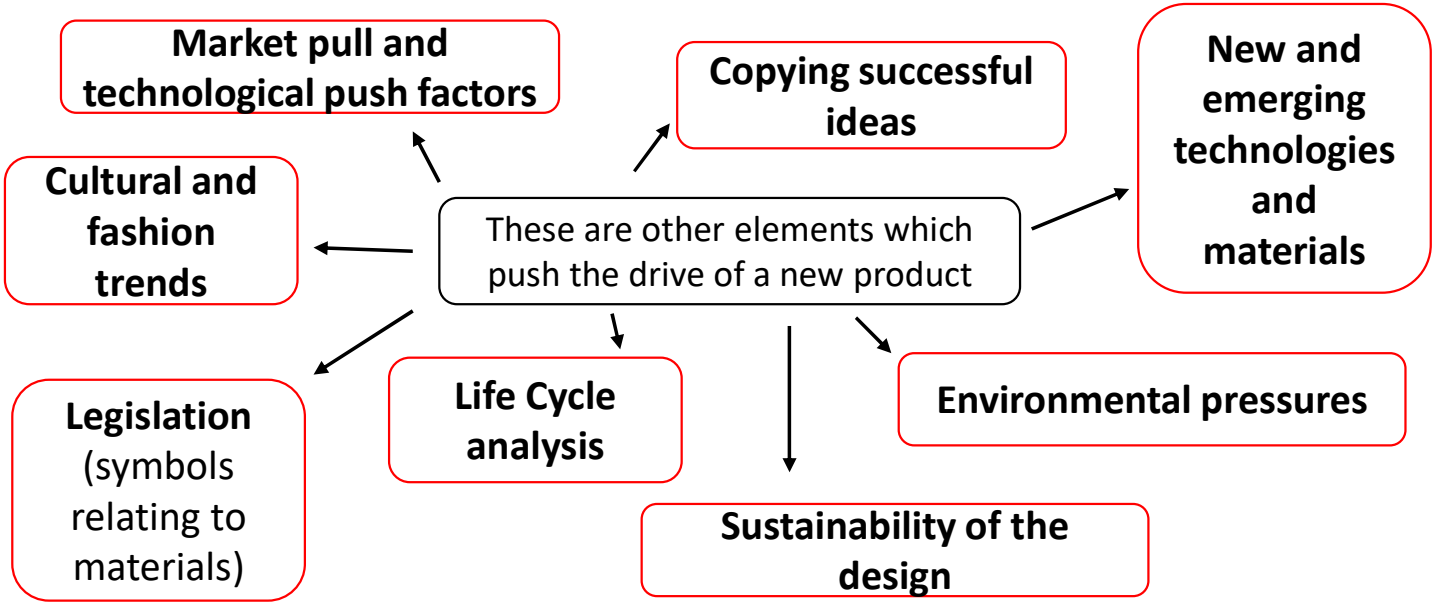
LO2 and LO3 on next sheet

Engineering design

R105 - LO 2 (to understand the requirements of design specifications in the development of a new product)

A specification is the requirements for creating a new product and is mainly broke into 5 sections.

User needs are needed if the product is to be successful. These include; aesthetics, ergonomics, anthropometrics, benefits and features and safety.	**Product requirements** are linked to client needs and are the things people usually consider when buying a product. Such as; appearance, function, limitations, target group and lifecycle.	**Manufacturing considerations** this is the part where the materials available are considered, the scale of production and reliability.	**Production costs** should consider the direct costs (traceable costs) and indirect costs (costs which aren't related specifically to an individual product).	**Regulations and safeguards** need to be considered. You need to look out for trademarks and obey copyright law.



Scan me

This QR code will give you more information about symbols

This QR code will give you more information about Life Cycle.

Scan me

Engineering design

R105 - LO 3 (to understand wider influences on the design of new products)

Child Development RO19

OCR Oxford Cambridge and RSA

Travelling
- Buggy/ pram
- Carrier
- Car seat
- Trike
- Walker

Clothing & Footwear
- Waterproofs
- Aprons
- Jackets/coats
- Babygro's
- First shoes

0-12 month room

Sleeping
- Cot/ travel cot
- Bouncer chair
- Pram/buggy
- Blankets/sheets
- mattress
- Sleeping bags

Feeding
- Highchair
- Table and chair
- Bottles
- Steriliser
- Plates/bowls/cups
- Bibs

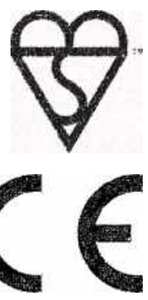
Travelling
- Buggy
- Buggy board
- Harness/ reins
- Wrist straps
- High vis jackets
- Walking line/rope
- Trikes/ scooters

Clothing & Footwear
- Waterpoofs
- Jackets/coats
- Hats gloves
- Sun hats
- Swimwear
- Jumpers/cardigans
- Wellies
- slippers

1-5 years room

Sleeping
- Cot
- Bean bags
- Ready beds
- Sleep mats
- Beds
- Blankets/sheets
- mattress

Feeding
- Cups/bowls/plates
- Cutlery
- Bibs
- Tables and chairs
- Highchairs
- Bottles



Factors to consider:

- **Age-appropriateness** - babies develop quickly and this has an impact on what equipment can be used. You should always follow the safety guidance. For example small babies can sleep in a mosses basket, but as the baby grows and can roll over the basket can tip.
- **Safety** - when buying an item practitioners need to check that it has a recognised safety mark. You should also check to equipment on a regular basis to ensure nothing is damaged and could turn into a hazard. (e.g. flammability, stability)
- **Cost -** what does the product cost, how many do you have to buy? How quickly would you have replace items? Is it cost effective for a nursery to buy the cheapest ones if they have to be replaced all the time.
- **Design/ergonomics -** is the science of design, which is then applied to make products efficient, safe and comfortable to use.
- **Durability -** what materials have been used? Are they hardwearing or will they wear out quickly? Are they safe? Are more durable materials more expensive?
- **Hygiene -** when choosing pieces of equipment it is important to think about the hygiene of a product. Is the product easy to clean? Will the product you are choosing require regular cleaning? Is the item washable? What kind of care do fabrics need?

NUTRITION

- Protein
- Carbohydrates
- Fat
- Vitamins
- Minerals
- Fibre
- Water.

Macronutrients – protein, fats, carbohydrates
Micronutrients – vitamins, A, B group, C, D, E, K, minerals – calcium and iron

KEY TERMS

Macronutrients The structural and energy-giving calorie components of food.
Micronutrients Micronutrients enable necessary chemical reactions to occur in the body.
Nutrients The nourishment that comes from the food we eat.
Weaning
The process by which babies are introduced to solid foods.

0-6 MONTHS NUTRITION

Breastfeeding
Expressing
Formula
Combination
Soya

WEANING

Weaning stage 1 – Babies are introduced gradually to solids, generally starting with baby rice and moving onto pureed fruit and vegetables.
Weaning stage 2 – Babies are introduced to minced foods such as chicken, and finger foods such as rusks and toast.
Weaning stage 3 – Babies are introduced to solid foods such as pasta and cheese.

CURRENT GOVERNMENT DIETARY GUIDELINES

The Eatwell Guide
Change for Life
Fruit and veg scheme in primary schools

STERILISATION

There are different sterilising methods:

- Cold water
- Microwave
- Electric

Always wash the equipment to prepare it for the steriliser.
Always follow manufacturer's instruc-

Bottle feeding – mothers who choose not to breastfeed can bottle feed their babies with formula milk. Formula milk contains all the vitamins and minerals a baby needs. But doesn't offer the same degree of protection from infection as breastfeeding. Some babies are allergic to cows milk and a soya based formula may be used. Milk can be bought in powdered form and have water added. Different milks are produced for different ages.

Combination feeding

Is a term used to describe when a baby is:

- Breastfed and also given some expressed milk in a bottle
- Breastfed for some feeds and given formula milk for some feeds
- Bottle fed, but the mother wishes to start breastfeeding

Breast feeding - is a natural process controlled by prolactin. In the first few days after birth **colostrum** is produced. This is a clear liquid that becomes yellow, containing protein and antibodies. When lactation (milk production) begins, a thin, blush milk, which turns creamy at the end of the feed,, is produced. Milk is squeezed out by the baby sucking the areola. The more the baby feeds the more milk is produced. The government recommends breastfeeding exclusively for six months. Breast milk can be expressed and given in a bottle. It can also be stored in sterile containers in the fridge if not for immediate use.