

1 – Observational drawing

Observational drawing is drawing what you see. It can be anything: a flower, a person, a still life, a landscape. But it's drawing what you see in front of you as realistically as possible.

You'll preferably draw from real objects or using a photographs if that isn't possible.

Tips for observational drawing:

- Keep your pencil sharp
- Look at the object / person you are drawing
- Start drawing light lines: they are easier to rub out
- Look at object / person you are drawing (again)
- Draw rough shapes first and make sure you have the proportions right before you add detail
- Look at what you are drawing (again – looking and observing carefully is essential)

2 – Colour vocabulary

Primary colours – The primary colours are **red, yellow and blue**. They cannot be made, but are used to make all other colours.

Secondary colours - Secondary colours are made by mixing 2 primary colours.

Tertiary colours are made by mixing a primary and secondary colour together.

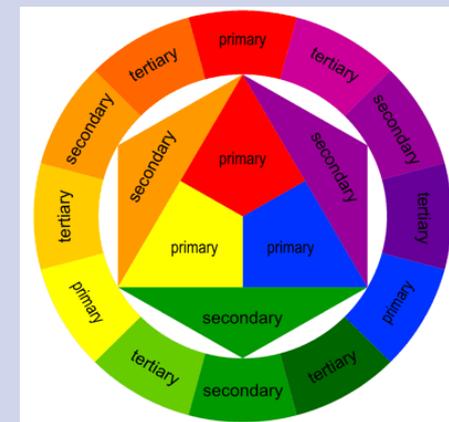
Complementary colours are opposite sides on the colour wheel.

Harmonious colours are next to each other on the colour wheel.

Tint – when you add white to a colour to make it lighter



Shade – when you add black to a colour to make it darker



3 – Coloured pencil techniques

Hatching: lines are drawn in one direction.

Cross hatching: lines are drawn in two or more directions.

Stippling: Dots which are close together or far apart.

Overlay: Layering multiple colours with even shading.

Scumbling: Random marks – close together or far apart.

Burnishing: Blending colours using a white pencil.



4 – Ben Rothery

Ben is a detail-obsessed illustrator who lives in London. He creates intricate and delicate illustrations inspired by his love of nature.

He is best known for his beautiful illustrations of animals and insects.



5 - Definitions

Symmetry: when something is made up of identical parts facing each other.

Proportions: the size relationships between different parts. For instance the height compared to the width.

Pattern: a design that is created by repeating a shape. It can be a design on a fabric or a natural pattern, such as the markings on an animal's fur

Sgraffito method: Overlap two thick layers of different oil pastel colours on paper. Using a wooden skewer, scratch or scrape away line designs revealing the colour underneath.



1: Computers	2: Under the hood	3: Systems
<p>The computer is the only appliance that can do more than one thing. Toasters toast. Refrigerators cool. Lamps illuminate. One appliance, one task. But the computer can do hundreds of tasks. The purpose of a general-purpose computer is to execute programs that operate on data.</p> <p>Software – simply means programs.</p> 	<p>Processor – executes program instructions RAM – Random access memory. Hard drive – is where your computer stores data. Storage device - A piece of computer equipment on which data can be stored. Input – An input device is any piece of computer hardware used to provide data to a computer system. Hardware that stores data is a storage device.. Output –Any piece of computer hardware that is used to communicate the results of data that has been processed by a computer system</p>	<p>Operating system- The operating system is a set of programs that controls the operation of a computing system. A user interface is a way of interacting with a computer or an electronic device. This creates the impression of simultaneous program execution . General purpose software is a single application that carries out lots of different tasks. Applications that carry out one specific task are called special purpose software.. System software - The biggest part of systems software is the operating system</p>
4: Boolean	5: Artificial intelligence (AI)	6: Open source
<p>In 1854, George Boole published The Laws of Thought. operations: not (inversion) and (conjunction) or (disjunction) A Boolean variable has only two possible values: true or false. It is common to use Booleans with control statements to determine the flow of a program For the output of an AND gate to be 1, both inputs need to be 1. If the input of a NOT gate is 1, the output will be 0 - the opposite of the input.</p>	<p>Artificial - Created by humans, usually as a copy of or substitute for something natural. Intelligent - astute, clever, creative, imaginative, ingenious, insightful, inventive, knowledgeable, perceptive, rational, smart, thinking AI has by now succeeded in doing essentially everything that requires ‘thinking’ but has failed to do most of what people and animals do ‘without thinking’ – that, somehow, is much harder! Logic gate - A type of programming language. They are represented as truth tables.</p>	<p>Free and open source software The creators of a program can choose to provide access to its source code: anyone can ‘see inside’ the program to understand how it works, check for errors, suggest improvements, and ‘remix’ it. This is called ‘free’ (as in ‘freedom’), ‘libre’, or ‘open source’ software. Sometimes abbreviated as ‘FOSS’ or ‘FLOSS</p> <p>User interface – A way of interacting with a computer device.</p>

1: John Godber

- John Godber is an English dramatist—primarily known for his observational comedies
- Godber was born in 1956, in Upton, near Pontefract, West Yorkshire
- He trained as a teacher of drama at Bretton Hall College
- He became the artistic director of Hull Truck Theatre Company in 1984
- A 1993 survey for *Plays and Players* magazine cited Godber as the third most performed playwright in the UK, after Shakespeare and Alan Ayckbourn
- His plays are performed all over the world
- In 2011, Godber became creative director at Theatre Royal Wakefield and set up The John Godber Company as its resident company.

2: The Playwright

- **Playwrights**, often known as writers, dramatists, or scriptwriters, write the story for the theatrical productions.
- The story or script is written in a specific format. The playwright writes the dialogue of a character next to, or under, their name. They also include descriptions of settings, and stage directions for the actors and actresses to take to production.
- **Playwrights** have an extremely difficult job. They must not only write a good script but also must find a producer willing to finance the production. In some instances, a producer may have an idea that they want developed, and will hire a playwright to write a suitable script.



3: Theatrical Skills

- **direct address:** when a character speaks directly to the audience
- **stereotype:** a fixed general image or set of characteristics
- **improvisation:** a piece of drama that is made up on the spot by performers without using any prepared material
- **flashback:** a scene which shows events from before the main action of the play
- **mime:** the use of movements, gestures and facial expressions to communicate an idea without words
- **marking the moment:** a technique that draws the audience's attention to an important moment

4: Godber's Style

- **fast pace:** moving or developing very quickly
- **slick:** something done in a smooth and efficient way
- **comedy:** a play characterised by its humorous or satirical tone and its depiction of amusing people or incidents
- **synchronised:** to cause two or more things to happen at the same time and speed as each other
- **movement:** where (and how) an actor moves on stage, what this communicates to the audience, and the effect this has upon the drama

5: Vocal Skills

- **pitch:** the degree of highness or lowness of the voice
- **pace:** the speed at which someone speaks
- **tone:** a quality in the voice that expresses the speaker's feelings or thoughts
- **volume:** the degree of loudness or the intensity of a sound
- **clarity:** the quality of being clear and easy to understand
- **articulation:** the formation of clear and distinct sounds in speech
- **projection:** *the strength of speaking or singing whereby the voice is used loudly and clearly*



6: Performance Skills

To ensure that you give an effective performance, the skills and points below should be incorporated:

- **NVC—Non Verbal Communication**
- **vocal Skills**
- **theatrical skills (see boxes 3 and 4)**
- **remain in character**
- **no back to the audience**

Oracy Focus

oracy: the ability to express oneself fluently and grammatically in speech

volume: ensure that your voice reaches everyone in the audience

clarity: ensure that you speaking clearly

pace: ensure that your pace of speech is appropriate to your character

English	'Of Mice and Men' - John Steinbeck	Year 9	Term 1
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<p>1. Methods</p> <ul style="list-style-type: none"> • foreshadowing: clues or hints of a future event e.g. Steinbeck utilises foreshadowing in the novella, to hint at future events. • cyclical Structure: structure is cyclical when the conditions at the end are in some way the same as the start e.g. 'Of Mice and Men' has a cyclical structure. • simile: comparison of one thing to another, using 'like' or 'as' e.g. He snorted into the water like a horse.' • colloquialisms: words or phrases that are informal e.g. 'He's just a bindle-stiff.' • vulgarisms: a word or expression that is offensive e.g. Curley uses an array of vulgarisms to cause offense to Lennie. 	<p>2. Vocabulary</p> <ul style="list-style-type: none"> • illustrates (verb): to make something clear or visible e.g. The novella illustrates the patriarchal society in which the characters live. • depicts (verb): to portray in words; describe e.g. Steinbeck depicts Slim as 'God - like'. • educates (verb): to develop the mental, moral or social understanding of someone e.g. Steinbeck educates us about the impact of racial discrimination in the 1930s. • transcends (verb): be or go beyond the range or limits of (a field of activity or conceptual sphere) e.g. Slim's morals transcend the time period in which he is characterised. • alludes (verb): suggest or call attention to indirectly; hint at e.g. Curley's wife's mannerisms allude to her loneliness.
<p>3. Grammar – Speech Marks</p> <ul style="list-style-type: none"> • Punctuation is used in direct speech to separate spoken words, or dialogue, from the rest of a story. The words spoken by a character sit inside speech marks: "Did you hear that noise?" whispered George. • Every time there is a new speaker in the conversation, a new line is used. Each new section of dialogue is like beginning a new paragraph, so in a printed novel you will see that each new line is also indented - this is when a line starts further in from the margin. Each new line of direct speech should also start with a capital letter: "I think there is something moving in the bushes," George said. "I can't see anything," said Lennie. • Each section of direct speech should end with a punctuation mark. If there is no reporting clause then this is likely to be a full stop, question mark or exclamation mark: "Listen! I definitely heard something that time!" 	<p>4. Themes</p> <ul style="list-style-type: none"> • Friendship: friendships are symbiotic relationships, where people share their talents and qualities to help one another. In 'Of Mice and Men', there are many of these friendships: George and Lennie, Crooks and Lennie, and George and Slim. These friendships show how each pair benefit from companionship. • The American Dream: a happy way of living that is thought of by many Americans as something that can be achieved by anyone in the U.S. especially by working hard and becoming successful • Loneliness: Loneliness is an inevitable part of life, which many individuals struggle with. It is an emotional response to a lack of companionship and communication with others, which has a huge impact in one's overall behaviour. Some impacted individuals may try to end their loneliness; others become hopeless and bitter. Steinbeck uses characters to reflect on the discriminative time period that ultimately lead to the characters' loneliness.

English	'Of Mice and Men' - John Steinbeck	Year 9	Term 1
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5. Context – The Great Depression	6. Context - Oppression in society (1900s)
<p>John Steinbeck was born in 1902 in Salinas, California, a region that became the setting for much of his fiction, including 'Of Mice and Men' which was written in 1937.</p> <p>The novella (a piece of narrative fiction, longer than a short story but shorter than a novel) is set in the 1930s against the backdrop of the United States' economic catastrophe, the Great Depression.</p> <p>The Great Depression</p> <ul style="list-style-type: none"> • In 1929, the US stock market Wall Street Crash plunged the USA into economic depression. • 16 million shares were sold on the stock market which caused the US economy to completely collapse. • The Great Depression was a worldwide period of economic uncertainty and decline. • The situation was made worse by the 1930s Dust Bowl, where dust storms swept across America destroying crops. <p>Migrant Workers</p> <ul style="list-style-type: none"> • Unemployment during the Great Depression rose to 25%. • As a result, many farmers migrated to California to look for work, as this state was perceived to have spare land and a lot of work. • However, because so many people moved to California (an estimated 1.3 million), work was not so easy to find. • Ranch workers often moved from one place to another looking for work, as jobs on ranches would be temporary and seasonal. • Wages for men like these were low and jobs were scarce, so the lifestyle that they lived was very insecure. 	<p>Oppression- prolonged cruel or unjust treatment or exercise of authority</p> <p>Race and Segregation</p> <ul style="list-style-type: none"> • Racism: prejudice or discrimination directed against someone of a different race based on the belief that one's own race is superior. • Racial discrimination was not illegal in 1930s America. • White and black people were segregated and black people were considered as second class citizens. • Black people were paid less than white people and they had to work harder than everyone else, often given the more 'dirty work'. • Jim Crow Laws, were laws in America enforced between 1876 and 1965 that provided a legal basis for segregating and discriminating against African-Americans. <p>Disability</p> <ul style="list-style-type: none"> • People with disabilities were treated very unsympathetically by the majority of society. • Abnormal behaviour and low levels of economic productivity were thought of as a burden to society. • Anything 'abnormal' or different such as disability was ridiculed or feared. <p>Age</p> <ul style="list-style-type: none"> • The Depression hit the elderly particularly hard. Those who were retired or close to retirement watched a lifetime of savings disappear, and they weren't well enough to work or couldn't find the jobs that would allow them to rebuild their lost investments. <p>Gender</p> <ul style="list-style-type: none"> • Women were not treated equally compared to men. • Instead of working, most of society believed that a woman's place was in the home. This was largely because of the patriarchal society (male dominated) in which women at the time lived, where women were considered inferior to men.

1: Social Media Vocabulary

un adolescent	a teenager	s'abonner	to subscribe
un étranger	a stranger	acheter	to buy
l'écran	screen	cliquer	to click
l'appareil	device	se connecter	to login
le harcèlement	bullying	enregistrer	to save
l'inconvénient	disadvantage	envoyer	to send
l'internet	internet	éviter	to avoid
le mot de passe	password	mettre	to put
l'ordinateur	computer	passer du temps	to spend time
le portable	mobile	poster	to post
le réseau sociaux	social media	recevoir	to receive
le risque	risk	supprimer	to delete
le vol d'identité	identity theft	surfer	to browse
la confiance	trust	tchatter	to chat
l'informatique	ICT	télécharger	to download
l'identité	identity	trouver	to find
la sécurité	safety	utiliser	to use

2: Infinitive Structures

Impersonal expressions may start with 'il' but have nothing to do with 'he' - the 'il' refers to 'it' or 'one'.

il faut = it is necessary to (you must)
il vaut = it is better to
on peut = you can

These expressions are always followed by a verb in the infinitive. For example:

Il faut respecter les autres - You must respect others
Il vaut tchatter les amis - It is better to chat with friends
On peut utiliser un portable - You can use a mobile phone

We can also make these expressions negative:
 Il **ne** faut **pas** = you must not
 On **ne** peut **pas** = you can not

3: Comparatives and Superlatives

When using **comparatives**, remember that your adjective has to agree with the subject of the sentence.

plus... que → more... than
 e.g. Le français est **plus** amusant **que** le sport.

moins... que → less... than
 e.g. La géographie est **moins** fascinante **que** l'histoire

aussi... que → as... as
 e.g. Les maths sont **aussi** difficiles **que** l'anglais.

Superlatives are used when something is the best, least, most etc.

le/la/les plus... → the most ...
 eg. Le français est le sujet **le plus** intéressant.

le/la/les moins... → the least
 e.g. La biologie est la matière **la moins** inspirante.

4: Present Tense

To **conjugate** verbs in the present tense we remove the – infinitive ending and add the correct ending to match the person doing that action:

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

regarder → je regarde = I watch/I am watching
 finir → nous finissons = we finish/we are finishing
 attendre → vous attendez = you wait/you are waiting

5: Perfect Tense

We use the perfect tense to describe what has happened in the past. It is made up of three parts:

- A pronoun or noun (e.g. je, nous, or a name)
- The auxiliary verb (usually avoir, but sometimes être)
- A past participle (e.g. regardé, fait)

Verb ending	ER	IR	RE
Past participle ending	é	i	u

Past participles

Some past participles are irregular, for example:
 dire → dit (said) faire → fait (did)
 écrire → écrit (wrote) voir → vu (saw)

For verbs which take être the past participle must agree with the subject. For example:
 elle est **allée** – she went
 nous sommes **allés** - we went

6: Near Future Tense

To form the near future tense we use the verb **aller** plus an **infinitive verb**.

aller	to go	
je vais	I am going	I go
tu vas	you are going	you go
il/elle va	he/she is going	he/she goes
nous allons	we are going	we go
vous allez	you (pl) are going	you (pl) go
ils/elles vont	they are going	they go

For example:
 je **vais utiliser** mon portable = I am going to use my phone
 nous **allons tchatter** = we are going to chat
 je **ne vais pas lire** un livre = I'm **not** going to read a book

We use **ce sera** (it will be) to give opinions in the near future.

1: Evidence of Climate Change	2: Causes of Climate Change	3: Impacts on the United Kingdom
<ul style="list-style-type: none"> · Climate - The average weather conditions over the course of a year. · Quaternary - This is a period of time from 2.6 million years ago to the present day. · Climate change has occurred since the Earth was formed 5.6 billion years ago. For the past 800,000 years, where we have reliable data, climate change has been a natural phenomena. · To prove that climate change was a natural event we looked at the relationship between CO₂, global temperature and sea levels. · However, to see current climate change we use evidence from a range of sources such as, satellite images, photographs and atmospheric data. 	<ul style="list-style-type: none"> · Human— This is something caused by ourselves. · Natural—This is something which we have no control over. · Climate change is a natural occurring event which has been accelerated due to human activity. · Human causes of climate change are due to our everyday activities such as burning fossil fuels, deforesting our rainforests, drinking milk and eating meat. · Natural causes of climate change are due to changes in the Earth’s orbit of the Sun, solar activity and volcanic eruptions. 	<ul style="list-style-type: none"> · Extreme Weather—These are events that are unusual due to their severity. · The weather in 2020 was at record levels for rainfall in February and record dry days in April. · One of the major impacts of climate change is the melting of the polar ice caps at the North and South Pole. · Rising sea levels will claim areas of land which have a human use. From fertile farmland to urban areas such as Liverpool and Cardiff, all of the United Kingdom will be affected by rising sea levels. This is due to us being an island nation that has relied on the sea for our economic development.
4: Impacts on Asia and the Middle East	5: Impacts on Africa	6: What can YOU do?
<ul style="list-style-type: none"> · Uninhabitable— This is a place where humans cannot live. · Scarcity— This is where there is a lack of resource such as food, water or energy. · Russia is impacted by climate change with the melting of the permafrost. Polar bears will start to migrate southwards due to a lack of food in the Arctic North. · The Himalayan Glaciers will melt which results in an increase in flooding. In addition the glaciers are a water source for 1.9 billion people which is disappearing. · Parts of the Middle East will become uninhabitable due to rising temperatures. Food and water will become more scarce in the region which will increase conflict between nations. 	<ul style="list-style-type: none"> · Arid—This is where water is a scarce. · Desertification— This is the increased size of a desert. · The Western Sahel Region of Africa is threatened by the encroaching of the Sahara Desert. · Land is being swallowed up by the desert due to a lack of rainfall and deforestation. · Farmland is lost by the desert growing and there are less opportunities for humans in the region. This means people are migrating to the cities in the South or North to the European Union. · 86% of Burkina Faso’s GDP is at risk due to water scarcity and disappearance of farmland. 	<ul style="list-style-type: none"> · Adapting—This is a making something suitable for a new use or purpose. · Carbon Footprint— This is amount of carbon used in everyday life. · To help reduce the causes of climate change we need to reduce our carbon footprint. This means we need to walk, cycle and use public transport more. · In addition, we need to consider our buying habits. We need to look for products which don’t use palm oil or are farmed on land which used to be rainforest. · We need to eat food which is locally produced and reduce the amount of animal based products

1	2	3
<ul style="list-style-type: none"> • The First World War began in 1914 and ended in 1918. • It was known as the Great War because of the scale of the conflict, the number of people involved and the huge number of casualties. • During this time there were also national conflicts taking place such as The Easter Rising in Ireland in April 1916 and two revolutions in Russia in 1917 <p>Key Dates August 1914—The First World War began 1 July 1916—The Battle of the Somme April 1916—The Easter Rising 1917—Revolutions in Russia Language of the Lesson: Conflict—a serious disagreement or argument Revolution— the overthrowing of a system Independence— to be alone and away from someone/something else</p>	<ul style="list-style-type: none"> • The Second World War began in 1939 • Historians disagree about the causes of the Second World War. Some trace it back to the anger created in Germany by the Treaty of Versailles. Some blame Neville Chamberlain (British Prime Minister) for being too weak and appeasing Hitler. Some blame Hitler's aggression and determination to make Germany great again, especially when he invaded Poland. <p>Key Dates: 28 June 1919—The Treaty of Versailles was signed 1939—The start of the Second World War when Hitler invaded Poland Language of the Lesson: Cause—the reason for something happening Treaty—a formal agreement between two or more countries Aggression—anger and determination that makes you ready to attack others</p>	<ul style="list-style-type: none"> • Between 1933-1939 Hitler rebelled against the Treaty of Versailles and pursued an aggressive foreign policy (issues with other countries). • At the same time, Britain and France followed a policy of appeasement. They did this for a number of reasons: they had economic problems from the Great Depression, they were not ready for and were afraid of another war, they mistakenly believed that Hitler also wanted to avoid war at all costs and they knew that the US would not be prepared to get involved in another European dispute so were afraid to fight alone. <p>Key Dates: 1935—Hitler told the world about his rearmament of Germany but no one did anything 1936—Hitler invaded the Rhineland—again breaking the terms of the Treaty 1938—Germany annexed (joined together) Austria and demanded the Sudetenland in Czechoslovakia. 1939—Germany seized the rest of Czechoslovakia and invaded Poland Language of the Lesson: Appeasement—keeping someone happy Rearmament—the process of building up armed forces and a stock of military weapons</p>

4

- The Second World War began in September 1939. Poland surrendered quickly in October 1939 and for the next six months there was no fighting on land. This period of quiet was known as the 'Phoney War' but was ended suddenly with the German invasion of Norway in April 1940 and France a month later.
- The German Blitzkrieg tactics quickly destroyed the Allied forces. France was defeated and the British army was evacuated from Dunkirk. For a while, Britain and the empire faced the Germans alone, and had to survive the Battle of Britain and the Blitz.

Key Dates:

1 September 1939—Hitler invaded Poland

3 September 1939—Britain and France declared war on Germany

April 1940—German invasion of Norway

May 1940—German invasion of France

10 May 1940—Winston Churchill took over as the British Prime Minister

Language of the Lesson:

Phoney—something that is false or not real

Blitzkrieg—'lightning war' - a military offensive used by the German army - a combination of speed, surprise air attacks and overwhelming land forces to destroy the opposition

5

- **Operation Dynamo**, the evacuation from Dunkirk, involved the rescue of 338,000 British and French soldiers from the French port of Dunkirk between 26 May and 4 June 1940.
- The evacuation, sometimes referred to as the Miracle of Dunkirk, was a big boost for British morale.
- The evacuation of British forces from Dunkirk, at the end of May 1940 showed the strength of the Nazis forces. However, the fact that so many British troops were saved to fight another day meant the defeat for Britain was actually seen as an important victory.

Key Dates:

May 26-June 4 1940—The evacuation of British troops from Dunkirk

Language of the Lesson:

Evacuation—to send people to a place of safety and away from a dangerous place

Morale—the confidence, enthusiasm, and discipline of a person or group at a particular time.

Victory—an act of defeating an enemy or opponent in a battle, game, or other competition

6

- After Hitler failed to defeat the RAF (Royal Air Force) in the Battle of Britain, he cancelled his invasion plans and started to target London and other major cities in huge night time bombing raids in an attempt to bomb the British into surrender.
- Before the war broke out, civilians had been issued with gas masks and Anderson shelters, which people were encouraged to build at the bottom of their gardens to protect them from bombs and possible chemical attacks.
- In London, after several nights of relentless bombing and lack of sleep, people took to the underground to seek safety from the attacks. In Cardiff, people used the cellars of the castle for protection.
- Wartime propaganda and the press praised the spirit of the Blitz to show that the people were united, brave and would not be broken.

Key Dates:

September 1940—the Blitz began

7 September - 2 November—London was bombed every night

Language of the Lesson:

Blitz—an intensive or sudden military attack

RAF—Royal Air Force

Invade—when a foreign army enters a country by force

1. Square Numbers

$1^2 = 1$

$7^2 = 49$

$2^2 = 4$

$8^2 = 64$

$3^2 = 9$

$9^2 = 81$

$4^2 = 16$

$10^2 = 100$

$5^2 = 25$

$11^2 = 121$

$6^2 = 36$

$12^2 = 144$

2. Graphs

Cartesian co-ordinates - the ordered pair of (x,y) to define a point in a quadrant

Quadrant - One of four regions separated by the x and y axis.

x - coordinate – The first number given in a coordinate which is the horizontal value

y - coordinate – The second number given in a coordinate which is the vertical value

Horizontal—parallel to the horizon

Horizontal graphs are in the form $y = n$

Vertical – at right angles to horizontal plane

Vertical graphs are in the form $x = n$

Origin—A fixed point at which measurements are taken from. This is usually (0,0)

3. Straight Line Graphs

y-intercept – Where a line crosses the y – axis

Linear graph – produces a continuous straight line

$y = mx + c$ – This is often the form of a linear graph where **m** is the gradient and **c** is the y intercept

When we talk about the **steepness** of a line we are referring to its gradient

Lines are **parallel** if they have the same **gradient**

e.g. $y=3x+4$ and $y=3x-2$ are parallel

A linear sequence that is **ascending** results in a positive gradient

A linear sequence that is **descending** results in a negative gradient

Non Linear graph - does not produce a continuous straight line

*$y = x^2$ is an example of a **non linear graph***

4. Equations and Inequalities 1

Equation - a statement that two things are equal, it contains expressions on both sides of the equal sign.
e.g. $5 = 2x + 1$

Solution – the answer when you solve an equation

Inverse operations - used to solve equations. Addition and subtraction, multiplication and division are inverse operations.

Inequality - when one quantity is not equal to another. We use the following symbols:

- \neq not equal
- \leq less than or equal to
- $<$ less than
- \geq greater than or
- $>$ more than
- equal to

Solution set - a set of all the solutions to an equation

5. Equations and Inequalities 2

Formula - a mathematical rule expressed with symbols
e.g. $f = ma$

The plural of formula is **formulae**

Subject of a formula - the single variable that is equal to everything else
In the example above force is the subject

We can **re-arrange** a formula to change the subject of it. This is done using inverse operations.

Substitute - where we replace a letter with a number.

Evaluate - to calculate the value of.
e.g. if $y = 7$ evaluate $5y$. Answer $5 \times 7 = 35$

6. Types of Numbers

Highest common factor (HCF) - the greatest number that is a factor of two or more numbers

Multiples of a number are found by multiplying that number by an integer.

e.g. the multiples of 4 and 4, 8, 12, 16...

Lowest common multiple (LCM) - the common multiple of two or more numbers which has the least value.

Prime numbers - have exactly 2 factors – itself and one
One is not a prime number as it only has 1 factor

Even numbers - any number that is divisible by 2
Even numbers are written algebraically as **$2n$**

Odd numbers - leave a remainder of 1 when they are divided by 2

Odd numbers are written algebraically as **$2n + 1$**

1: What is Rap?

Hip Hop: a cultural movement that gained popularity in the 1980s and 1990s. Relates to the backing music used in RAP

RAP: A popular music style which uses the rhythm of speech and recurring rhythmic patterns to tell stories.

MC: The Masters of Ceremony was the original name for the rapper who was used to introduce a DJ. Over time they became more involved in the music and the rapper became the main focus of Hip-Hop/Rap music

Rap was introduced in the 1970s in New York, USA.

Rappers delight was the first piece of Rap music introduced by the group The Sugarhill Gang in 1979

2: The Development of Rap

Synthesiser: an electronic musical instrument, typically operated by a keyboard, producing a wide variety of sounds by generating and combining signals of different frequencies

Distortion: a music effect where a sound is altered on electronic instruments. Produces a “fuzzy”, “growling” or “gritty” tone.

Sampling: the reuse of a portion (sample) of a sound recording in another recording.

Instrumentation: Term used to discuss the use of instruments in a piece of music.

Scratching: A techniques used by DJs where a vinyl record would be moved back and forth on a turntable to produce a percussive sound.

3: Structure

Binary Form: A two part structure containing two different sections of music (A and B). The structure can be described as AB

Ternary Form: Three part structure containing two different sections of music (A and B). The structure can be described as ABA

Song form: A structure which contains: verse, chorus and sometimes a middle 8 or instrumental section. The sections can be performed in a number of ways.

Modulation: A term used to describe the change of key in music.

Dynamics: The term used to describe the volume of the music.

4: Beat and Tempo

Tempo: The speed of the music.

Beat: The heart beat of music. It is usually inaudible, but you sense it throughout the music.

Rhythm: a string of different note values combined one after another to produce interest.

Syncopation: When the weak beat is emphasised creating an ‘off-beat’ feel to the rhythm

Simple Time: The time most popular music is written in simple time. It relates to the number of beats in a bar. Simple time is usually 4/4, 3/4, 2/4 and 2/2

5: The Ostinato/Riff

Ostinato: A repeated musical idea which continues throughout a piece of music. There are two types of ostinato: rhythmic and melodic. The term usually related to classical music.

Riff: A repeated musical idea which continues throughout a piece of music. There are two types of riff: rhythmic and melodic. The term usually related to popular music.

Bass Line: The bass line is low in pitch and is played by the lowest instrument. It creates rhythm and harmonic interest. It helps to create texture to music. There are many different types of bass line including riff, walking bass and rock.

Texture: Layers of sound in music. There are many different terms to describe texture including: monophonic, homophonic, polyphonic and heterophonic.

Tonality: This is a term used to describe the sound of a piece of music. Music can be major or minor in tonality.

6: Lyrics

Rhyme Scheme: The ordered pattern of rhymes at the ends of the lines of a poems or verse.

Freestyle: rapping spontaneous and unwritten lyrics.

Wordplay: how a rapper creatively uses lyrics within a song. For example, incorporating words with double meanings and puns for humour or including punch lines.

Flow: refers to the rhythm of the rhyme and how closely rappers keep in time to the music, as well as their intonation.

Couplet: a pair of rhyming words for example; 'in the morning the shone **bright** – Clearing the thoughts of the dark **night**'

Component 1: Passing

- Chest pass - flick wrists, thumbs point down, elbows out. Used for short distance.
- Shoulder pass – from head height, opposite foot forward, elbow out. Used for longer distance.
- Bounce pass– bounce from chest height, ball should hit the floor two-thirds of the distance towards the receiver. Used to get round tall players.
- Overhead – above head, elbows in, spread fingers around the ball. Used for longer distance.

Key vocabulary:

- Centre third
- Goal third
- Goal circle
- Centre circle

Remember: Step into the pass to increase power!
You need coordination, strength and power to be good at passing!

Component 2: Footwork

Footwork rule:

- A player may receive the ball with one foot grounded or jump to catch the ball and land on one foot. The landing foot cannot be moved (other than to pivot on the spot) whilst the other foot can be moved in any direction.
- Turning in the air before landing is beneficial because it saves time so you don't have to land and pivot!
- The running pass can be used when on a quick attack. The player catches the ball mid-run and although the landing foot is lifted, the ball must be released before the landing foot is re-grounded.

Key vocabulary:

- Footwork, Landing foot, Goal line, Side line, Pivot, regrounded.

Component 3: Attacking

Court linkage

This is when you make the most of the space on the court and the position of team members by passing the ball down the court. For example, GK – GD – WD – C – WA – GA – GS.

Counter attacking

When the defending team win the ball unexpectedly and immediately attack, taking advantage of the fact that there will be gaps on the court. This happens quickly to gain the most advantage.

Timing is key!

Move too early and you will run out of space. Move too late and the opposition will intercept the pass.

Key vocabulary:

- Possession
- Counter attack
- Linkage

Component 4: Defending

- Stage 1: mark the player even when they do not have the ball. Stay close to your opposing player.
- Stage 2: mark the ball. 1m away from the landing foot. Arms up.
- Stage 3: mark the space. Time your run to intercept a pass.

Key vocabulary:

- Obstruction
- Man to man marking
- Intercept

Component 5: Positional play

Goal Keeper (GK): The Goal Keeper is the last line of defence on the netball court, they defend against the Goal Shooter and Goal Attack to prevent them from scoring a goal.

Goal Defence (GD): Their role is to stop the opposing players (Goal Shooter and Goal Attack) from scoring and get the ball away from defensive play to attacking play.

Wing Defence (WD): Their main role is to defend the opposing team and stop the ball reaching the goal circle.

Centre (C): The main role of the Centre player is to defend, attack and mark the opposing centre player. Another part of the Centre's role is to help the team by changing play from defensive to attacking, to try create as many goalscoring opportunities by getting the ball up the court towards the net.

Wing Attack (WA): Their role is to create as many goalscoring opportunities as possible by trying to get the ball down the court towards the goal circle, and pass to a Goal Shooter or Goal Attack to score.

Goal Attack (GA): The players primary role is to create goal-scoring opportunities for the goal shooter by feeding the ball and working with them to create space to score against the opposing team.

Goal Shooter (GS): The player's main job is to score goals for the team.

Offside rule: A player with or without the ball cannot move into an area of the court that isn't designated for their position.

Key vocabulary: Goal keeper, goal defence, wing defence, wing attack, centre, goal attack, goal shooter

Component 6: Shooting

One point is scored by the ball going through the net from inside the goal circle.

Shooting technique: Ball held by dominant hand and high above the head. Second hand is placed at the side of the ball to steady its position. Aim for a point above the ring to gain height. Do not let the ball drop behind the head. Power comes from the legs – bend the knees! Flick the wrists on release to put backwards spin on the ball.

Key vocabulary: Goal circle, Goal line

**Component 7: Set plays**

A **tactic** is an action or strategy that is carefully planned to achieve an advantage, for example using the centre pass to gain an advantage over the opposition by planning where the pass will go, in order to outwit the opponents.

Key vocabulary:

- Tactic
- Strategy
- Outwit



Component 1: Passing

When passing in football the components of fitness needed to be effective are:: coordination, balance, power

Use this link when designing a passing drill: <https://www.youtube.com/watch?v=969gLTkOh>

Key Vocabulary:

- Central Midfielder (CM) – this position needs excellent passing skills as they need to be accurate to maintain possession and thread through balls into attacking space to create goal scoring opportunities
- Through ball – a type of pass that penetrates a team's defence so an attacker can run onto the ball

Component 2: Receiving & Footwork

Components of fitness needed when receiving the ball in football:

- Balance
- Coordination
- Muscular Strength (if holding off an opponent)

Your first touch needs to be out of your feet so that you are immediately and effectively able to play the ball with your second touch

Key Vocabulary:

- Touch – a touch is a control or play of the ball. A player's first touch is usually bringing the ball under control so they can play the ball, be it a pass or shot, with the second touch

Component 3: Dribbling

Components of fitness needed when dribbling with the ball:

- Muscular strength (if shielding the ball from an opponent)
- Speed
- Agility
- Co-ordination

Use this link to help you design a football dribbling drill: <https://www.youtube.com/watch?v=jwHc9rz7yo>

Key Vocabulary:

- Left Wing (LW), Right Wing (RW) - two attacking positions where dribbling ability is vital to beat defenders in 1vs1 situations

Component 4: Defending

Double Team – calling a double team defensively means to call upon another team mate to help defend a player

Offside Trap – stepping up into line with the defensive to catch an attacker offside is a good way to defend a through ball

Components needed in defending: Agility, Muscular Strength, Balance, Co-ordination & Reaction time

Key Vocabulary:

- Offside – an attacking player is ahead of the last defender when the ball is played through and they interact with that ball

Component 5: Positioning

Half turn – When receiving the ball it is best practice to do so with your back to the touch line so you have maximum visibility of the rest of the pitch and players, therefore a more informed and better decision can be made

The importance of triangles – by creating triangles through movement, teams can maintain possession of the ball but also create goal scoring opportunities. It gives the player on the ball at least two options to choose from.

Key Vocabulary:

- Central Attacking Midfielder (CAM), Number 10 – this position while the team is attacking is vital in linking the play and possession with midfield and attack, their movement creates the triangles

Component 6: Shooting

When attacking the ball as a striker in the 18-yard box or 6-yard box, movement is vital as it allows you to escape the marking of the defender and create a goal scoring opportunity.

Components of fitness needed in shooting for effectiveness: Power, Balance, Co-ordination

Key Vocabulary:

- Near Post – movement made to the nearest post to the attacker with the ball
- Back Post – movement made to the furthest post from the attacker with the ball

Component 7: Set Plays & Tactics

When attacking it is important to use the width of the pitch and play the ball into the positions that are wide i.e. right or left wing, right or left full back. In doing so, you will be stretching the opponent's defence horizontally and therefore, spaces will begin to open for attackers to exploit or midfielders to attempt through balls in.

Another excellent way to attack the defence is by getting the ball to the byline through either passing or dribbling. By doing so, you will be getting behind the opponent's defence which will enable you to create chaos as this is an advantageous position to cross the ball into the 18-yard box or 6-yard box. Ultimately, a high amount of goal scoring opportunities will come from this position.

Key Vocabulary:

- Byline – the portion of goal line outside the goal posts. An advantageous position to create goal scoring opportunities through crossing and pull backs.

1 – The life of Siddhartha Gotama

Before he became known as the **Buddha**, **Siddhartha Gotama** was a Prince who lived in **Lumbini** (in modern Nepal) around 563 BCE. His father wanted him to be a great king and he shielded him from seeing any form of **suffering** in the world. Siddhartha never left the walls of the palace. He never witnessed poverty, pain, illness or even old age.

The king was concerned that if Siddhartha left the palace, he would dedicate his life to trying to solve all problems that cause suffering.

Siddhartha was **wise** and he knew that there was more to the world and he asked his friend to help him escape. When Siddhartha left the palace, he saw **four sights** that had a huge impact on his life: old age, illness, death and a holy man.

2 – The impact of suffering on Siddhartha

The final of the four sights Siddhartha saw was of a **samana** – a holy man who wore simple clothes and begged. Siddhartha saw that this man was happy even though he had nothing. Siddhartha became a samana and started his **spiritual journey**.

Siddhartha searched for happiness for many years and finally settled on **‘the Middle Way’**: not having too much or too little of anything. He believed that when people find the truth about life they become **‘enlightened’**.

The discoveries he made during his search for Enlightenment are called the **Three Signs of Being**. These are **anicca** (everything changes), **dukkha** (suffering exists) and **anatta** (there is no permanent self or soul).

3 – The Four Noble Truths

The first step to Enlightenment is to follow the **4 noble truths**:

- 1. Illness** – nothing is perfect and all lives involves suffering. Everything in the world is **dukkha**.
- 2. Craving** – people are selfish and they are always wanting more. This craving causes **dukkha**.
- 3. A cure exists** – if people are satisfied, and understand the world, then dukkha will end. This is not easy, but it is possible.
- 4. Cure** – the way to stop craving more is to follow the **Middle Way**. The **eightfold path** will help reach this point.

The Buddha said “I teach suffering, its origin, cessation and path”.

4 – The Eightfold Path

The Buddha believed that only the **Middle Way** could help lead you to **Nirvana**. The best way to find the Middle Way is to follow the **eightfold path**. This is a guide for living in the right way with the right attitudes:

- 1. Right understanding** – seeing that there is suffering in the world
- 2. Right attitude** – committing to developing the right mental attitude
- 3. Right speech** – speak in a positive, truthful and helpful way
- 4. Right action** – be honest, content & faithful
- 5. Right livelihood** – earn a living in an honest way
- 6. Right effort** – work hard
- 7. Right mindfulness** – be aware of your thoughts and their consequences
- 8. Right contemplation** – concentrate the mind, get rid of bad thoughts

5 – Buddhist Worship

Worship is about paying respect to someone or something. Buddhists do not believe in a god, so their worship often takes a different form.

Some Buddhists pay respect to the Buddha when they worship. He founded the faith and for that they are very thankful.

Some acts of Buddhist worship take place at a **shrine** and include chanting, making offerings and listening to scriptures being read.

Many Buddhists perform **puja**, which is worship at home with a personal **shrine**.

Buddhists remove their shoes before an act of worship as a mark of respect. They sometimes bow their heads towards a **Buddharupa**, with their hands help together in a prayer like position. This is called **anjali mudda**.

6 - Wesak

Buddhists in different areas of the world might celebrate their own **festivals**, but one festival that all Buddhists celebrate is **Wesak**.

Wesak is held on the day of the **full moon** in the month of Wesak, which is in May or June in Britain. It is a festival to remember 3 important events in the life of the Buddha: his **birth**, his **Enlightenment** and his **death**.

At Wesak, people visit **temples** and **monasteries** and show their respect to the Buddha by pouring scented water over the **Buddharupa**. People give each other cards and presents. At night, the Buddharupa is taken out of the temple and people light **candles** and carry **lanterns** around it. This surrounds the Buddha in light to represent how he taught people how to become Enlightened.

Key Word	Definition	Example Sentence
Suffering	The state of undergoing pain, distress or hardship.	Siddhartha had been shielded from seeing any suffering in his life, until he left the palace.
Samana	A wandering holy man.	One of the four sights Siddhartha saw when he left the palace was a Samana.
The Middle Way	A way of life that is found in the middle of indulgence (having too much) and asceticism (having very little).	Siddhartha believed that following the Middle Way would lead to enlightenment.
Enlightenment	Having the spiritual knowledge and awareness that frees you from a state of suffering and allows you to escape life on earth.	Siddhartha reached Enlightenment when he started living the Middle Way.
3 Signs of Being	Anicca – everything changes; dukkha – suffering is present in the world; anatta – the lack of belief in a permanent soul.	The discoveries that the Buddha made during his Enlightenment are called the Three Signs of Being.
Dharma	The teachings of the Buddha.	The Buddha taught for about 50 years and his dharmas are still followed now.
4 Noble Truths	All life involves suffering; this suffering is caused by craving and wanting more; there is a chance that this suffering can end; the way to stop suffering is to follow the Middle Way.	Buddhists believe that if the Four Noble Truths are accepted, people can stop living a life of suffering.
8 Fold Path	A guide for living in the right way with the right attitudes. A guide for following the Middle Way.	The Eightfold Path teaches Buddhists how to treat others, how to think about yourself, and how to see the world.
Nirvana	The state of perfect peace when one reaches Enlightenment.	Buddhists believe that the soul can escape reincarnation and reach Nirvana once it is Enlightened.
Puja	An act of worship.	Buddhists often perform puja at home.
Shrine	A place regarded as holy, often marked with an icon or image.	Buddhists often have shrines in their homes, with images or statues of the Buddha to aid their worship.
Buddharupa	The Sanskrit name for a statue of the Buddha.	Buddhist shrines often include a Buddharupa.
Monasteries	A building or complex of buildings which house monks or nuns (men or women who dedicate their life to a religion).	Buddhist monks live in monasteries and dedicate their life to trying to reach Enlightenment.

1: Food Chains		3: Reactivity Series		5: Electrical Circuits	
biomass	the total mass of the organic matter of an organism	reactivity	the tendency for a substance to undergo a chemical change	circuit	a complete loop which allows an electric current flow
producer	organism which can produce their own food via photosynthesis	inert	very unreactive	series	a circuit with one loop through which current flows
consumer	organism which eat other organisms for energy	displacement reaction	when a more reactive metal displaces a less reactive metal from a compound	current	the rate of flow of charge
predator	an organism which hunts others	observation	what can be seen happening (in a chemical reaction)	ammeter	a device which measures the current in a circuit
prey	an organism which is hunted	fizzing	the production of a gas from within a solution	potential difference	a measure of the difference in energy between two parts of a circuit
herbivore	an organism which only feeds on plants	carbon	an element used to extract less reactive metals from ores	voltmeter	a device which measures potential difference
carnivore	an organism which feeds on consumers				
2: Food Webs and Bioaccumulation		4: Extracting Metals, Properties and Recycling		6: Resistance	
ecosystem	all the living organisms and non-living factors in an environment	extraction	removing metals from metal ores	component	parts of a circuit e.g. cell, bulb, switch...
trophic level	the position of an organism within a food web or food chain	ore	rock which contains metal that can be extracted for profit	resistance	how much the wires and components reduce the flow of charge (current)
biodiversity	the variety of different organisms in an ecosystem	metal oxide	a compound containing metal and oxygen	ohms (Ω)	the unit of measure for resistance
food web	shows how different food chains link	ceramic	hard, brittle, waterproof materials	resistance (Ω) = potential difference (V) \div current (A)	
bioaccumulation	the increase in concentration of chemicals in organisms higher in food chains	polymer	materials made from lots of smaller units (monomers)	variable	a factor which could affect experimental results
food security	how much food is available and how easy it is to access it	composites	materials made from more than one other material		

1- Research and Designing

As a designer you must be able to follow the design process to produce successful products. You need to know what the following terms mean:

- Design Brief** – a short statement outlining key points such as function, target market and the intended user which is given to the designer to work towards during the design process.
- Task Analysis** – a breakdown of the design brief to help you understand what you are going to design and make. This includes components, materials, techniques, colours, target market, function, artist inspiration.
- User needs** – the specific needs the user has and how the product is going to cater for those needs.
- Target Market** – the specific group of people who will buy/use the product. This includes specific age groups, gender, hobbies and interests.
- Specification** – a list of points that the product must meet in order to fit the end users needs.

2- Smart Materials

Smart materials are materials that change their characteristics/properties depending on their environment. They are often developed to solve design solutions to fix problems.

Smart materials react with changes in:

- Temperature
- Light
- Pressure
- Electricity

Example of smart materials are:

- Thermochromic pigments** – these types of pigments react with a change in temperature. These pigments usually change colour when exposed to varying temperatures
- Photochromic pigments** – the particles react with ultraviolet light. An example of a product is photochromic glasses.
- Self healing concrete** – avoids cracks in the concrete filling with water. The concrete has bacteria added to the mixture. When cracks form and water seeps in the bacteria starts to react and fills in the cracks.
- Self healing polymers** – react to stress fractures by releasing a resin into the new crack.

3- Technical Textiles

Technical textiles are textiles with an increased functionality. Examples include:

- Weatherproofing**
- Strengthening**
- Adding conductivity and insulation**

Examples of technical textiles include:

- Gore-Tex** – a type of fabric that is waterproof but also breathable.
- Kevlar** – made from tough fibres to prevent cuts and tears, provide insulation and are flame proof. This type of material is often used in police officer uniforms.
- Electronic textiles** – allows electricity to travel along conductive threads which are woven or sewn into the fabric.
- Microencapsulation** – solids, liquids and gases are sealed into tiny capsules. These ingredients can be released at controlled rates.