CHRIST THE KING

KNOWLEDGE ORGANISER

Year 8 LENT

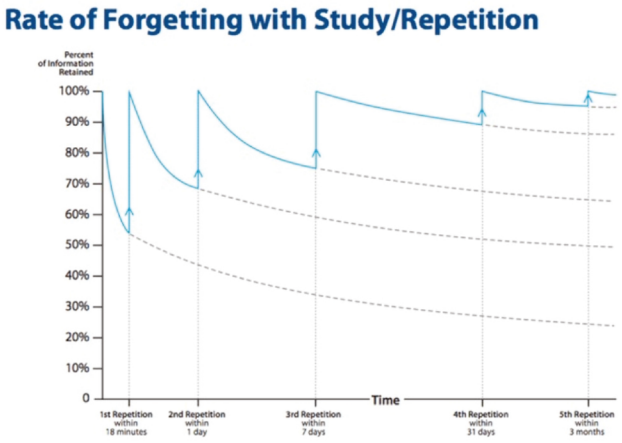
(Term 2)

#CTKCares

Knowledge Organisers

We use knowledge Organisers at Christ the King to help all students achieve. Knowledge Organisers improve your confidence by helping you to understand how to learn and revise. We are building a seven-year revision strategy that supports you to remember the core and powerful knowledge that is required to be successful in each subject.

The Ebbinghaus Forgetting Curve demonstrates that knowledge is lost over time if it is not revisited. A simple model for memory involves working memory and long term memory; working memory is limited, and can very easily become overloaded, whereas long-term memory is effectively limitless. You can support your limited working memory by storing key facts and processes in your long-term memory. Research evidence indicates that regular recall activities, known as retrieval practice, are an effective way of ensuring that knowledge is committed to long-term memory



At the start of each term, you will receive a knowledge organiser booklet that contains content for all subject areas. You will use your knowledge organiser in your lessons, in tutor time, and during homework tasks. An important aspect of your revision for assessments and end-of-year examinations will be to use the knowledge organisers for self-quizzing. If this core knowledge is secured, you will be in a strong position to use and apply this knowledge in a range of contexts. You will be given your knowledge organiser in a plastic wallet along with a homework booklet – the expectation is that you bring this to school every day – **it should be placed on your desk in every lesson**, ready to use. Geography and History highlight the essential 'golden knowledge' in yellow to support your learning.

How to use your Knowledge Organiser

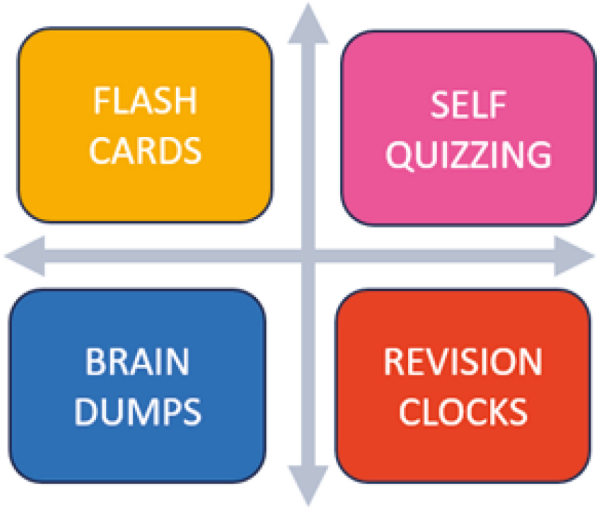
The best way to use your knowledge organisers is to regularly use one of our Core 4 Revision strategies as part of your home learning. These strategies will be explained to you in more detail in tutor time, by your class teachers and as part of your Personal Development lessons.

- **Flash Cards:** Use the information from your knowledge organiser to create flashcards – these could be double sided, with a question on one side and the answer on another, or a keyword on one side and the definition on the other.

- **Self Quizzing:** There are different ways you can self-quiz:
  - Look, cover, write, (say), check
  - Create gaps fills
  - Create questions for the information you want to learn and then answer them from memory

- **Brain dumps:** These are a small but powerful revision strategy which help makes the information 'sticky' so that it goes into your long-term memory, ready for you to recall it into your working memory. They are good to use at the end of topics. An effective brain dump involves you writing down everything you can about a topic you want to revise from your memory. You then check the information against the information on your Knowledge Organiser – you then mark your work and add any missing information onto your brain dump in a different colour pen, so that you know which information you need to revisit, either through using flash cards or self-quizzing.

- **Revision Clocks:** Revision Clocks are a blank clock shape – divided into 12 segments. In each segment put a sub-heading and then include the information linked to that. They are effective as they allow you to 'chunk' up the core knowledge from the topic into the segments. You can use colours and pictures to make the information more 'sticky'.



Homework Schedule

You should complete at least one hour of Home Learning per school day.

This will consist of:

- Knowledge Organiser and Online Learning as directed by your teachers.
- If you have no tasks set, carry out Knowledge Organiser activities as per the Knowledge Organiser timetable below.
- Two periods of 20 minute reading each week.

Week 1					
20 Minutes Per Subject	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Subject 1	English	Science	Maths (Sparx)	Maths	English
Subject 2	RE	PE	RE	Science	Geography
Subject 3	Music	History	Technology / IT	MFL	Art

Week 2					
20 Minutes Per Subject	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Subject 1	Science	English	English	Maths (Sparx)	Science
Subject 2	RE	Maths	RE	Drama	Geography
Subject 3	Music (Practical)	History	Technology / IT	MFL	Art (Practical)

Read 20 minutes a day and you'll read 1,800,000 words per year.

Reading for 6 minutes a day reduces stress by 68%.

Children learn 4,000 to 12,000 words per year through reading,

What are the homework expectations?

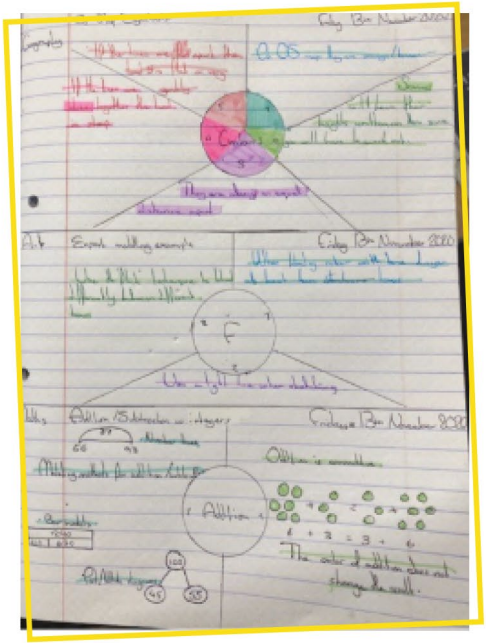
Each homework must meet the following 5 requirements:

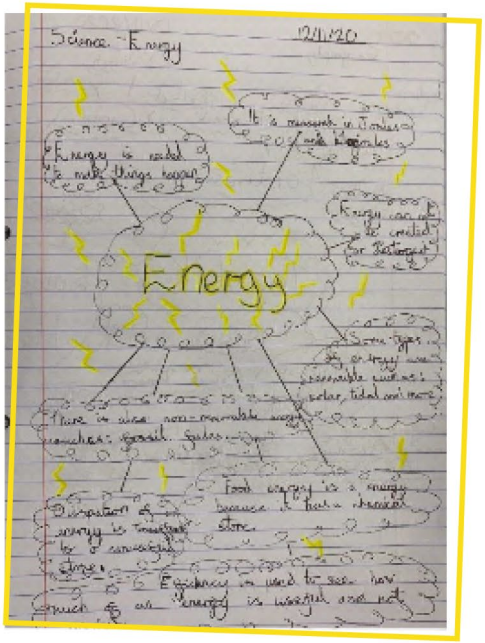
- Write the complete title and date in full *e.g Wednesday 7th June 2023* on each page and underline.
- You should include minimum of words to summarise the topic. Do not copy the words from the text.
- Make full use of the page for each topic by scaling your notes and images appropriately to use all the space.
- You must include diagrams, sketches, or cartoon doodles to visually represent the topic, try to use humour.
- Highlight key words and phrases, using underlines and highlighter pens, and explain technical terms.

How should I present my work?

Please remember that the same rules apply to the presentation of your homework as applies for your class work: **dates and titles** (which should be the name of the subject) **need to be underlined with a ruler** and you should **present your work as neatly as you are able to.**

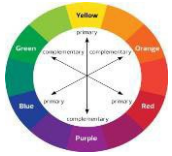
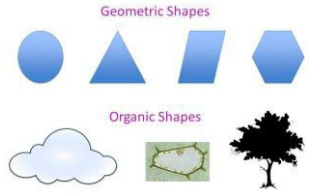
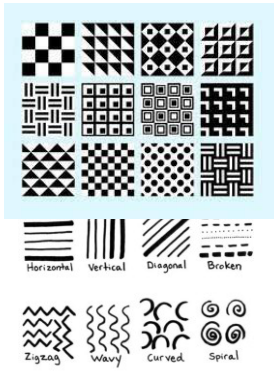
If you are self-quizzing correctly, there should be **evidence of green pen on your page**. Here are some examples of how to set out your work:





DON'T FORGET!

Always record the date, topic, and page number in your Home Learning Book!

1. Formal Elements	Definition	Visual
Colour Theory	Colour theory is the study of how colours work together and how they affect our emotions and perceptions. It helps artists, designers, and creators to help them choose the right colours for their projects.	
Shape	Shapes can be two-dimensional or three- dimensional enclosed areas. They can be geometric (circles, squares, rectangles, triangles) or organic (freeform, natural, erratic and irregular).	
Pattern **Line**	Pattern isa design that is created by repeating lines, shapes, tones or colours. Patterns can be manmade like a design on fabric, or natural such as the markings on animal fur. Line is a mark made by a drawing tool or brush. It can be straight, curved, light dark, long/thin it can be used to show contours, movements, Feelings, and Expressions	

2. Processes	Definition
Colour mixing	This term applies to mixing two or more colours together to create a new colour or tone.
Blend	The process of fusing two tones or colours to transition from one to another or to create a new tone or colour.

3. WASSILY KANDINSKY ARTIST

WHAT? Wassily Kandinsky was born in Moscow, Russia in 1866 and died in France in 1944. Kandinsky is considered to be one of the first leading Abstract artists of the 20th century. He mainly produced colourful abstract paintings.

WHY? Wassily Kandinsky is thought to have had a condition called synesthesia. This describes a person who may see colours and shapes when they hear particular sounds. Kandinsky was very passionate about music, especially Russian classical music, and he used this passion to inspire his paintings.

HOW? Wassily Kandinsky developed his Abstract compositions using a wide range of lines, shapes, patterns and colours. He used colour specifically to represent the sounds created by different musical instruments.

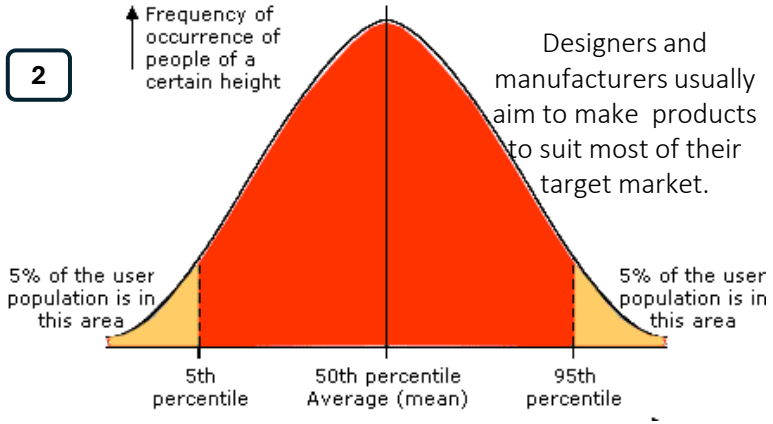
4. Keywords	Definition
Complimentary colours	Two colours which are opposite of each other on the colour wheel which can create a contrast.
Abstract Art	Is artwork which does not try to represent an accurate or realistic view of the world, but instead uses colours, shapes, forms and gestural marks to achieve its effect.
Composition	Composition in Art refers to the way different Formal Elements(shape, line, colour, pattern etc) are combined or arranged to make an artwork.
Medium	The material used to create a piece of artwork.

Design & Technology – Chair Project

1 Key terms

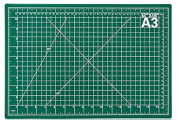
Anthropometrics	The **study of the human body** and its movement, often involving **research into measurements** relating to people. It also involves collecting statistics or measurements of the human body that can then be used to design products and environments that **fit** the users.
Ergonomics	Defined as the science of fitting a workplace to the user's needs, *ergonomics* aims to increase how comfortable, efficient and easy a product is to use.
Triangulation	Triangulation involves the use of triangular shapes to give stability to structures.
Crating	Using sketched 3D cubes/ cuboids to help structure more complex drawings.
Mood board	An arrangement of images, materials, pieces of text, colours, textures etc. Intended to embody or project a particular style or theme.
Scale	A method used to enlarge or reduce the actual size of a drawing of model whilst keeping proportions the same.

2

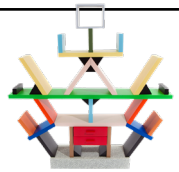


Designers and manufacturers usually aim to make products to suit most of their target market.

3 Modelling Tools & Equipment

Craft Knife	As single bladed knife that easily cuts through a variety of different materials. The blade is retractable so and can be snapped off to reveal a new blade, once the old one becomes blunt.	
Cutting Board	Self-healing cutting mats are purpose-built to be extremely durable and resilient, creating the perfect cutting surface that reduces blunting but also ensures any worksurface is well protected from damage.	
Metal Rule	Metal safety Rule's features a unique M profile which allows you **to keep your fingers well away from any knife edge** when used for cutting or scoring. They are made from metal to prevent the rule being damaged by the blade of a craft knife.	
Glue Gun	Heats up and melts hot glue sticks. Once melted, the glue is then directed out of the nozzle of the gun. **The nozzle can get very hot**, so it is important to follow safety rules to ensure that you don't burn yourself. Any burns should be reported straight away.	

4

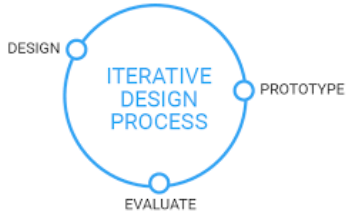
Aljoud Lootah 	Aljoud's designs focus on the idea of contrasts in form and function while distinctly interpreting the Emirati culture through contemporary design. Her creative drive comes from a passion for detail and experimental approaches to materials and aesthetics.	
Philippe Starck 	Stark has produced designs for large companies such as Alessi, Puma and Microsoft. He is interested in bright colours, unusual shapes and materials. He wants his designs to be mass produced and relatively affordable, but he also wants them to be durable.	
Morag Myer 	Known globally for creating installations and immersive public artworks that transform places and champion community. Her work is instantly recognisable, combining geometric patterns with bold shapes and hand painted type, it aims to bring joy to all those who encounter it.	
Ettore Sottsass 	Ettore was an Italian architect and designer, he brought bold colors, unconventional shapes and an innovative contemporary style to everyday items, creating iconic postmodern furniture pieces that shaped the history of the **Memphis movement**.	 

Design & Technology – Design and Make

The Stages of the Design Process	
Problem	The main purpose of developing a new product is to solve a problem, this solves either a need or a want. It is important to investigate problems before you start designing.
Design brief	A design brief is a statement of intent that addresses how the product will solve the identified problem and satisfy the need or want. It normal considers; budget, function, target market, aesthetics and timescale.
Research	Market research and analysis is performed to help the designer fully understand and identify issues. This may involve looking at existing products, speaking to users, making observations and completing site visits.
Specification	This is shaped through the results of research. It is a list of SPECIFIC requirements that are measurable. It is used to test the product to assess success throughout.
Design ideas	These are produced by the designer by hand or using computer aided design (CAD). They are used to develop and communicate solutions to the identified problem.
Development	Designers often used the iterative process to model and test the design ideas against the specification, continually making improvements to get to the best solution.
Prototype Manufacture	A prototype is aa pre-production working model of a product, that is used to test the concept. The prototypes are usually manufactured using the same processes to ensure that the product meets expectations.
Evaluation	Prototypes must go though rigorous testing and analysis to ensure they are safe, fit for purpose and meet the design brief and specification. Any issues that are found, need to be resolved before the product can go into production.

Material Properties	
Corrugated card	Two or more layers of card with a fluted layer in-between to add strength.
Foam core board	Two thin layers of card with a foam inner core in between.

Iterative design is the repeated process of prototyping a design, testing it, collecting feedback, evaluating the design and making improvements based on results. The process is repeated until the final design is ready to be produced.



Scale A scale drawing is an enlarged or reduced drawing that is proportional to the original object. This means that all of the ratios between the corresponding sides of the original figure and the drawing are equal. Scale drawings are used by architects, clothing designers, and map makers among others.

2:1	The drawing is twice the size of the actual object.
1:1	The drawing is to actual size.
1:2	The drawing is half the size of the actual object.

Attachment techniques

These are different ways to attach and join card together

A split pin is a standard component that can be used to join materials whilst still allowing movement.

Design & Technology – Paper and Board

1 Keywords

Keywords	Definition
1. Paper	Material manufactured in thin sheets from the pulp of wood or other fibrous substances, used for writing, drawing, or printing on.
2. Cellulose	Fibres found in plant materials.
3. Renewable	A sources of material that if managed responsibly will not run out.
3. Typography	The style or appearance of text.
4. Mood Board	An arrangement of images, materials, pieces of text, colours, textures etc. Intended to embody or project a particular style or theme.
5. Net	The 'net' of a shape is a term used to describe what a 3D shape would look like if it was opened out and laid flat.
6. Scoring	Scoring involves partially cutting into a material without going all the way through, usually to aid folding.
7. Branding	Key elements such as the logo, color scheme, typography, and other design components that makes a brand stand out from competitors, and recognizable to consumers.
8. Typography	The art of arranging letters and text in a way that makes it visually appealing to the reader.

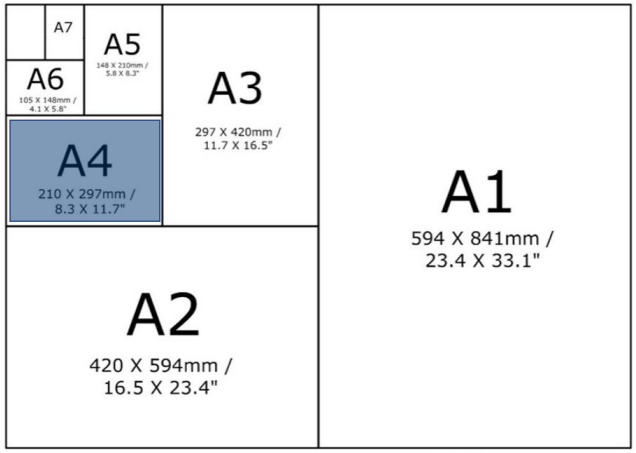
2

Anything that weighs under 200gsm is generally considered **paper.**

200 gsm

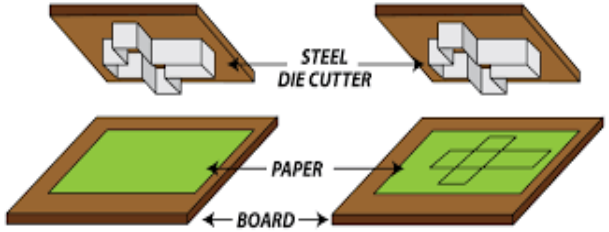
Anything that weighs over 200gsm is generally considered **board.**

4 Stock sizes



5 Die cutting

Die cutters are used to cut, crease or perforate paper to create shapes and make nets.



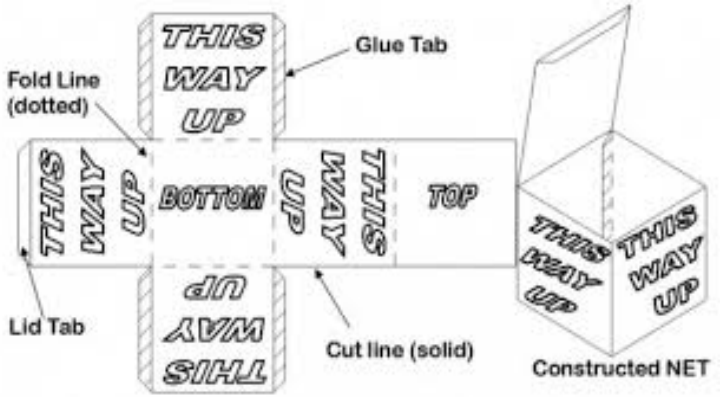
1. The die is pressed against the card and the steel cuts into the card.
2. Sharp blades will cut through the paper/card.
3. Rounded blunt blades will crease the paper/card for folding.

3 Paper Manufacture

1. **DEBARKED:** Trees chopped down and logs put into a rotating drum to remove the bark.
2. **WOOD CHIPPED**: Wood is then put through the chipper to make wood chips. Sometimes these are taken from unused offcuts from sawmills. This saves waste.
3. **COOKED WITH CHEMICALS:** Mixed with chemicals to dissolve the lignin in the wood. This creates pulp.
4. **SIZING**: The pulp is filtered, squeezed, bleached and pounded before other materials, such as chalk or chemicals, are added to change the **opacity** and **absorbency** of the paper.
5. **DRYING**: The pulp is pumped on to a moving belt and a set of rollers to remove the water. This is repeated until all of the water is removed.
6. **CALENDERS**: The paper passes through calendar rollers which give the paper its final finish.

6

The two-dimensional shapes that form a net can be arranged in different ways for a particular 3D shape. The relationship of **faces**, and **edges** must remain the same.

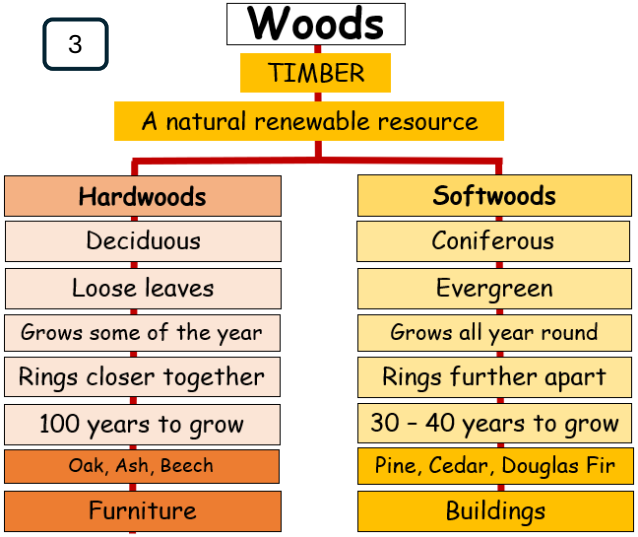


Design & Technology – Timbers / Phone Holder

1 Keywords

Keywords	Definition
1. Wasting	The term used to describe the process of removing material when manufacturing. This can be through drilling, sawing, filling or cutting.
2. Template	A shaped piece of rigid material that is used to draw or cut around to increase accuracy. They can also be used when shaping or drilling.
3. Finishing	The term used to describe the process of adding a 'finish' such as paint, varnish, wax or stain to a material for functional or aesthetic reasons.
4. Quality control	Quality control is when your check the quality of a product against a set standard or specification. Products will often have a tolerance of how accurate they need to be.

3 Woods



2 Tools

Marking Gauge		Mark out lines by running it along an edge and using the pin to mark a line into the material.
Try Square		Used for marking out and checking 90° angles on wood, metal or plastic.
Tenon Saw		A saw used for cutting wood. Its flat blade makes it good for cutting straight lines.
Belt Sander		A machine that rotates a belt of sandpaper at high speeds. Used to neaten up edges of wood.
Coping Saw		A saw used to cut wood and plastic. Its thin blade makes it ideal for cutting curved lines.
Chisel		Is a cutting tool with a sharp edge. Sometimes used with a mallet to run along the surface off wood and remove shavings.
Sand Paper		An abrasive paper used to smooth the surface of wood. It comes in a range of 'grit sizes' which range from rough to very fine.

4 Scots Pine - softwood

- Easy to work with, reasonably strong and lightweight.
- Straight grain with lots of knots.
- Pale to reddish brown.

Uses: furniture, construction, door frames.

5 Process of converting a tree to timber

FELLING	The trees are chopped down in to logs and taken to the sawmill.
Transport to sawmill	
DEBARKING	The bark is removed from the logs. The bark is used for fuel.
Sawing - CONVERSION	The wood is converted into different stock form sizes.
Sorting & stacking	The timber is sorted and stacked to ensure air flow.
Drying - SEASONING	The timber is then dried using air or a kiln to remove 9-14% of the moisture.

Oil – Soaks into the timber. As it penetrates the wood it provides protection and some water resistance.

Wax – a think layer is applied with a soft cloth and pushed in to the wood. It enhances colour and gives a shine. It protects wood from moisture.

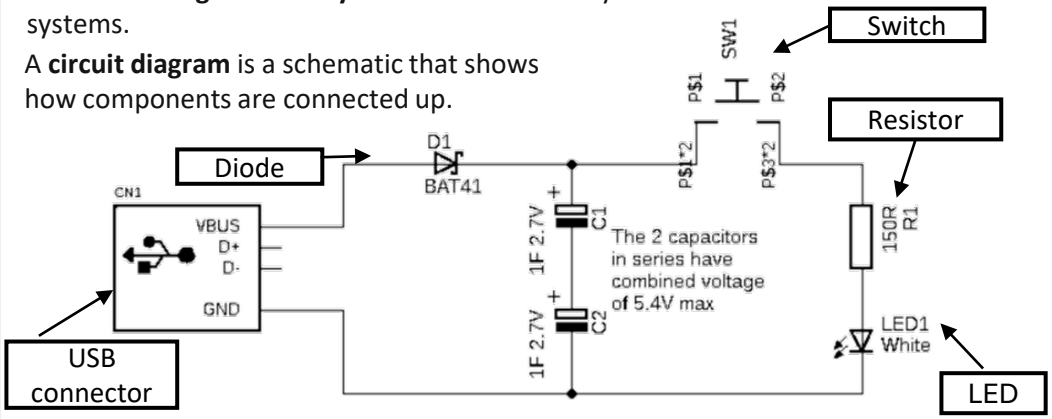
Stain – Permanently stains wood. The colour can be affected by the base wood. It does not protect.

Design & Technology – Torch Project

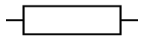
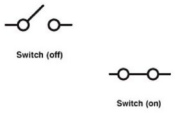
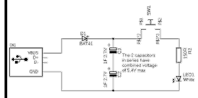
Key Word	Definition
1. CAD (Computer Aided Design)	Using a computer program to produce computer models/ designs.
2. CAM (Computer Aided Manufacture)	Machines that are controlled by computer software to determine movement and power.
3. Laser Cutter	An example of a CAM machine. A laser cuts through or etches onto a chosen material.
4. Etching	Using the laser cutter to etch/ burn the surface of a material and draw a design.
5. Solder	Solder is a metal alloy usually made of tin and lead which is melted using a hot iron. It is used to join electronic components to a circuit board.
6. 2D Design	The CAD software used to design models and control the laser cutter.
7. MDF (Medium Density Fibreboard)	It is a manufactured board that is made by pressing wood fibres pressed together using glue and heat.

Schematic diagrams use **symbols** to show the layout of electrical or mechanical systems.

A **circuit diagram** is a schematic that shows how components are connected up.



A **system diagram** uses the logical order of an input, a process and an output to plan the function of a circuit.

Electronic Components			
Component	**Job**	**Image**	**Symbol**
LED (Light Emitting Diode)	LED stands for Light Emitting Diode. LEDs are like normal diodes, in that they only allow current to flow in one direction, however, when the current is flowing, the LED lights up.		
Resistor	A resistor is a device that opposes the flow of electrical current. The bigger the value of a resistor, the more it opposes the current flow. The value of a resistor is given in Ω (ohms) and is often referred to as its 'resistance'.		
Switch	A device used to interrupt the flow of electrons in a circuit. They are usually on or off.		
USB Connector	Allows a circuit to connect to a USB port, charging the capacitor.		
Capacitor	A capacitor is a component that can store electrical charge (electricity). In many ways, it is like a rechargeable battery.		
Diode	Diodes let current flow in one direction, but stop it from flowing in the other. They are like a one way valve.		
Circuit Board	A thin rigid board containing an electric circuit; a printed circuit.		

How do I improve my performance?

What makes a good storyteller?

What Performance Techniques have I used?

'We Refugees' by Benjamin Zephaniah

A refugee is a person seeking safety who has fled their home country because they are afraid of being persecuted (mistreated) due to their religion, race, political beliefs or social behaviour.

"I am the dream and the hope of the slave".

Journey and Identity

Devised Theatre:
a process in which the whole creative team develops a show collaboratively. From actors to technicians, everyone is involved in the creative process

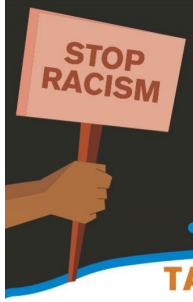
What is physical theatre?
a type of performance where physical movement is the primary method of storytelling. It often includes mime, gesture and modern dance to create performance pieces.

"I come from a beautiful place"

A good storyteller captures the audiences attention and creates impact!

'Still I Rise'- Maya Angelou

What is spoken word?
vocal poetic performance that sometimes uses song, rap, rhythm and music.



Key Words:

Refugee	Devising
Displaced	Collaborate
Sanctuary	Freeze Frame
Identity	Spoken Word
Prejudice	Narration
Journey	Physicality
Belonging	Movement
Racism	Theatre
Hope	Storytelling

TASK: Design the set for your devised piece of theatre. Consider colour, props, lighting and sound. What are they wearing? What belongings do they have with them?

WHAT AM I DOING WELL ? **WHAT DO I NEED TO DO TO IMPROVE ?** **HOW ARE THE AUDIENCE IMPACTED BY THE ACTING AND DESIGN CHOICES ?**

YEAR 8 wonder.land

Physical and vocal Key words

CHARACTERISATION
Using a range of physical and vocal skills to show a character who is different to you.

TONE OF VOICE
The emotion behind what your character says e.g. an angry tone, a surprised tone.

PITCH
How high or low your character's voice is.

PACE
The speed at which your character speaks or moves.

GESTURES
Using your hands (or sometimes eyes and head) to communicate meaning with other characters and the audience e.g. pointing/winking.

BODY LANGUAGE
Showing emotion through the way you sit, stand or position yourself.

FACIAL EXPRESSION
Showing emotion through your face- eyes, mouth, eyebrows...

moment effect scene
script stage skills physical
suggests **words we use to talk about theatre** actor element
choices story dialogue
successful character
design movement
engaging audience line
director performance vocal

Writing structure

WHAT? Explain **which** element was successful.

HOW? Explain exactly **how** this moment was created.

WHY? **Why** was it successful? What impact did it have on the audience?

JUSTIFY How did **you** feel about this particular moment?

Design Key words

DESIGNER
The person in charge of making decisions about a particular element of the production.

SET
The scenery and furniture on the stage throughout the production.

PROPS
The items held or used by actors on stage to make the action more realistic.

COSTUME
What the actors wear when performing. Costume can denote character, historical era and the style of the production.

MUSIC AND SOUND
Live or recorded sound used to enhance a production and create a certain atmosphere.

LIGHTING
Lighting is used to make sure the audience can see the actors and set, focus their attention on what is important and to create a mood.

LEVELS
Used to create different locations or to show status on stage.

COLOUR/FIT/STYLE
Can suggest a character's personality, occupation or status.

- One moment that stood out for me was...
- This helped to communicate to the audience that...
- This effect was created by...
- This could have been communicated more effectively by...
- The actor/designer used... effectively to create...
- The impact of this on the audience was...
- This created an atmosphere/ feeling of...
- Overall the cast & crew successfully communicated...

1. Sentence starters:

Try the/our…
Visit the/our…
Take a moment to…
Explore the…
Sample our…
Experience the…

You'll love the/our…
You're welcome to…

What better…?
When did you last…?
How about…?
Why not…?
Did you know…?
Have you ever…?

Since…
When you…
Before you visit…
After you've…
Once we've…
Beside our…
Outside the grounds…
Inside your room…

We'd recommend…
One of the highlights…

2. Adjectives linked to the senses:

	Beautiful, stunning, spectacular, splendid, tremendous, impressive, jaw-dropping, awe-inspiring, breath-taking, remarkable, astonishing, incredible, phenomenal, unbelievable, sparkling, glistening, dazzling, gleaming, shimmering, glittering
	Soft, silky, warm, cosy, cool, soothing, calming, comforting, relaxing, uplifting
	Tasty, delicious, delectable, delightful, succulent, luscious, juicy, moist, crispy, scrumptious, appetising, yummy, tempting, mouth-watering, tender, ice-cold
	Melodious, mellow, melodic, rhythmic, calming, soothing
	Aromatic, fragrant, sweet-smelling, fresh, perfumed, intoxicating

3. Purpose	**Audience**
The reason or goal you have for writing about your topic	The specific people you are writing for

Purpose	Definition	Examples
Describe	The writer wants you to visualise a person, a place or a thing	Product descriptions, imagery
Persuade	The writer wants you to do, buy or believe something	Adverts, letters, opinions, campaign speeches

Audience		
Couples (20s)	Families (1 to 50s)	Retirees (60+)
romance, extreme sports, clubbing	creche, sport, beaches, quiet pool fun pool	sightseeing, shows, dining, guided tours

4. Language techniques :

Noun
Adjective
Comparative adjective
Superlative adjective
Triplet
Alliteration
Verb
Imperative verb
Adverb
Simile
Metaphor
Repetition
Onomatopoeia
Rhyme
Rhetorical question
Direct address
Preposition

5. Tone:

Too friendly? Can seem unprofessional and suggest unsafe hotel.

Too cold? Can seem unfriendly and suggest uneasy atmosphere.

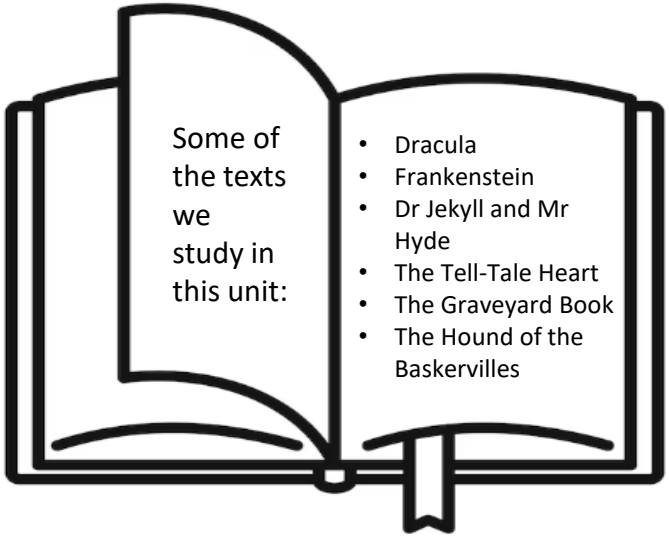
English – Glace at the Gothic Genre

What is the Gothic genre?
The Gothic genre first emerged from the Romantic movement. It used art and ideas from the Dark Ages, wild emotion and nature to contrast with modern ideas about science and logic.
Gothic writing transformed into the format of the extremely popular Victorian ghost story.
Definition: A genre that places strong emphasis on intense emotion, pairing terror with pleasure, it is characterised by its dark settings, disturbed characters and eerie stories.

Key Characters:

- Mysterious aristocrats (a high social status)
- Persecuted maidens or innocent feminine characters who are vulnerable
- Femme fatale/ threatening wicked women who are seen as 'unnatural'
- Powerful, tyrannical male villains
- Supernatural beings: vampires, ghosts, werewolves and giants
- 'Monsters' can be categorised in three ways – external (such as Dracula) , internal (such as The Tell Tale Heart) and man-made (such as Dr Frankenstein's creation)

Gothic writers often present challenging characters. They sometimes use **duality** to present conflicting aspects of their personality (such as good and evil) which can leave a reader feeling **ambivalent** (mixed feelings) about a character.



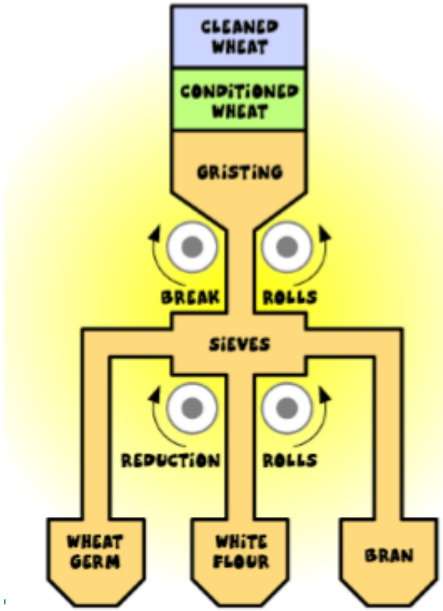
Conventions of Gothic writing:	
Settings –castles, graveyards, dungeons or religious buildings such as churches and chapels. They are often old, decaying buildings, usually set in remote, hidden places such as the wilderness of a forest or in the isolation of the mountains.	
Pathetic fallacy - the writer makes a connection between human emotion and the appearance of the landscape or the behaviour of the weather.	
Tension - feelings of suspense, uncertainty, or anticipation created by conflicting forces such as a character in danger.	
Sensory Description - The use of the five senses (sight, touch, sound, taste, and smell) to add depth of detail to writing to help the reader imagine the scene.	
Linear/Non-linear narrative – How the events of a narrative are presented. Linear narratives are in the order they happened (chronological order) whereas non-linear narratives are written in a disjointed or disrupted order (non-chronological)	
Obscurity – Something partly hidden or somewhat concealed, to intrigue the reader and evoke doubts/fear.	

Food Preparation and Nutrition: Special Diets and Food Origins

Key terms	Definition
1. Halal	Foods that are allowed to be eaten according to Islamic law. Foods that are not permitted are known as haram.
2. Kosher	Is a word used to describe food and drink that complies with Jewish religious dietary law and that are fit and proper for consumption.
3. Organic	Food produced without the use of chemical fertilisers, pesticides or other artificial chemicals.
4.Intensive farming	A way of producing large amounts of crops, by using chemicals and machines as well as keeping animals indoors to restrict movement.
5. Seasonal	The times of the year when the harvest or the flavour of a food is at its peak.
6. Food miles	The distance food is transported from the time of its making, until it reaches the consumer.

1

Farm to Fork – How flour is made



On arrival at the mill the wheat is **cleaned** to remove dust, straw and other impurities.
Conditioning with water softens the bran layer of the wheat and makes it easier to separate the parts of the wheat.
The wheat is blended with other types of wheat in a process called **gristing** to make different kinds of flour.
It is then **milled** through steel rollers with teeth that break the grains open.
The fragments of wheat grain are **separated** by sieves.
The bran, wheatgerm and endosperm have all been separated out. They can now be **blended** to make different types of flour.

2	Intensive Farming	Organic Farming
Quantity (yield)	High yield, large amounts of food produced.	Lower yield of crops and more is lost and less is grown.
Pesticides	Artificial pesticides are used to keep pests away resulting in more crop.	Pesticides restricted; natural predators encouraged.
Animals	Battery rearing of animals in enclosures , less humane and can cause disease to spread quickly through the animal population..	Animals have a better quality of life with access to outdoors. Animals not given antibiotics.
Labour	Artificial chemicals and machines means fewer people are needed for work.	More people are needed to work the farms.
Fertilisers	If too much is used, it can wash in to steams and lead to pollution.	Only natural fertilisers are used along with crop rotations.
Cost	Low cost of production but a high initial set up, maximum output is achieved resulting in a lower cost for consumers	Production is lower and more space is needed, resulting in higher cost produce for consumers.

3

RSPCA ASSURED

Farmed animals that have been inspected to **VERY high welfare standards** – providing them with physically and mentally stimulating environments from birth to slaughter.

ASSURED FOOD STANDARDS

This symbol means that the food you buy has been **responsibly sourced** from **British** farmers, safely produced and comes from crops and animals that have been well cared for.

Lion Quality

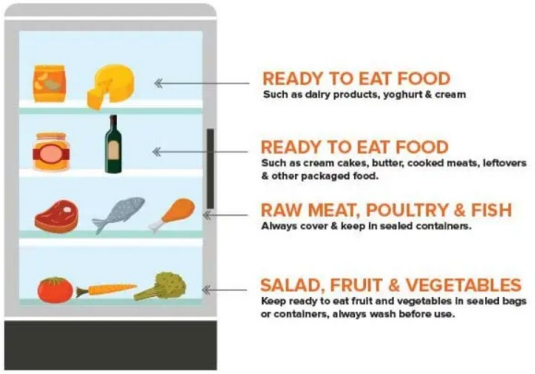
This logo is stamped on to egg to certify that they are **British** and that the **hens have been vaccinated** against Salmonella.

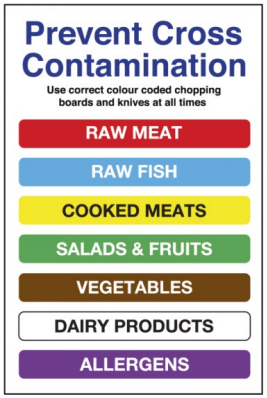
SOIL ASSOCIATION · ORGANIC STANDARD ·

This symbol means that the product is certified to **high organic standards** and provides an assurance of organic authenticity.

Food Preparation and Nutrition: Special Diets and Food Origins

4	Food Safety
Microorganism	Tiny living things, such as bacteria, yeasts and moulds which cause food spoilage.
Pathogen	Harmful bacteria which can cause food poisoning.
High Risk Food	Foods which are ideal for the growth of bacteria or micro-organisms (e.g., chicken and shellfish).
Contamination	When food is affected with micro-organisms.





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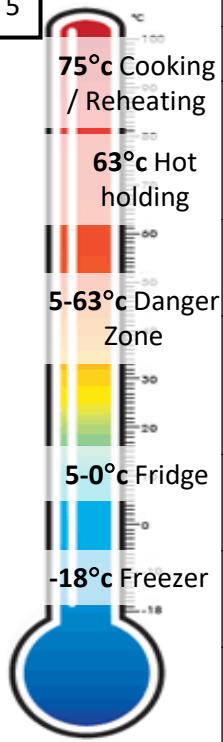
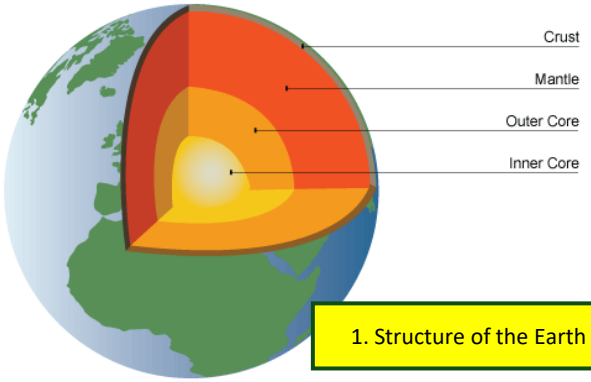


6	Different ages have different nutritional needs
Age	**Definition**
Young children	Children have small stomachs and should have small meals more frequently. Dairy is important for calcium. They should be encouraged to try new foods.
Children	They are very active and growing rapidly. Need a balanced diet, sugar and snacking should be avoided.
Teenagers	Growth is in spurts, protein required for muscles and calcium for skeleton. Teenage girls begin mensuration. Teenagers deal with stress and this can lead to poor eating habits.
Adults	Stop growing so needs don't as much. Eatwell guide should be followed. Metabolic rate slows through age. Muscle is lost and fat gained.
Elderly	Usually less active and need less energy. Taste and smell can change which affects enjoyment.
Pregnancy	Mum's diet is important for formation of a heathy fetus. Iron and calcium and supplement of B9.

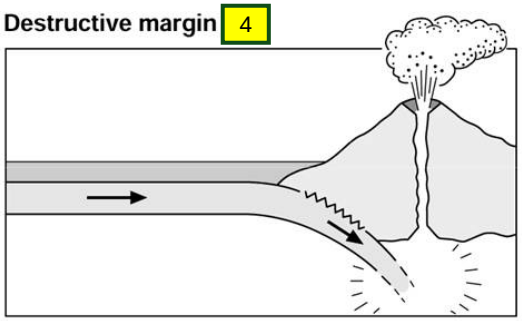
7	Diet Related Health Problems
Obesity	The most common over nutrition problem is **obesity** caused by too much energy being consumed, or high levels of inactivity. It is measured as a ratio of weight to height.
Dental Health	To maintain healthy teeth, you need to have a balanced diet. Bacteria feeds on the sucrose found in food and produces acid.
CHD & High blood pressure	**Coronary heart disease** (CHD) is related to the amount of fat in the diet and is caused by a narrowing of the blood vessels to the heart. This reduces the flow of blood to the heart. **High levels of cholesterol** in blood increase the risk of CHD.
Type 2 Diabetes	This is a metabolic disorder caused by poor absorption of glucose. Diet plays a strong role in preventing type 2 diabetes, a condition that causes the level of sugar (glucose) in the blood to become too high.
Anaemia	A condition caused by insufficient **iron** in the body and **vitamin C**, which is needed for absorbsion. Common symptoms include tiredness and lethargy.
Diverticulitis	A condition which affects the large intestine. It is linked to a **low fibre** diet and causes the lining of the bowel to become inflamed, infected and damaged.
Osteoporosis & rickets	**Calcium** is important for strong bones. Vitamin D is needed for calcium to be absorbed from food. Rickets is caused by a lack of calcium **and vitamin D** in children. Osteoporosis is a disease in which the bones start to lose minerals and their strength and break easily.

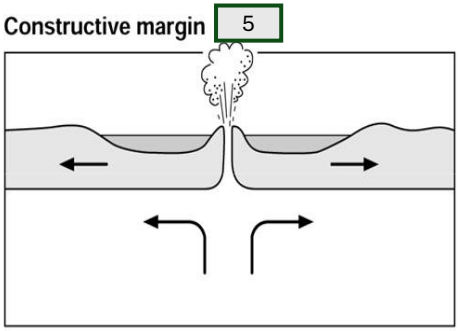
French		English
Normalement au petit déjeuner je mange des céréales avec du lait	**1**	*Normally for breakfast I eat cereal with milk*
et je bois du thé mais ma mère boit du café.	**2**	*And I drink tea but my Mum drinks coffee*
Cependant hier j'ai mangé un pain au chocolat, c'était délicieux	**3**	*However, yesterday I ate a pain au chocolat it was delicious*
Souvent au déjeuner nous mangeons du poisson avec des légumes,	**4**	*Often for lunch we eat fish with vegetables*
à mon avis c'est bon pour la santé.	**5**	*In my opinion it's healthy*
Comme dessert je prends du gâteau ou une tarte aux fraises, c'est trop bon !	**6**	*For dessert, I have cake or strawberry tart, it's so good!*
Hier soir, pour le dîner nous avons mangé des plats chinois,	**7**	*Yesterday evening for dinner we ate Chinese food*
ce que j'ai beaucoup aimé	**8**	*Which I really liked*
Néanmoins ce n'est pas bon pour la santé	**9**	*Nevertheless it's not healthy*

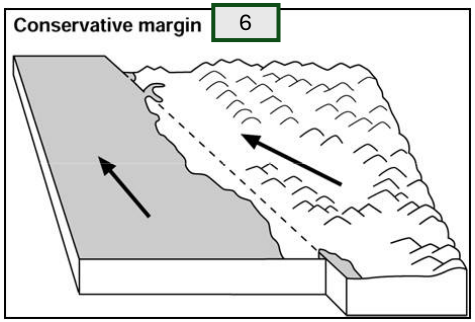
Geography – Topic 7 – Tectonic Hazards

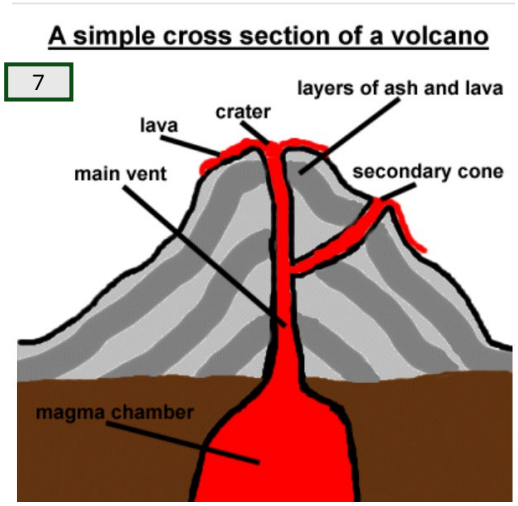


1. Structure of the Earth









2. Plate tectonic theory key words	
Plate	A large rigid section of the earth's surface
Plate Margin	The boundary of two plates
Tectonic	The structure of the earth and processes within.
Continental Drift	Gradual movement of continents across time
Convection	Movement in a fluid of rising less dense heat and sinking denser cooler liquid.
Subduction	Denser oceanic plate sinks below less dense continental plate at a destructive margin.

3. Plate Margin	Plate movement	Hazards
Destructive	Together	Volcanoes and earthquakes
Constructive	Apart	Volcanoes and earthquakes
Conservative	Past one another	Earthquakes
Collision	Together	Earthquakes

8. Volcanic Hazards	
Lava	Molten rock which erupts from the ground
Ash	Small pieces of shattered roc, minerals and gas thrown from the volcano
Volcanic Bomb	balls of molten rock that solidify as they fall
Lahar	Mud flows, made from pyroclastic materials, rocks and water.
Pyroclastic flow	Pyroclastic flows spill down the sides of the volcano. It is carrying heavier materials such as gas and rock.

9. Reasons for living near volcanoes
Fertile soil
Tourism
Precious minerals
Geothermal energy
Social factors

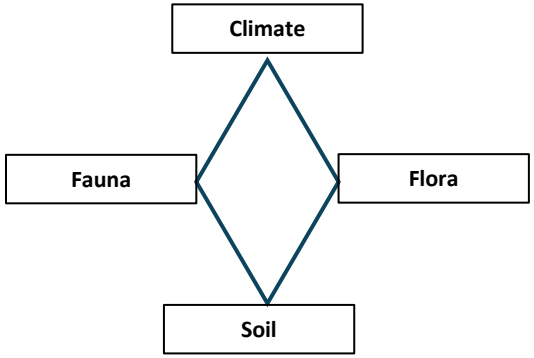
10. Managing Volcanic Eruptions	
Dams	Blocking the path with a concrete wall
Channels	Digging channels to direct lava flow away from settlements
Water	Cools the lava to turn rock from molten to solid to slow the flow
Education	Teach people how to behave during a hazard to protect lives and communities
Evacuation	Remove people quickly and safely from a hazard
Monitoring	Observing the movement of the earth's crust for evidence of tectonic activity

Geography – Topic 8 - Biomes

1. Biomes key words	
Ecosystem	A community of living organisms and their connections with climate and soil
Food chain	Links between organisms which feed on each other
Food web	A series of interconnected food chains
Fauna	The wildlife of a particular place
Biodiversity	The volume and variety of plants and animals within a biome
Deforestation	The removal of trees, often on a large scale
Ecotourism	Tourism designed to support local social and economic development whilst conserving the local environment.
Desertification	Fertile land turning into desert over time

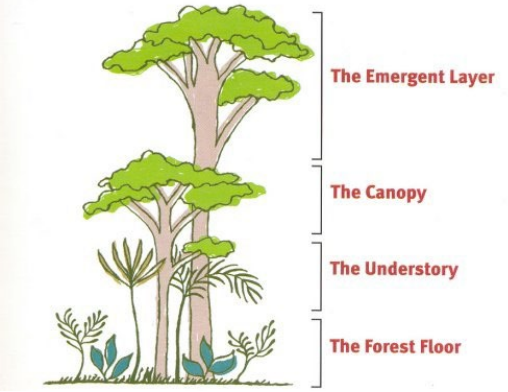
2. Biomes of the world	
Tundra	Low growing plants and shrubs in cold and windy conditions
Taiga	Cone-bearing evergreen trees able to cope with cold winters
Temperate deciduous forest	Trees which lose their leaves in autumn to retain moisture during winter
Mediterranean	Shrubs, herbs and olive trees able to cope with high temperatures and summer droughts
Hot Desert	Few plants and animals in areas of extreme high temperature and low rainfall
Tropical grassland	Area which copes with long, dry periods followed by thunderstorms.
Tropical Rainforest	Dense vegetation suited to a warm, wet climate

3. Key components of a biome



4. Features of a food chain	
Producer	Produce energy from their environment
Primary Consumer	Get energy from producers
Secondary consumer	Get their energy from primary consumers
Decomposer	Fungi and bacteria break down dead organic matter to release nutrients
Predator	An animal that hunts, kills and eats other animals for food

5. Layers of the rainforest



6. Plant and animal adaptations in tropical rainforests	
Drip Tip	Allow heavy rain to drop from leaves in the canopy to lower layers
Buttress roots	Wide roots which allow trees to anchor tall trees
Camouflage	Blending in with the environment to avoid predators
Strong grip	Allow animals to live in the canopy to avoid predators
Nocturnal	Avoid large predators in the day

7. Causes of deforestation
Logging
Mining
Plantations
Ranching
Settlement

8. Impacts of deforestation
Loss of habitats
Soil erosion
CO2 emissions

9. Features of a Hot Desert
Found in belts 30degrees north and south of the equator
Dominated by high pressure systems
Hot in the day, cooler at night. Low rainfall.
Plants have shallow roots, waxy leaves and spines or thin leaves
Animals produce little urine, can store water effectively. Many rodents are nocturnal.

10. Opportunities in Hot Deserts
Renewable energy production
Mining
Agriculture
Tourism

11. Effects of desertification
Soil erosion
Crop failure
Famine
Hunger

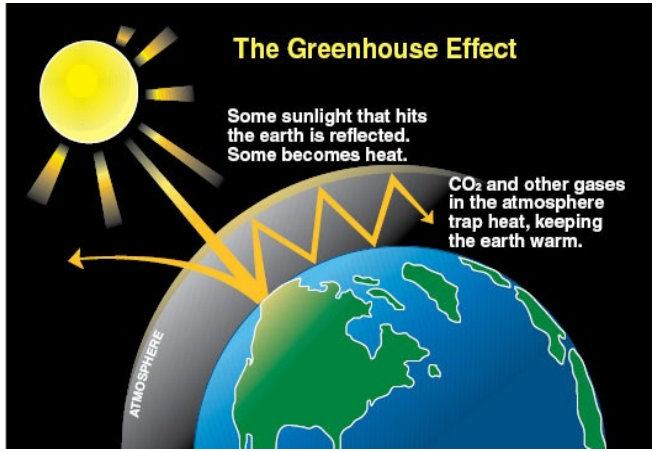
12. Coral reef key words	
Coral reef	Hard, rocky ridge formed on the seabed from external skeletons of many, tiny coral animals.
Coral	Very small animals called polyps with a hard exoskeleton
Fringing reef	Form in shallow water close and parallel to the shore
Barrier reef	Starts as a fringing reef but has been surrounded by deeper water as sea levels rise pushing the coral further from the shore.
Coral atoll	Circular coral reef formed on top of an underwater volcano
Coral bleaching	Warm water forces coral to expel algae which turns the coral white and puts the coral under stress.

13. Importance of coral reefs
Food and fishing
Medicine
Coastal protection
Tourism
Ecology

Geography – Topic 9 – Climate Change

1. Climate Change key words	
Climate Change	Changes in climate as a result of natural causes or human activity
Global warming	The recent increase in global temperatures
Greenhouse effect	Trapping of the sun's warmth in our lower atmosphere which warms the earth
Greenhouse gases	Gases such as carbon dioxide and methane, which absorb heat from Earth
Anthropogenic	Environmental change caused by humans
Mitigation	To reduce or eliminate the effects of something from happening
Adaptation	Do not aim to reduce or stop global warming – actions taken to adjust to natural events

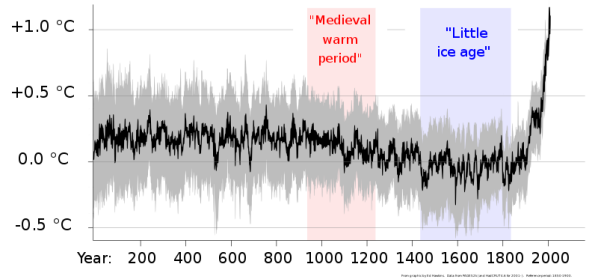
2. The greenhouse effect
The natural process of trapping the sun's warmth in our lower atmosphere which warms the earth



3. Evidence of Climate Change	
Short-term	**Long-term**
Glacier retreat	Ice cores
Rising sea levels	Pollen analysis

4. Causes of Climate Change	
Natural	**Anthropogenic**
Changes in the orbit and tilt of the Earth	Burning of fossil fuels
Volcanic activity	Deforestation
Solar output	Dumping waste into landfill
	Agriculture

Global Average Temperature Change



5. Natural Resources	
Natural Resource	Substances that are found in nature which can be used by humans for our benefit e.g. water, soil, coal, minerals, wood, animals
Energy Mix	The proportion of energy that comes from different sources e.g. coal, wind, solar
Fossil Fuels	Non-renewable energy sources e.g. coal, oil and natural gas
Renewable	Sources of energy that can be replaced when they are used
Non-renewable	Sources of energy that cannot be replaced once they are used
Resource security	Plentiful supply of a resource

6. Sources of Energy	
Renewable	**Non-renewable**
Solar	Oil
Wind	Coal
Hydro-electric power (HEP)	Gas
Biomass	Nuclear
Geothermal	

7. Factors in locating a wind farm
Droughts
Storms
Heat waves
Rising sea levels
Melting glaciers
Warming oceans

7. Global Consequences of Climate Change
Droughts
Storms
Heat waves
Rising sea levels
Melting glaciers
Warming oceans

8. Effects on small island developing states (SIDS)
Increase in storms
Relocation of populations
Loss of biodiversity
Coastal erosion

9. Climate Change impacts in the UK
Severe water shortages in the summer
Risk of flooding will double to 1.9 million people
Increase in sea levels by one metre and as much as two metres by coasts
Increase in heat related deaths in the summer

10. Managing global climate change	
Mitigation	Adaptation
Alternative energy	Agriculture
International agreements	Water supply
Planting trees	Reducing risk from sea level rise

History – The British Empire

1. The Empire	
Empire	a group of countries/areas/ peoples ruled by a single person, government, or country
Colony	an area of land ruled by another country
Import	send (goods or services) to another country for sale
Export	bringing goods or services into a country from abroad for sale
Trade Triangle	A system of profit from slavery involving 3 countries – Britain, Africa and The West Indies
Goods	Cotton, tobacco, sugar, indigo

2. Who made Britain rich?	
Slave Trader	Supplied slaves to do the work.
Plantation Owner	Grew commodities on their planation which were sold across the world.
Enslaved person	Supplied the labour to extract the commodities which were used and sold across the world.
Factory Owner	Manufactured goods to be sold around the world.
Factory Worker	Worked in the factory producing goods to be exported.
Ship Owner	Took British factory goods to Africa, and took slaves from Africa to West Indies, returning with commodities to be used in factories.

3. Britain in India case study	
Gaining control	By 1668 Britain had three trading posts. British trading stations in India were run by one company - the East India Company.
The Indian Mutiny	The Bengal Army had fought faithfully for Britain BUT it was on the British terms. In 1857 they rebelled. They shot British Officers and marched to Delhi.
The Amritsar Massacre	April 13, 1919, British troops fired on a large crowd of unarmed Indians in an open space in Amritsar killing several hundred people and wounding many hundreds more.

4. Individuals	
Elizabeth I	Elizabeth I sent ships around the world exploring new lands.
James I	establishing Jamestown in America in 1607, which is where tobacco grew, and they began transporting it to Britain.
Robert Clive	Clive is known for establishing the East India Company and was the first governor of Bengal
Mahatma Ghandi	Ghandi was an Indian lawyer and anti-colonial nationalist who employed non-violent resistance to lead the successful campaign for India's independence.

5. India gaining Independence	
Indian National Congress	The INC, was formed in 1885 and the idea of independence and freedom from colonial rule began to be openly discussed.
Mahatma Gandhi	Gandhi urged people to boycott British institutions and refuse to pay taxes. Ghandi and 60,000 others were arrested in 1930, and whilst in jail they went on hunger strike. During WW2 Ghandi launched the quit India movement.
Winston Churchill	Winston Churchill was committed to stopping Indian independence, but the USA had agreed to fight in WW2 if Britain allowed colonised countries to have a say in how they were governed after the war.
Indian Independence Act	In 1947, Clement Attlee agreed to the Indian Independence Act and the country was partitioned into Hindu majority India and Muslim majority Pakistan. Over 15 million people found themselves as a religious minority. Gandhi was assassinated in 1948.

8. Timeline of key dates	
1600	East India Company was founded by Elizabeth I
1607	Jamestown is established in America by English explorers.
1783	133 Africans are thrown overboard alive from the slave ship Zong so that the owners can claim compensation money from their insurance company.
1807	The Act to end the transatlantic slave trade as it became illegal to purchase slaves in Africa.
1833	The Abolition of Slavery Act ended enslavement.
1857	The Indian Mutiny
1919	The Amritsar Massacre
1947	India gain independence from Britain

History – Enslavement

1. Capture and middle passage	
Capture	Men, women and children kidnapped and sold.
Conditions on board	Chained in rows on their backs in the dark for months
Food	Weak watery porridge every meal brought in buckets below deck
Disease	Cholera and Typhus

2. Life on the plantations	
Auctions	People were sold to the highest bidder on a stage alongside goods
Work	6 days a week. At least 12 hours a day without pay. Picking cotton in gangs.
Living conditions	Small wooden huts, no amenities, straw bed.
Punishments	Whipping, hanging, amputations, chains.

3. Resistance	
Mutinies on ships (refusing orders)	10% of slave ships experienced some type of slave revolt. Usually, they would be defeated by the crew, often with great bloodshed. However, some mutinies were successful.
Cultural resistance	Slaves would often keep alive aspects of their African heritage, resisting attempts to destroy their culture. Music united slave communities. Drums were used to send messages to slaved in other villages. Songs would contain secret messages about freedom.
Maroons	Maroons were a group of former slaves who had escaped enslavement. They lived in the Blue Mountains of Jamaica, where the established their own towns and way of life. They would often assist other slave in escaping.
Haitian Revolution 1791-1804	Toussaint Louverture was a former slave who was granted freedom. He was very organised and a skillful military leader. He inspired slaved with ideas of liberty and freedom. He led the Haitian revolution in the French colony of Saint-Domingue.
Slave revolts after 1807	After the Abolition of Slavery Act in 1807, slaves were made to work harder as there were fewer slaves in the British colonies. This led to an increased in slave revolts. In Jamaica 1831-32 60,000 slaves seized areas of land.

4. Abolition of Slavery	
Why?	1. Economic reasons 2. White kindness 3. Black activism 4. Religious reasons
How?	Abolitionism movement campaigned and pushed the British government to end slavery in the British Empire in 1833.
Opposition	Plantation owners and investors demanded financial compensation from the government
Key individuals and groups	The Quakers William Wilberforce Olaudah Equiano

1. Causes of WW1	
The Alliance system	The Triple Alliance and the Triple Entente
Triple Alliance	Germany, Italy and Austria-Hungary
Triple Entente	England, France and Russia
Arms Race	Competition to build armies and Dreadnoughts
Schlieffen plan	German plan for war
Assassination	Murder of Archduke Franz Ferdinand in Sarajevo

2. Living and fighting in the trenches	
Trench warfare	System of open top interlinking tunnels used by both sides
Layout	Zig zag lines, fire steps, duck boards, sandbags, dugouts, bell
Food	Bully beef, tinned food, a tot of rum before going over the top.
Rats	Grew fat on the bodies of fallen soldier's dead bodies
Lice	Clothing and skin was infested with lice and fleas all the time.
Weapons	Tanks, machine guns, mustard gas, rifles and bayonets.

3. The Battle of the Somme	
The Somme	River in France
Purpose	Reduce pressure on French forces
Length	5 months
Losses	300,000 lives

4. Causes of WW2	
Appeasement	Negotiating with an aggressive power with the intention of avoiding conflict.
Hitler and the Nazi's	Hitler built up the Germany army, he marched soldiers into the Rhineland, he invaded Austria, Czechoslovakia and Poland.
League of Nations	They had no army, no power, met a few times a year, and the USA (most powerful country) were not included.
Treaty of Versailles	The treaty was very harsh and hated by Germans, particularly the Nazi party.

5. Dunkirk	
Dunkirk	Port in France where British troops were evacuated from.
Causes	Nazi Blitzkrieg tactics
Events	British navy and little ships evacuated soldiers off the beaches
Short term consequence	Presented as a victory to the general public
Long term consequence	Narrowly avoided destruction of entire army. Loss of vehicles, horses and ammunition

History – WW1 and WW2

1. Blitz and evacuation	
Blitz	Nighttime bombing of key British cities
Blitzkrieg	The German word for 'Lightning War'
Air raid warning siren	Alarm would go off to warn of incoming Nazi planes
Air raid shelter	Underground areas of safety to hide in during the bombings
Evacuation	Organised removal of children from cities to the countryside.

2. Imperial Soldiers in WW1 and WW2	
WW1	Around 1.4 million Indians volunteers as soldiers and labouers. Around 15,000 West Indians joined, with 10,000 from Jamaica. British colonies in Africa provided 12,000 soldiers, but also food and materials.
WW2	Most empire countries gave money to Britain to help fight during WW2. Nations also contributed with soldiers, sailors and aircrew. India, served as a training base and provided vast quantities of food to Britain. African countries supplied vital raw materials such as rubber, tin, palm oil, steel and cotton. Canada built thousands of tanks, ships and aircraft. West Indian men and women volunteered to fill jobs in Britain.

3. Atomic Bomb	
Causes	Japan attacked Pearl Harbour (US naval base) in 1941
Events	2 bombs dropped – Fat Man and Little Boy.
Short term consequences	Up to 126,000 immediate civilian deaths at Hiroshima and up to 80,000 at Nagasaki. Radiation burns, extreme heat which incinerated people, and later nuclear fallout.
Long term consequences	Increase in deaths due to cancer. Genetic deformities in newborn babies.

4. Timeline of key dates	
1914	The start of World War One
1916	The Battle of the Somme
1918	The Armistice 11am 11th November (end WW2)
1919	Treaty of Versailles
1st September 1939	Germany invaded Poland. Start of WW2.
1st September 1940	The evacuation of children to the countryside began
7th September 1940	The Blitz began
May/ June 1940	Dunkirk
December 1941	America entered the war after the Japanese attack on Pearl Harbour
6th August 1945	Atomic Bomb dropped on Hiroshima
9th August 1945	Atomic Bomb dropped on Nagasaki
2nd September 1945	End of WW2

1

Keyword	Description
Algorithm	A sequence of instructions that can be used to complete a task
Computational Thinking	Understanding a complex problem and developing possible solutions
Programming	Writing computer code to solve a particular problem
Programming Language	A defined structure of words that can be used to create a program or application

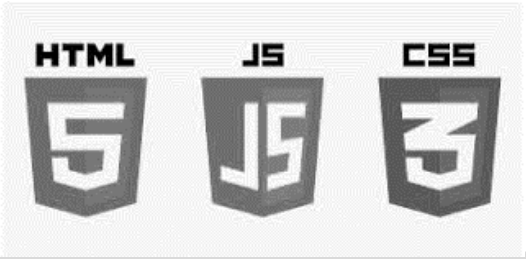
2

Variable Rules

- Suitable name (helps you to understand what they are for)
- Can't use spaces in the name
- Can't start with a number
- Use quotes for text
- No quotes for numbers

3

Concept	Explanation
Variable	A named memory location that can store information for later use. This can be changed whilst the program is running
Constant	A named memory location that can store information for later use. This cannot be changed whilst the program is running
Input	Information provided by the user
Output	Information displayed to the user, usually as audio, text or video



4

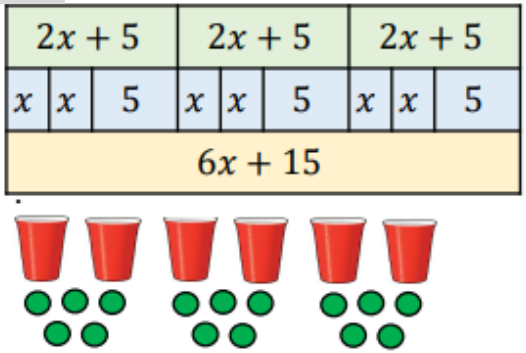
Python Keywords	Explanation
print	Output a message to the display
input	Take input from the user
if	Branch code depending on if a condition is met
while	Loop code depending on if a condition is met
int	Convert to an integer

Brackets, Equations and Inequalities

Sparx Codes M237 M792 M960 M100 M509 M554 M384 M118

1. Key Word	Definition
Expand	Multiply out the bracket
Product	The result of a multiplication
Coeffient	The value in front of. E.g. the coefficient of x in the term $3x$ is 3
Factor	a number or algebraic expression that divides another number or expression evenly with no remainder
Factorise	To put an expression into brackets
Quadratic	An expression or equation where the highest power of x is 2
Solve	To find the solutions to an Equation
Equation	A mathematical statement between two expressions that have equal values. E.g. $3x + 5 = 15$
Inequality	A statement showing two expressions are not equal

2



3

$2(x + 4) = 14$

Expand brackets

$2x + 8 = 14$

$-8 \quad -8$

$2x = 6$

$\div 2 \quad \div 2$

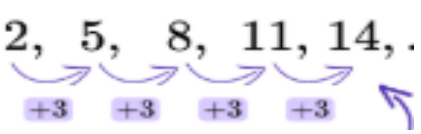
$x = 3$

Sequences

Sparx Codes M381 M241 M991 M981

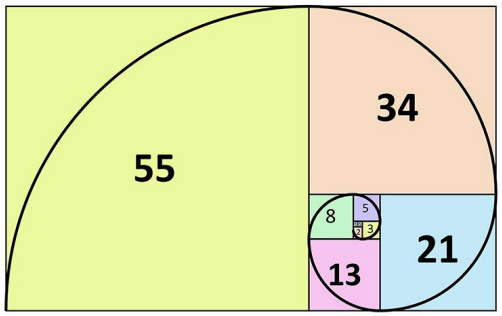
1. Key Word	Definition
Sequence	An arrangement of objects or set of numbers in a particular order followed by some rule
Term	An individual number in a sequence
Linear	The difference from one term to the next in a sequence is constant (adding or subtracting the same value)
Fibonacci	The series of numbers where each number is the sum of the two preceding numbers.
Term-to-Term	A sequence in which the next term is obtained from the previous term
Position-to-Term (nth term)	Uses algebra to work out what number is in a sequence given its known position.

2



A linear sequence increasing by a value of 3 term to term

3

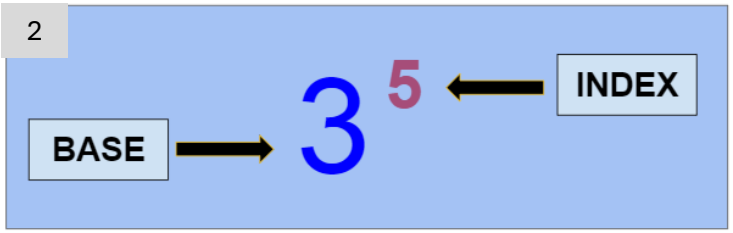


Indices

Sparx Codes M608 M150 M905 M608

1. Key Word	Definition
Index (Power)	Indices, or an index, are another word for powers and are the small floating number that appears after a number or letter
Simplifty	To make shorter a numerical or algebraic expression. E.g. instead of writing 5×5×5×5 we can simply write it as 5^4
Base	23 = 2 × 2 × 2. 2 is the base and 3 is the index.

2



3

$y^{13} \times y^4 =$ y^{17}

$6y^{13} \times 5y^4 =$ $30y^{17}$

$y^{13} \div y^4 =$ y^9

$40y^{13} \div 8y^4 =$ $5y^9$

$(y^{13})^4 =$ y^{52}

$(3y^{13})^4 =$ $81y^{52}$

$7y^4 \div y^2 =$ $7y^2$

$7y^4 \times y^2 =$ $7y^6$

$(7y^4)^2 =$ $49y^8$

Fractions and Percentages

Sparx Codes M533 M528 M235

1. Key Word	Definition
Fraction	A numerical quantity that is not a whole number
Percentage	A fraction of an amount out of 100
Multiplier	A number used to calculate a percentage change, representing 1 plus or minus the percentage as a decimal
Increase	To become a value greater than an original amount
Decrease	To become a value smaller than an original amount
Profit	A positive balance when expenses are deducted from revenue. (Money in minus money out)
Loss	A negative balance when expenses are deducted from revenue.

2

Increase

Decrease

% Change	Multiplier
+73.45%	1.7345
+46.6%	1.466
+53%	1.53
+45%	1.45
+10%	1.1
+/- 0%	1
-20%	0.8
-35%	0.65
-67%	0.33
-81.5%	0.185
-97.75%	0.0225

Standard Index Form

Sparx Codes M719 M678

1. Key Word	Definition
Standard Form	A way of writing down very large or very small numbers easily.
Reciprocal	To get the reciprocal of a number, we divide 1 by the number.
Fractional Power	The index of a number is not whole
Negative Power	All negative exponents can be expressed as their positive reciprocal
Square Root	The square root of 25 is 5 because 5 x 5 is 25.
Cube Root	The cube root of 8 is 2 because 2 x 2 x 2 is 8

2

List of Indice Laws

- $x^0 = 1$
- $x^{-n} = \frac{1}{x^n}$
- $x^n \cdot x^m = x^{n+m}$
- $x^n \div x^m = x^{n-m}$
- $(x^n)^m = x^{n \cdot m}$
- $x^{\frac{n}{m}} = \sqrt[m]{x^n}$

3

Ordinary Number	Standard Form
29	2.9×10^1
350	3.50×10^2
4716	4.716×10^3
600000000	6×10^8
0.3	3×10^{-1}
0.09	9×10^{-2}
0.0071	7.1×10^{-3}
0.000502	5.02×10^{-4}

Music – Programme Music

HISTORICAL CONTEXT

1. Programme music is **descriptive**, suggesting visual images or '**telling a story**'. The descriptive idea or **story-line is known as the programme**.

2. Instrumental music that is free of a programme and exists purely for its own sake is known as absolute music.

3. Although descriptive music had always existed, **orchestral programme music became very popular during the Romantic period** (roughly the 19th century) when music developed close links with **literature and painting.**

4. Musical devices used to express the story or inspiration include:

- **Musical motifs** - short melodic or rhythmic ideas used to represent characters or images
- **Transformation** of themes where a basic theme undergoes changes to mirror a situation
- **Orchestral colour** - use of instruments to represent characters or images
- **Imitation** of sounds e.g. birdsong or thunder
- **Use of musical elements** – dynamics, harmony, tempo, key

DYNAMICS (= Volume)

Term	Symbol:	Effect:
pianissimo	*pp*	very soft
piano	*p*	soft
mezzo piano	*mp*	moderately soft
mezzo forte	*mf*	slightly loud
forte	*f*	loud
fortissimo	*ff*	very loud
fortepiano	*fp*	loud then soft
sforzando	*sfz*	sudden accent
crescendo	<	gradually louder
diminuendo	>	gradually softer

Instruments and common associations (Musical Cliché's)

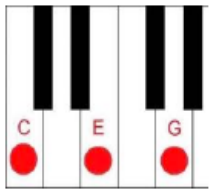
Woodwind	Natural sounds such as bird song, animals, rivers
Brass	Soldiers, war, royalty, ceremonial occasions
Tuba	Large and slow moving things
Harp	Tenderness, love
Glockenspiel	Magic, fairy tales
Timpani/Drums	War, fighting, thunder
Strings	Often used to portray emotions: passion, grief etc.

TEMPO (= Speed)

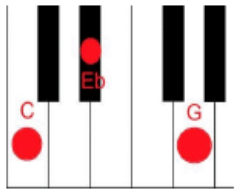
Largo	Very Slow
Adagio	Slow
Andante	Walking pace
Moderato	Moderate
Allegro	Fast
Vivace	Lively
Presto	Very fast
Ritardando	Getting slower
Accelerando	Getting faster

Key Composers

- Hector Berlioz – Symphonie Fantastique (1830)
- Modest Mussorgsky – Pictures at an Exhibition (1874)
- Camille Saint-Saëns – The Carnival of the Animals (1886)
- Paul Dukas – The Sorcerer's Apprentice (1897)



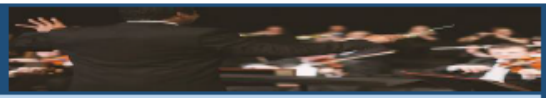
MAJOR CHORD
=
Root Note
+ 4 Semitones
+ 3 semitones



MINOR CHORD
=
Root Note
+ 3 Semitones
+ 4 semitones

Sonority City

Exploring Instruments of the Orchestra



A. Key Words, Terms and Facts about the Orchestra

ORCHESTRA – A large **ENSEMBLE** (group of musicians) of performers on various musical instruments who play music together. No set numbers of performers although a **SYMPHONY ORCHESTRA** (a large orchestra) can have between **80-100+** performers. Famous orchestras include: **THE LONDON SYMPHONY ORCHESTRA, THE BBC SYMPHONY ORCHESTRA** and the **HALLÉ ORCHESTRA** (Manchester).

CONDUCTOR – Leads the orchestra with a **BATON** (white 'stick') and hand signals. Stands at the front so they can be seen my all performers. Sets the **TEMPO** and **BEATS TIME**. Brings different instruments 'in and out' when it is their turn to play. Keeps the performers together. Takes charge in rehearsals. In ultimate control of the performance of the music, adjusting **DYNAMICS, TEMPO,** and mood.

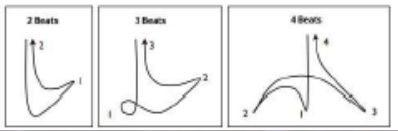
FAMILIES/SECTIONS – Instruments of the orchestra can be divided into 4 families or sections: **STRINGS**, **WOODWIND**, **BRASS** and **PERCUSSION.**

TUNING UP – Before the orchestra rehearses or plays, all instruments need to be **IN TUNE** with each other. The **OBOE** always sounds the note '**A**' which all other instruments **TUNE** to.

SONORITY (also called **TIMBRE**) – Describes the **UNIQUE SOUND OR TONE QUALITY** of different instruments and the way we can identify orchestral instruments as being distinct from each other –Sonority can be described by many different words including – ***velvety, screechy, throaty, rattling, mellow, chirpy, brassy, sharp, heavy, buzzing, crisp, metallic, wooden etc.***

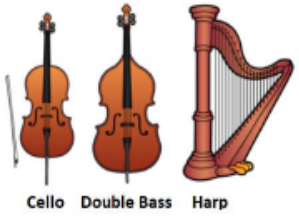
PITCH - The **HIGHNESS** or **LOWNESS** of a sound, a musical instrument or musical note (***high/low, getting higher/lower, step/leap***).

B. The Layout of the Orchestra and Famous Conductors



C. Strings Section/Family

Largest section of the orchestra who sit at the front, directly in front of the conductor. Usually played with a **BOW (ARCO)**, (not the HARP) but can be **PLUCKED (PIZZICATO)**. VIOLINS split into two groups: **1st VIOLINS** (often have the main **MELODY** of the piece of music) and **2nd VIOLINS**.



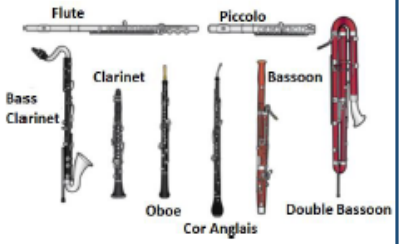
D. Woodwind Section/Family

Originally (and some still are) made from wood (some now metal and plastic). All are **BLOWN**.

FLUTES: Flute and Piccolo – air blown over hole.

SINGLE REED (small piece of bamboo in the mouthpiece): Clarinet, Bass Clarinet & Saxophone (not traditionally in the orchestra, but some modern composers have used it)

DOUBLE REED (two reeds in the mouthpiece): Oboe, Cor Anglais, Bassoon, Double Bassoon.



E. Brass Section/Family

Four types of brass instruments in an orchestra, all made from metal – usually brass and **BLOWN** by the player 'buzzing their lips' into a **MOUTHPIECE** *(shown right)*.

The Trumpet, French Horn and Tuba all have three **VALVES** which, along with altering the players mouth positions, adjust the length of the tubing allowing for different notes to be played. The Trombone has a **SLIDE** which adjusts the length of the tubing. Brass instruments (along with Percussion) have often been used to play **FANFARES**: a short, lively, loud piece of music usually warlike or victorious in character used to mark the arrival of someone important, give a signal *e.g., in battles*, of the opening of something *e.g., a sporting event or ceremony*.

Fanfares often use notes of the **HARMONIC SERIES** – a limited range of notes played by **BUGLES** (smaller trumpets with no valves) and valveless trumpets.

F. Percussion Section/Family

Always located at the very back of the orchestra (due to their very loud sounds!). Large number of instruments which produce their sound then ***hit, struck, scraped, or shaken.***

TUNED PERCUSSION (able to play different pitches/notes)

Piano Xylophone Glockenspiel Timpani Celesta Tubular Bells

UNTUNED PERCUSSION (only able to produce 'sounds').

Bass Drum Snare Drum Cymbals Woodblock Guiro

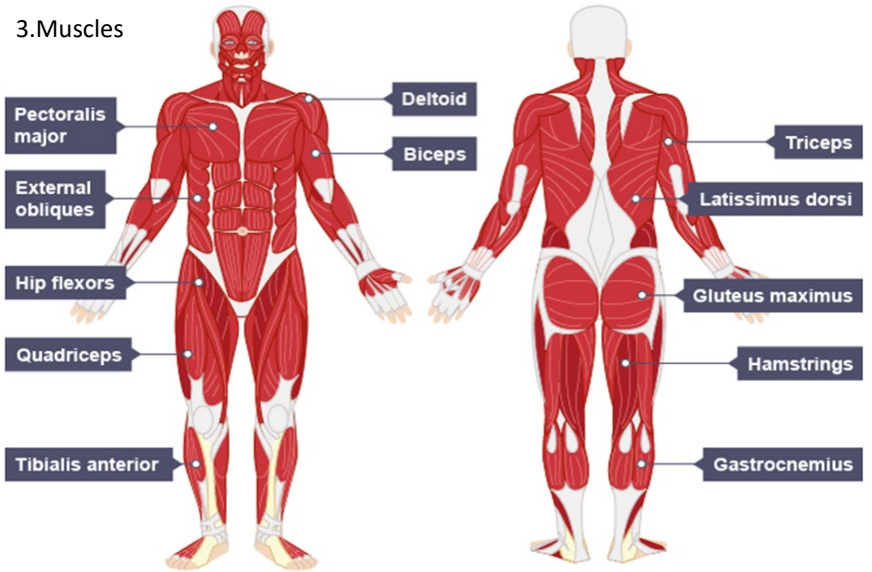
Triangle Gong Tambourine Cabasa Maracas

Muscular System

1, Antagonistic Muscle Pairs	
One muscle relaxes for the other to contact. Examples:	
Muscle 1	**Muscle 2**
Biceps	Triceps
Hamstrings	Quadriceps
Gluteus maximus	Hip flexors
Gastrocnemius	Tibialis anterior

2. Muscle Fibres			
	Type I	Type IIa	Type IIx
Speed of contraction	Slow	Fast	Very fast
Force produced	Low	Medium	High
Resistance to fatigue	High	Medium	Low

3.Muscles

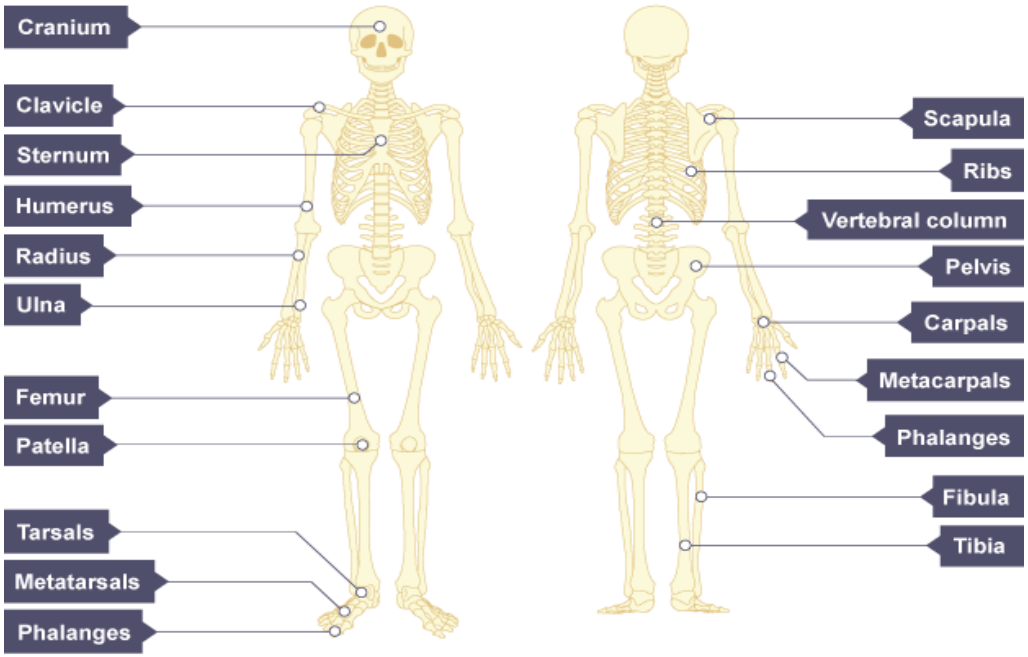


Training Methods

1. Interval	Periods of exercise followed by periods of rest.
	For example, sprint for 30m and then rest for ten seconds, before doing it again.
	This is good for games players who require short bursts of sprinting.
2. Weight	This involves resistance training using weights aiming at improving strength and endurance of muscles.
	You do a series of repetitions which makes up a set.
	This is good for sprinters who want to build muscle.
3. Continuous	This involves aerobic activity for long periods of time without stopping e.g. cycling, running, swimming.
	To be classed as continuous training, the period of exercise must be 12 minutes without stopping.
	This is good for long distance runners if the activity is running.
4. Plyometric	This is high intensity training where the athlete performs a series of explosive jump movements, lengthening and then shortening the leg muscles.
	This is good for basketball and volleyball players who will benefit from jumping high.
5. Circuit	This involves performing a series of activities in a circuit to develop either aerobic or anaerobic fitness.
	This is good for all sports, depending on what is in the circuit.
6. Fartlek	This is also known as speed play.
	It involves working at different speeds across different terrains and distances. E.g. walk, jog, sprint
	This is good for games players where different speeds are required.

Skeletal System

1. Identification of Bones



2. Classification of Bones

Long	A bone that is longer than it is wide. E.g. femur
Short	Weight bearing bones which are roughly the same size in length, width and thickness. E.g. carpals
Flat	Protect the vital organs in the body. E.g. ribs
Irregular	Odd shaped bones which protect. E.g. vertebral column

The Olympics

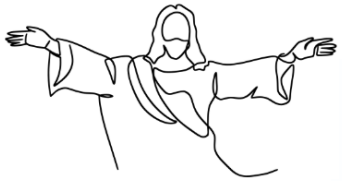
1.	The Olympics was an ancient tradition and originated in Greece.
2.	They were created by a French man called Baron Pierre de Coubertin.
3.	The first modern-day Olympics were held in 1896 and was hosted in Greece.
4.	Each Games' are held every four years and this allows a country to build ne facilities and show off their country to the world.
5.	The 5 Olympic rings represent the major regions in the world *(Europe, Africa, The Americas, Asia and Oceana).*
6.	Every national flag of the world has at least one of the 5 colours of the Olympic rings within it: *blue, black, red, yellow and green.*
7.	1936—The Games took place in Germany when Hitler was the leader of the country
8.	1984—The Los Angeles Olympics which a number of countries boycotted as American boycotted the 1980 Summer Olympics in Moscow
9.	2012—The London Olympics and the first event where Paralympic events sold out all of their tickets
10.	The Olympics are split into two: Summer Games and Winter Games
11.	The Paralympics runs after the Olympic Games and this is for athletes who have experienced a disability
12.	The word 'Para' means equal to as the games are equal to the Olympic Games
13.	During Paralympic events, athletes are graded depending on their disability so that they compete against other athletes with similar disabilities.

RE – Galilee to Jerusalem

	Key Quotes
1	'Through this holy anointing may the Lord in his love and mercy help you with the grace of the Holy Spirit. May the Lord who frees you from sin save you and raise you up.'
2	"But you may know that the Son of Man has authority on earth to forgive sins – he said to the paralytic – I say to you, rise, pick up your bed, and go home" Mark 2:11

	Key Words	
1	Kingdom	The spiritual realm over which God reigns as king and the fulfilment of God's will on earth by humankind, living by the laws and commandments of God.
2	Moral sense of scripture	The understanding that a Christian takes from a scriptural text about how to live a good and holy life.
3	Miracles	Astonishing events, that can only be attributed to divine power and reveal something about who God is; the miracles of Jesus were messianic signs of the presence of God's Kingdom on earth.
4	Parables	Simple stories used to illustrate a spiritual or moral lessons
5	Rite	A sacred act or ceremony
6	Anointing of the Sick	The Sacrament of Healing that provides a Catholic with spiritual strength when they are ill or dying.
7	Preferential Option for the Poor	The idea that God shows particular love for people who are vulnerable or living in poverty.
8	Oil of the sick	This is a special oil that has been blessed by the bishop on Holy Thursday of the previous year.

	Key Facts
1	Lourdes is a place of pilgrimage in the south of France. People visit there because Mary appeared to St Bernadette. It is said to be a place of healing.
2	Jesus always reached out to the outcasts of society. For example Whilst most people avoid people who suffered with leprosy, Jesus went out of his way to be near them and heal them.
3	Jesus used parables to teach people important messages. Jesus used the Parable of the Sheep and the Goats to explain what happens when we die.
4	Catholics receive the Sacrament of the Anointing of the Sick when they are facing illness or death. In this sacrament a Catholic will be anointed with oil, be forgiven for their sins and receive the Eucharist.
5	Jesus performed a miracle of nature when he calmed the storm. Jesus was with his disciples, fishing, when a storm started rocking the boat. Jesus used his voice to calm the raging storm.
6	Mother Elvira Petrozzi was an Italian nun and the founder of a Christian community who helped those struggling with addiction and social marginalisation.
7	The Catholic Church teaches that the Kingdom of God is something we can live in now and something that we will experience fully in the future. It means living as God wants us to and being united with Him forever.



RE – Desert to Garden

	Key Quotes
1	'If God the Father almighty, the Creator of the ordered and good world, cares for all his creatures, why does evil exist? To this question, as pressing as it is unavoidable and as painful as it is mysterious, no quick answer will suffice.' *Catechism of the Catholic Church 309*
2	'…physical suffering is present when 'the body is hurting' in some way, whereas moral suffering is 'pain of the soul'. *Salvifici Doloris 5*

	Key Words	
1	Suffering Servant	A servant of God, prophesised by Isaiah, who is sent to save humankind and will face hardship and pain on behalf of them.
2	Passion	The suffering Jesus faced during his trial and death on the cross.
3	Suffering	Negative experiences such as pain or loss that harm human beings and come from the presence of evil or the absence of good in the world.
4	Lent	A season in the liturgical year beginning on Ash Wednesday and ending on Holy Saturday; it is a time of repentance, in the 40-day period leading to Easter.
5	Fasting, almsgiving and prayer	Fasting is going without something, almsgiving means giving to others & prayer is the way in which humans communicate with God. All are ways that Christians prepare for Easter.
6	Triduum	The three days beginning on the evening of Holy Thursday when the Last Supper was celebrated, and including Jesus' suffering and crucifixion on Good Friday, and resurrection on Easter Sunday.
7	Sacrament of Penance (Reconciliation)	The Sacrament of Healing in which a person confesses and is forgiven of their sins, receiving spiritual healing; also known as Sacrament of Penance or Confession.
8	Problem of Evil	Asking why there can be evil in the world if God is good.

	Key Facts
1	Some people argue that the fact that there is evil and suffering in the world means that there cannot be an omnibenevolent (all loving) God.
2	There are two types of evil. Physical evil is evil caused by uncontrollable natural events such as earthquakes or floods. Moral evil is the actions of human being who choose to inflict suffering through their behaviour. For example stealing or murder.
3	In the book of Isaiah a prediction is made that there will be a servant who's death will save all of humankind. Christians believe that Jesus fulfils this prophecy when he dies on the cross.
4	Jesus's suffering on the cross teaches Christians that good things come out of pain. Christians learn that they should trust in God, offer their suffering to Him and recognise that their suffering can be a mission from God.
5	One of the ways that Christians can pray during Lent is by taking part in the Station of the Cross. Catholics will 'follow' Jesus on His journey to his death around their local church.
6	The sacrament of Reconciliation can be split into four parts: Contrition (recognising wrongdoing), Confession (admitting the sin and saying it out loud), Penance (doing something to make amends for the sin) and Absolution (being forgiven for the sin).
7	Catholic receive the sacrament of Reconciliation to repair their broken relationship with God and with the people they may have hurt around them.

Keyword	Definition
Aerobic respiration	The process by which organisms use oxygen to transfer the energy in a fuel into chemical energy
Algae	A single celled plant
Anaerobic respiration	The process by which organisms transfer the energy in a fuel into chemical energy, but in the absence of oxygen
Chlorophyll	The green pigment found in plants which absorbs light during photosynthesis
Mineral deficiency	A condition in organisms where the concentration of a mineral is lower than it should be and so impairs the function of the organism
Fermentation	A type of anaerobic respiration in which glucose is converted to ethanol, carbon dioxide and energy
Fertiliser	Chemicals containing minerals that plants need to be healthy
Haemoglobin	The substance in blood that carries oxygen around the body
Lactic acid	An acid produced by animals during anaerobic respiration
Magnesium	An element essential for healthy plant growth. It is used to make chlorophyll
Nitrates	Minerals containing nitrogen, used by plants to make protein
Oxygen debt	Extra oxygen required after anaerobic respiration to break down lactic acid
Phosphates	Minerals containing phosphorus, used by plants to form healthy roots
Photosynthesis	The process plants and algae use light energy to make glucose.
Plasma	A liquid that transports blood cells and other materials around the body
Potassium	A mineral needed by plants for healthy leaves and flowers
Producer	The plant in the food chain that uses light energy and photosynthesis to produce glucose
Red blood cells	Blood cells that transport oxygen around the body

1. Respiration

- Respiration is the process in which energy is released from the molecules of food which you eat
- Respiration happens in the mitochondria of the cell
- **Aerobic respiration** involves oxygen, it is more efficient as all of the food is broken down to release energy

glucose + oxygen ➞ carbon dioxide + water

- The glucose is transported to the cells in the blood **plasma**
- The oxygen is transported to the cells in **red blood cells**, by binding with **haemoglobin**
- Carbon dioxide is a waste product and is transported from the cells to the lungs to be exhaled
- **Anaerobic respiration** is a type of respiration which does not use oxygen, it is used when the body cannot supply the cells with enough oxygen for aerobic respiration
- Anaerobic respiration releases less energy than aerobic respiration

glucose ➞ lactic acid + carbon dioxide

- The **lactic acid** produced through anaerobic respiration can cause muscle cramps
- Lactic acid will build up if there is not enough oxygen present in the blood supply to break it down. This is known as an **oxygen debt**

2. Fermentation

- **Fermentation** is a type of anaerobic respiration which occurs in yeast
- Instead of producing lactic acid, yeast produces ethanol, which is a type of alcohol

glucose ➞ ethanol + carbon dioxide

- This process can be used to form alcohol to drink or to allow bread and cakes to rise

5. Leaves

- To best adapt for photosynthesis leaves have a number of adaptations
- They are thin to allow the most light through
- There is a lot of **chlorophyll** to absorb light
- They have a large surface area to absorb as much light as possible

3. Plant minerals

Plants need minerals for healthy growth, if they do not have enough of these minerals this is known as a **mineral deficiency**

Mineral	What is it used for?	What happens if there is not enough?
nitrates (contain nitrogen)	healthy growth	poor growth and older leaves yellow
phosphates (contain phosphorus)	healthy roots	poor growth, younger leaves look purple
potassium	healthy leaves and flowers	yellow leaves with deadpatches
magnesium	making chlorophyll	leaves will turn yellow

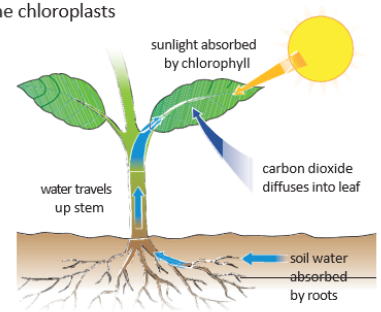
Fertilisers can be used to stop plants from suffering with mineral deficiencies

4. Photosynthesis

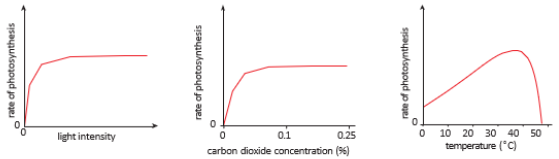
- **Photosynthesis** is the process which occurs in the chloroplasts to produce glucose using sunlight

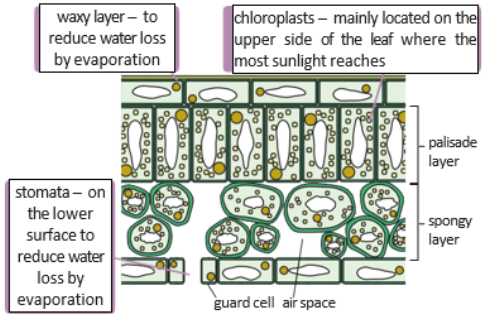
glucose + carbon dioxide ➞ glucose + oxygen

- Any organism that can use photosynthesis to produce its own food is known as a **producer**, these are not just limited to plants but can include other organisms such as **algae**



- The rate of photosynthesis can be affected by:
  - Light intensity – the higher the light intensity the higher the rate of photosynthesis up to a point
  - Carbon dioxide concentration – the higher the carbon dioxide concentration the higher the rate of photosynthesis up to a point
  - Temperature – the optimum temperature is the temperature at which photosynthesis occurs at the highest rate, before and after this the rate will be less

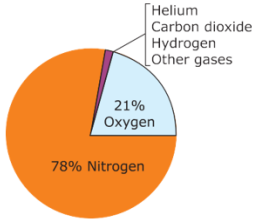


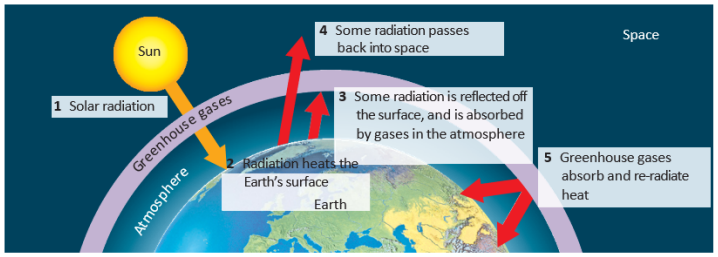


Keyword	Definition
Atmosphere	The mixture of gases found in the air around us.
Carbon cycle	The process by which carbon is naturally transferred from one store to another
Climate change	Long term changes to weather patterns
Combustion	The burning of a fuel in oxygen
Electrolysis	The extraction of metal from a compound using electricity
Fossil fuel	A chemical energy store formed from the remains of organisms
Global warming	The gradual increase in the temperature of the Earth
Greenhouse gas	Gases in the atmosphere that trap radiation.eg methane and carbon dioxide
Mineral	A naturally occurring mineral or compound
Natural resources	Resources that are not man-made and can be found in the environment
Ore	A naturally occurring rock which has a mineral content worth extracting
Photosynthesis	The process of plants transferring light energy to chemical energy
Recycling	The collecting and processing of materials so they can be used again
Respiration	The process by which organisms transfer chemical energy to useable energy stores

1. The atmosphere

- The air around us all of the time is known as the **atmosphere**, it is made up of a mixture of gases
- When the Sun heats the Earth's surface, some of the radiation is absorbed and some is reflected back into space
- Some of the gases in the atmosphere absorb radiation that is about to be reflected into space, this keeps the Earth at a warmer temperature than it would be without the atmosphere, this is needed as otherwise it would be too cold for life
- The gases in the atmosphere which absorb and trap this radiation are known as **greenhouse gases**, the most commonly known greenhouse gases are carbon dioxide and methane



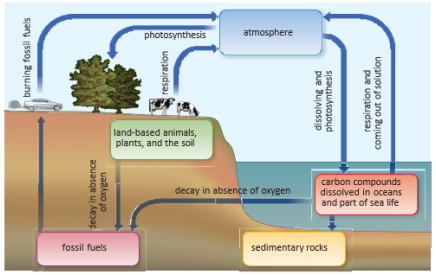


2. Global Warming

- **Global warming** is the gradual increase in temperature of the Earth
- This is closely linked to the rise in carbon dioxide levels in the atmosphere

3. The carbon cycle

- The **carbon cycle** is the processes by which carbon is naturally transferred to different stores through a range of natural processes
- Carbon is released into the atmosphere through **combustion** of **fossil fuels**, and animal **respiration**
- It is then reabsorbed by plants during **photosynthesis**



4. Climate change

- Long term changes to weather patterns are known as **climate change**
- This can cause the ice caps to melt, leading to sea levels rising and flooding of low level land
- Graphs alone cannot confirm that humans are the cause, but the majority of scientists now believe that human activity is a very likely cause
- We can help to prevent climate change by:
  - Using renewable energy resources
  - Using cars less
  - Buying and wasting less resources

5. Extracting metals

- Metals are a **natural resource**, with most being found joined with other elements in compounds
- Naturally occurring metals and their compounds are known as **minerals**
- An **ore** is a naturally occurring rock which contains enough of a mineral to be worth extracting
- An example of an ore is Bauxite, which contains aluminium hydroxide

- When metals are extracted they first have to be separated from other minerals in the ore, then they need to undergo a chemical reaction to separate them from the other element that they are joined to in a compound
- If a metal is below carbon in the reactivity series, it can be extracted by reacting it with carbon in a displacement reaction
- As carbon is more reactive it will take the place of the metal in the compound, leaving the metal on its own:

  carbon + metal oxide → metal + carbon dioxide carbon + copper oxide → copper + carbon dioxide
- If the metal is above carbon in the reactivity series, **electrolysis** can be used, this involves separating the metal by using electricity

Reactivity series

magnesium
aluminium
carbon
zinc
iron
lead
copper

6. Recycling

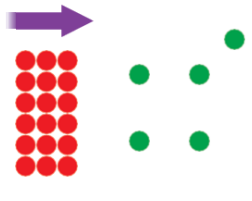
- **Recycling** is the collecting and processing of materials that have been used so that the resources can be used again
- Recycling can have both advantages and disadvantages:

Advantages	Disadvantages
• Resources will last longer • It uses less energy than extracting new materials • It reduces waste and pollution	• Separating rubbish can be seen as a nuisance • The lorries collecting recycling produce pollution • Some materials are easier to recycle than others

1. Friction and drag

- **Friction** is a force which will slow down a moving object due to two surfaces rubbing on one another
- The greater the friction, the faster an object will slow down, or the greater the force it will need to overcome the force of friction. For example, it is easier to push a block on ice than on concrete, as the ice is smoother and causes less friction

- When an object is moving through a fluid, either liquid or gas, the force which slows it down is known as **drag**
- The fluid particles will collide with the moving object and slow it down, meaning that more force is needed to overcome this
- Both drag and friction are **contact forces** as the two surfaces in friction, and the object and fluid particles in drag, come into contact with one another



A solid moves through a gas.

A solid moves through a liquid.

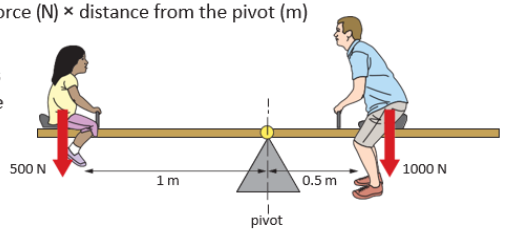
- Both drag and friction are forces so they are measured in **Newtons** (N)

2. Turning forces

- A **moment** is the turning effect of a force, it is measured in Newton meters
- We can calculate a moment with the equation:

moment (Nm) = force (N) × distance from the pivot (m)

- The size of the moment will increase as the distance from the **pivot** or the size of the force increases
- When an object, such as a seesaw, is balanced, the clockwise and the anticlockwise moments will be equal and opposite, which is known as **equilibrium**
- When forces are equal and opposite to each other, there is no **resultant force**



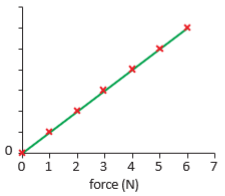
clockwise moment = force × distance on the right
= 1000 N × 0.5 m
= 500 Nm

anticlockwise moment = force × distance on the left
= 500 N × 1 m
= 500 Nm

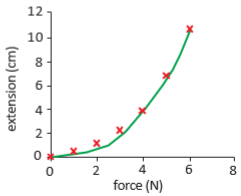
Keyword	Definition
Air resistance	The force on an object moving through the air (also known as drag)
Atmospheric Pressure	The pressure caused by the weight of the air above a surface
Contact force	A force when 2 objects are touching
Drag	The force slowing down an object as it moves through a liquid or gas
Elastic limit	The point beyond which a spring will not return to its original length when the force is removed
Equilibrium	When the moments are equal and opposite
Extension	The amount of stretch in an object
Friction	A force which will slow down an object due to 2 surfaces rubbing on one another
Gas pressure	Caused by the particles of a gas colliding with the wall of a container
Hooke's Law	A law that says that if you double the force on an object, the extension will double
Incompressible	Cannot be compressed
Linear relationship	When 2 variables are graphed and show a straight line through the origin
Moment	A measure of the ability of a force to rotate an object about a pivot
Newton	Unit for measuring force (N)
Pivot	The point about which a lever or see-saw balances or rotates
Pressure	The ratio of force to surface area, in N/m^2 and how it causes stresses in solids
Resultant force	Single force which can replace all the forces acting on an object and have the same effect
Stress	The effect of a force applied to a solid Stress = force/area

3. Hooke's law

- Some objects, like springs, can be stretched, the amount that they stretch is known as their **extension**
- A force needs to be applied to the spring for it to be stretched, we can achieve this by adding masses which exert the force weight
- A spring will continue to stretch until it passes it's **elastic limit**
- If an object obeys **Hooke's law** it will have a **linear relationship**: if the force applied to the spring is doubled, the extension will double too
- If an object does not obey Hooke's law, it will not have a linear relationship



This graph shows how the extension of a spring changes as you pull it



This graph shows the relationship between force and extension

4. Gas pressure

- **Gas pressure** is caused by the particles of a gas colliding with the wall of the container which they are in
- The more often that the particles collide with the wall of the container, the higher the pressure of the gas will be
- Gas pressure can be increased by:
  - Heating the gas so the particles move more quickly and collide with the container with a higher energy
  - Compressing the gas so there are the same amount of particles within a smaller volume meaning that there are more collisions
  - Increasing the amount of particles within the same volume so there are more collisions

- **Atmospheric pressure** is the pressure which the air exerts on you all of the time, nearer the ground there are more particles weighing down on you so the pressure is greater
- The higher you go, the smaller the atmospheric pressure, this is because there will be less particles weighing down on you

5. Pressure in solids

- The pressure which is exerted on a solid is known as **stress**
- The greater the area over which the force is exerted over, the lower the pressure, this is why snowshoes have a large area to prevent you sinking into the snow
- **Pressure** can be calculated using the following equation:

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

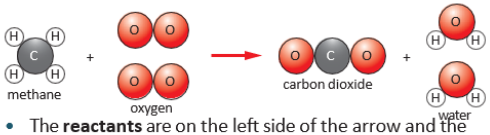
6. Pressure in Liquids

- Liquids are **incompressible**
- The particles in a liquid are already touching, meaning that there is little space between them to compress
- Liquids will transfer the pressure applied to them, this is seen in hydraulic machines
- As the ocean gets deeper, the pressure will increase, this is because the pressure depends on the weight of the water above
- The greater the number of water molecules above, the higher the pressure will be

Keywords	Definitions
Balanced symbol equation	Show the amounts of all the individual atoms in a reaction
Chemical bond	the force that holds atoms together in molecules
Chemical reaction	A change in which a new substance is formed
Combustion	A chemical reaction in which a substance reacts with oxygen and gives out heat and light
Conserved	When the quantity of something does not change
Conservation of mass	The total mass of the reactants is equal to the total mass of the products
Decomposition	A chemical reaction in which a compound breaks down
Fuel	A substance that stores energy in a chemical store
Endothermic	A reaction that takes in energy, usually heat from the surroundings
Energy level diagram	A diagram showing whether a reaction is endothermic or exothermic
Exothermic	A reaction that gives out energy into the surroundings
Products	Substances formed in a reaction
Reactants	Substances that react together
Thermal decomposition	A chemical reaction in which a compound breaks down when heated

1. Chemical reactions

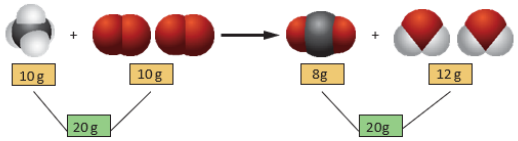
- Word equations can represent a **chemical reaction:**



- The **reactants** are on the left side of the arrow and the **products** are on the right side of the arrow
- We use an arrow instead of an equals sign as it represents that the reactants are changing into a new substance
- In a reaction, the amount of each type of atom stays the same, however they are rearranged to form a new product

2. Conservation of mass

- In a reaction the mass will be **conserved**, this means that the total mass of the reactants will be equal to the total mass of the products
- If it appears that some of the mass has been lost, this means that a gas has been produced and escaped, accounting for the lost mass



Balanced symbol equations show the amounts of all of the individual atoms in a reaction

- The symbols used are from the Periodic Table
- They also show:
  - Formulae of reactants and products
  - How the atoms are rearranged
  - Relative amounts of reactants and products

$$2H_2 + O_2 \rightarrow 2H_2O$$

3. Combustion

- **Combustion** is the burning of a **fuel** in oxygen
- A fuel is a substance which stores energy in a chemical store
- Examples of fuels include petrol, diesel, coal and hydrogen
- When a carbon based fuel undergoes combustion, it will produce water and carbon dioxide

methane + oxygen → carbon dioxide + water

- Hydrogen can also be used as a fuel, this is much better than traditional fossil fuels as it does not produce carbon dioxide:

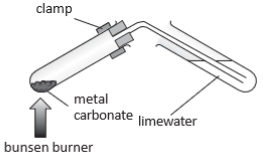
hydrogen + oxygen → water

4. Thermal decomposition

- A **thermal decomposition** reaction is one where the reactants are broken down (decomposition) using heat (thermal energy)
- An example of this is with metal carbonates:

zinc carbonate → zinc oxide + carbon dioxide

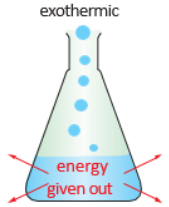
- We can test for this carbon dioxide by bubbling the gas through limewater, if the limewater turns cloudy, the gas is carbon dioxide



5. Exothermic and endothermic reactions

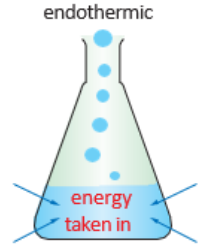
Exothermic reactions involve a transfer of energy from the reactants to the surroundings

- As energy is transferred to the surroundings this will show an increase in temperature
- Examples of exothermic reactions include combustion, freezing, and condensing



Endothermic reactions involve a transfer of energy from the surroundings to the reactants

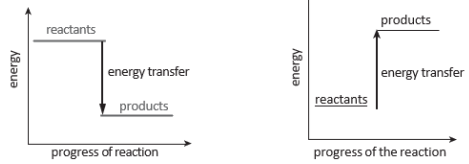
- As energy is taken into the reactants a decrease in temperature will be shown
- Examples of endothermic reactions include thermal decomposition, melting, and boiling



6. Energy level diagrams

Energy level diagrams show the values of energy between the reactants and the products in a reaction

- If the energy is greater in the reactants than the products then the reaction is exothermic as energy has been given out to the surroundings
- If the energy is lower in the reactants than the products then the reaction is endothermic as energy has been taken in from the surroundings



7. Bond Energies

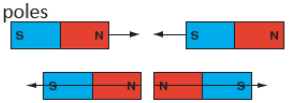
- Energy must be used to break chemical bonds, meaning that this reaction is endothermic
- Energy is given out when chemical bonds are made, meaning that this reaction is exothermic
- To see if a reaction is endothermic or exothermic, you must find the difference in the energy needed to break and to make the bonds in the reaction
- If the energy needed to break the bonds is less than the energy given out when making the bonds, the reaction is exothermic
- If the energy needed to break the bonds is more than the energy released when making the bonds, the reaction is endothermic

Keyword	Definition
Attract	Objects moving towards one another due to a magnetic force
Core	Soft iron metal which the solenoid is wrapped around
Circuit breaker	A device that uses an electromagnet to break a circuit
Electromagnet	A non-permanent magnet turned on and off by controlling the current through it
Electric bell	A device that uses an electromagnet to make sound using a "make and break circuit"
Loudspeaker	A device that uses an electromagnet. It turns an electrical signal into a pressure wave of sound

Keyword	Definition
Magnet	A material with a magnetic field around it in which a magnetic material experiences a force
Magnetic pole	The ends of a magnetic field, called north-seeking and south-seeking poles
Magnetic field lines	Imaginary lines that show the direction of the force on a magnetic material
Magnetic material	A material that experiences a magnetic force when placed near a magnet
Permanent magnet	An object that is magnetic all the time
Repel	Objects moving away from one another due to a magnetic force

1. Magnets

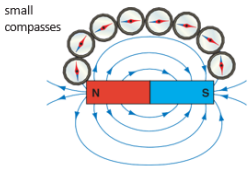
- A **magnet** has two poles, a north and a south pole
  - North poles **attract** south poles
  - South poles **attract** north poles
  - South poles **repel** south poles
  - North poles **repel** north poles



- **Magnetic materials** will experience a magnetic force when placed near a magnet, this is a type of non-contact force as the materials do not have to touch for the force to be apparent
- The three magnetic metals are iron, nickel and cobalt

2. Magnetic fields

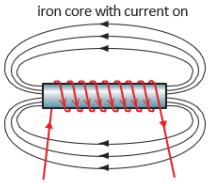
- A **magnetic field** is an area where a magnetic material will experience a force
- A **permanent magnet** will have it's own magnetic field
- **Magnetic field lines** represent the field, these always travel out of the north pole of the magnet, and into the south pole
- The closer together the magnetic field lines are, the stronger the magnetic field will be
- We can find out the shape of a magnetic field in two ways:
  - Using plotting compasses
  - Using iron filings



- The Earth has its own magnetic field, which acts like a giant bar magnet inside the centre of the Earth
- This magnetic field allows compasses to work when navigating around the Earth

3. Electromagnets

- **Electromagnets** are made by wrapping a coil of wire around a magnetic **core**
- Electromagnets only work when electricity is flowing through the coil, which means that they can be turned on and off
- Electromagnets are also stronger than **permanent** magnets
- The electromagnet will produce the same magnetic field shape as a bar magnet



- You can increase the strength of an electromagnet by:
  - Increasing the number of turns on the coil around the core of the electromagnet
  - Increasing the current which is flowing through the coil of wire
  - Using a more magnetic material for the core, e.g. iron rather than aluminium

4. Using electromagnets

Electric Bells

The electromagnet attracts the iron armature

↓

When it moves, it breaks the circuit, no longer allowing current to flow

↓

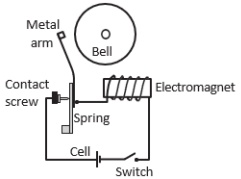
The coil and core are no longer magnetic meaning the spring is no longer attracted and returns to its original position

↓

The bell is rung once

↓

The circuit is complete again, restarting the process

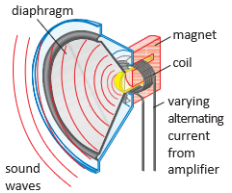


Circuit breakers

- Circuit breakers detect large changes in current in a house, and will break a circuit
- When a large current flows, the electromagnet becomes strong enough to attract an iron catch which will break a circuit
- They can then be reset and used again
- This makes them suitable as an electrical safety device in a home

Loudspeakers

- Loudspeakers use an electromagnet in order to generate sound
- A current passes through the coil and creates an electromagnet, this repels another permanent magnet which moves the cone in and out creating sound



Spanish		English
Hola, me llamo Miguel y tengo trece años. 	1	*Hello, I am called Miguel and I have thirteen years.*
Mi hermana se llama María y tiene catorce años. 	2	*My sister is called Maria and she has fourteen years.*
Vivo en Barcelona y hablo español y catalán.	3	*I live in Barcelona and I speak Spanish and Catalan.*
Me gustaría visitar Santiago en Chile donde también hablan español. 	4	*I would like to visit Santiago in Chile where they also speak Spanish.*
Me gusta el fútbol porque es divertido 	5	*I like football because it is fun*
pero no me gusta el flamenco porque es difícil. 	6	*but I don't like Flamenco because it is difficult.*

THE CORE FOUR

How to Create Flash Cards

1. Identify Knowledge

- What are you creating flashcards on?
- Do you have your knowledge organiser?
- Use your book to look at previous misconceptions from whole class feedback.

2. Colour Coding

- Use different coloured flash cards for different topics. This helps with organisation, NOT recall.

3. Designing

- 1 Question per flash card - make them concise and clear
- Use a one-word prompt, so that you can recall as much as you can
- No extended answer questions
- Number your cards for self-quizzing.

4. Using

- Write your answers down, then check, or say your answers out loud. This clearly shows the gaps in your knowledge.
- Do not just copy and re-read.
- Shuffle the cards each time you use them.
- Use the Leitner system to use flash cards every day.

5. Feedback

- How have you performed when you look back at your answers?
- Is there anything you need to revisit in more detail?
- Is your knowledge secure? If so, move on to applying knowledge in that area in specific extended exam questions.

Brain Dumps

1. Identify Knowledge

- Identify the knowledge / topic area you want to cover.

2. Write it Down

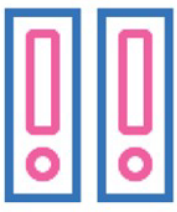
- Take a blank piece of paper/white board and write down everything you can remember about that topic (with no prompts)
- Give yourself a timed limit (e.g 10 minutes)

3. Organise Information

- Once complete and you cannot remember any more, use different colours to highlight / underline words in groups.
- This categorises / links information

4. Check Understanding

- Compare your brain dump to your Knowledge Organiser or book and check your understanding.
- Add any key information you have missed (key words) in a different colour.



5. Store and Compare

- Keep your brain dump safe and revisit it.
- Next time you attempt the same topic, try and complete the same amount of information in a shorter period of time or add more information.

THE CORE FOUR

Revision Clocks

1. Identify Knowledge

Select a topic you wish to revise. Have your class notes, knowledge organiser or revision books ready.

2. Designing

You can make your own revision clock by drawing a clock in the centre of a page and dividing it into 12 chunks. You can also use an existing template from your teacher, or one you can find online.

3. Manageable Chunks

Organise your revision notes into 12 sub-topics and make brief notes for each sub-topic into one of the segments on the page, creating manageable chunks of information. Combine text with images to help retain the information.

4. Using Revision Clocks

Revise each segment for 5 minutes. Turn the clock over and recite the sections out loud or ask someone to quiz you.

Alternatively, you can revise certain sections for 5 minutes and use a blank revision clock with headings, recall as much information as you can in the segments.

5. Check Understanding

How have you performed when you compare you answers to what you have written? Is your knowledge secure?

Remember to repeat the process regularly, using different techniques to answer the questions.

Put it somewhere visible for you to use again.

Self Quizzing

1. Identify Knowledge

- Identify knowledge / content you wish to cover

2. Review and Create

- Spend around 5 - 10 minutes reviewing content (knowledge organisers / class notes / textbook.)
- Create 10 questions on the content (if your teacher has not provided you with questions already)

3. Cover and Answer

- Cover up your knowledge and answer the questions from memory.
- Take your time and where possible answer in full sentences.

4. Self Mark and Reflect

- Go back to the content and self-mark your answers in green pen.

5. Next Time

- Revisit the areas where there were gaps in knowledge and include these same questions next time.

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