CHRIST THE KING

# KNOWLEDGE ORGANISER

## Year 8 LENT

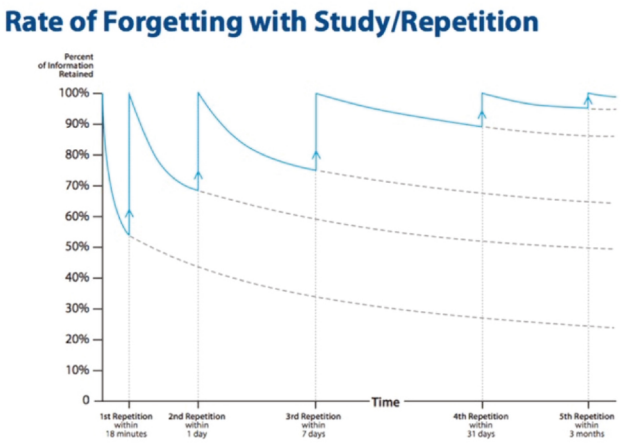
(Term 2)

#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

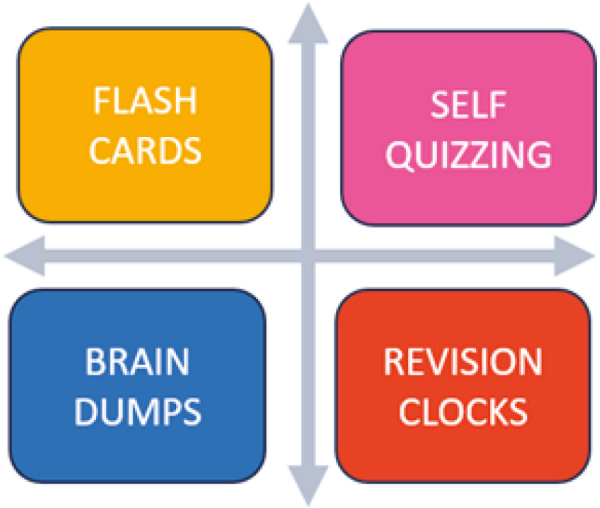
The best way to use your knowledge organisers is to regularly use one of our Core 4 Revision strategies as part of your home learning. These strategies will be explained to you in more detail in tutor time, by your class teachers and as part of your Personal Development lessons.

- **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?

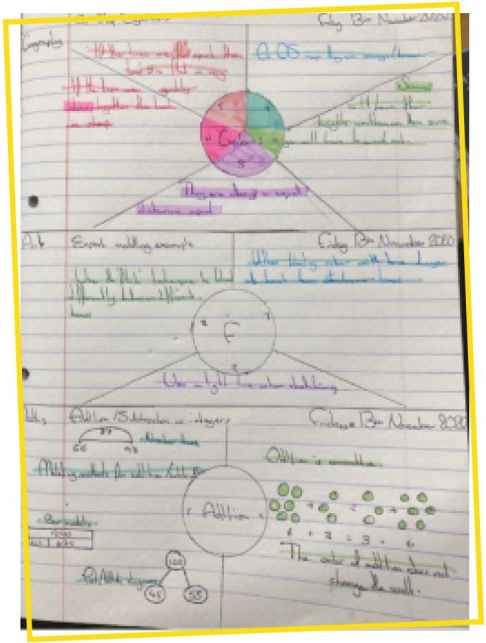
Each homework must meet the following 5 requirements:

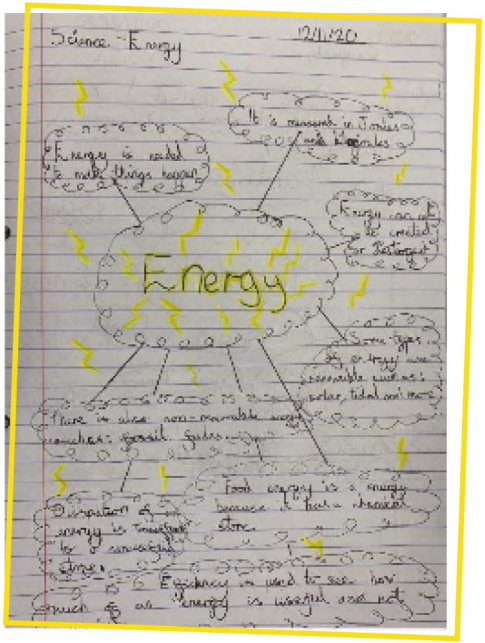
- Write the complete title and date in full *e.g Wednesday 7th June 2023* on each page and underline.
- You should include minimum of words to summarise the topic. Do not copy the words from the text.
- Make full use of the page for each topic by scaling your notes and images appropriately to use all 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.**

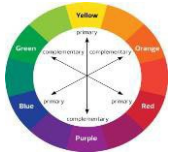
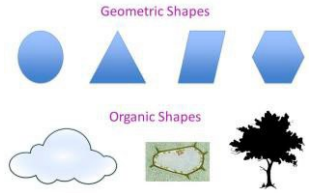
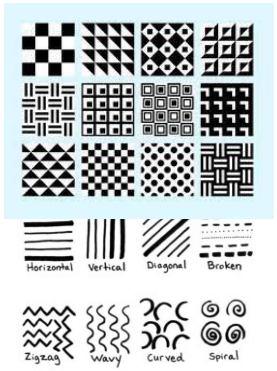
If you are self-quizzing correctly, there should be **evidence of green pen on your page**. Here are some examples of how to set out your work:






## 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**<br><br>**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.<br><br>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 – Paper and Board

## 1 Keywords

| Keywords | Definition |
|---|---|
| **1. Paper** | A thin, flexible material made from wood pulp or recycled fibres. It is measured in grams per square metre (gsm). Used for writing, printing and sketching. |
| **2. Board** | A thicker and more rigid version of paper, made by layering or compressing pulp. It is often used for packaging, modelling. Typically, over 200gsm |
| **3. Renewable** | A sources of material that if managed responsibly will not run out. |
| **3. Typography** | The style or appearance of printed 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** | The identity of a product, including name, logo, colours and style that make it recognisable and appealing. |
| **8. Logo** | A symbol or other small design adopted by an organization to identify its products. |

## 2

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

**200 gsm**

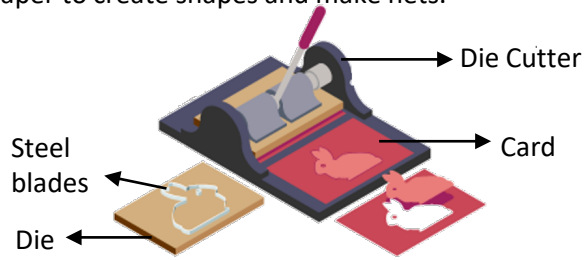
Anything that weighs over 200gsm is generally considered **board.**

## 4 Typography

| | |
|---|---|
| **Serif** fonts have small decorative strokes or "feet" at the ends of the letters. | **Sans Serif** means "without serif". These fonts do **not** have the small strokes at the ends of letters. |
|  Traditional |  Mondern/Minimalist |

## 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

**Harvesting of trees** – cut down trees from forests or tree farms. These trees are grown just for making paper.

**Remove the bark** - The rough outer layer of the tree (called bark) is taken off. We don't use the bark to make paper—it's too tough!

**Chipping wood into small pieces** - The bare logs are chopped into tiny pieces called wood chips

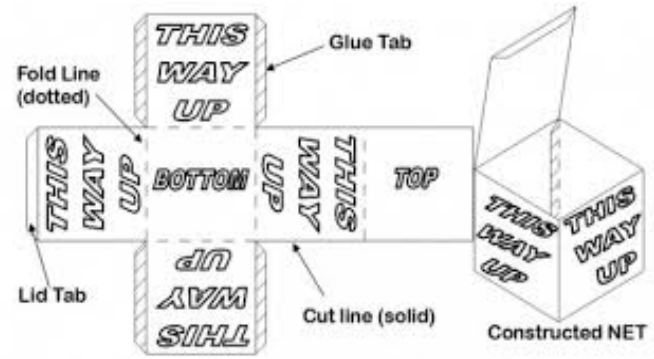
**Cooking or pulping** - The wood chips are mixed with water and sometimes chemicals in a big machine. This mix turns into mushy stuff called pulp.

**Washing & bleaching** - The pulp is cleaned to remove anything that shouldn't be there, like bits of bark or dirt. Sometimes they bleach it to make it whiter.

**Pressing and drying through rollers** - The clean pulp is spread out flat and squeezed between big rollers to get all the water out. The wet paper goes through hot rollers to dry it out. Then it's rolled up into huge rolls or cut into sheets.

## 6

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

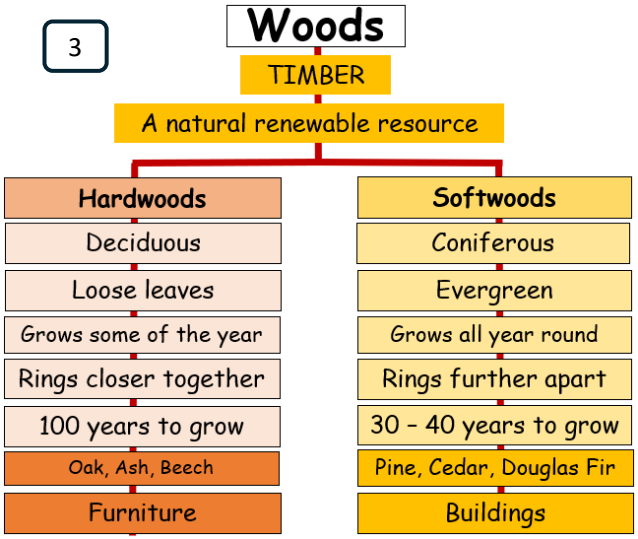


# Design & Technology – Timbers

## 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. |

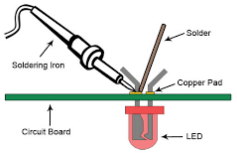
## 6

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.

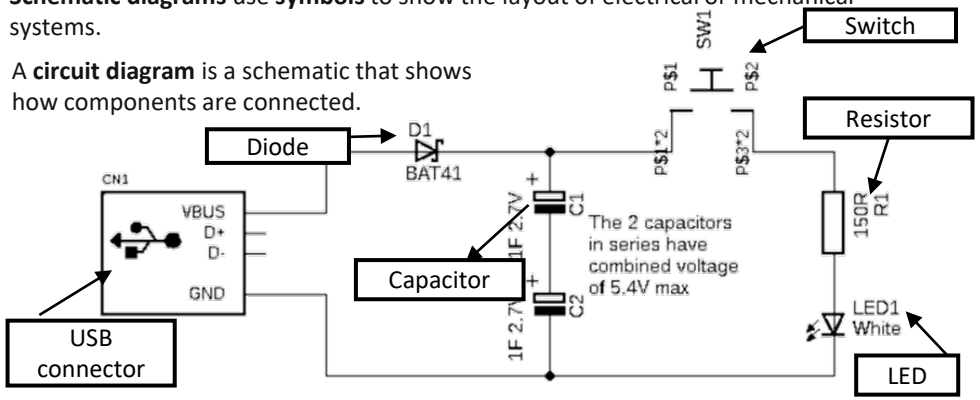
Stain – Permanently stains wood. The colour can be affected by the base wood. It does not protect.

# Design & Technology – Torch Project

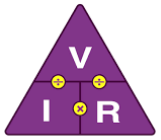
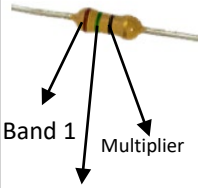
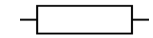
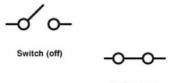
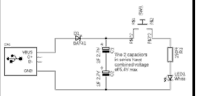
| Key Word | Definition |
|---|---|
| **1. Solder**  | A metal alloy that has a low melting point (high fusibility). It is **used to join electronic components** to a circuit board. |
| **2. Soldering Iron**  | This **provides the heat (300°C)** to melt the solder. It has a plastic handle to hold, and a tip that gets hot. It is usually held like a large pencil. |
| **3. Soldering Iron stand**  | Because the soldering iron gets hot it you need a **safe place to put it down**. It usually has a spring like surround to guard the hot tip, and a place to put a damp sponge for cleaning the tip of the iron. |
| **4. Side Cutters**  | A type of pliers with angled cutting edges designed for **cutting and trimming wires** |
| **5. Dry Joint**   | A faulty, dull solder join caused by insufficient heat or solder, leading to unreliable electrical flow. |
| **6. Soldering** | The process of joining two or more metal items together by melting solder into the joint, which then cools to form a strong, permanent electrical or physical connection   |

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

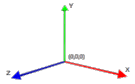
A **circuit diagram** is a schematic that shows how components are connected.




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 flat board that holds and connects **electronic components** using **wires or metal tracks**. It allows electricity to flow. |   |  |

# Design & Technology – CAD CAM

| Key Word | Definition |
|---|---|
| **1. CAD -** | **Computer Aided Design -** Using a computer program to draw, model and design products on a screen instead of using pencil and paper. Some CAD designs can be sent directly to CAM machines. |
| **2. CAM -** | **Computer Aided Manufacture -** Machines controlled by computer software to make products and parts designed using CAD. |
| **3. Laser Cutter**  | A type of CAM machine that uses a powerful **laser** to cut or engrave shapes into materials. It can cut through thin sheets of wood, plastic, card and textiles. |
| **5. 2D Design** | A CAD software program used to **draw** flat, two-dimensional designs (width and height). It can be used to create files for the laser cutter.  |
| **6. Sketchup** | A CAD program used to create 3D **models** of products on a computer.  |
| **7. 3D Printer** | A CAM machine that makes a physical object from a 3D model by building it up **layer by layer** usually using thermo plastic. |
| **8. Virtual Modelling** | Creating and testing a product on a computer before making it in real life. |
| **9. Rapid Prototyping** | A group of techniques, including 3D printing, used to quickly make a physical or digital model of a product for testing. |
| **10. Co-ordinates** | Numbers used to show the exact position of points in a CAD drawing using x, y and sometimes z values.  |
| **11. Datum point** | The **fixed starting point** in a CAD drawing where x, y and z all equal zero (0,0,0). |
| **12. Automation** | Using machines to carry out tasks automatically with little or no human input. |

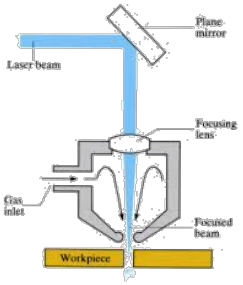
## Laser cutting

- A **2D CAD drawing** is created using software such as **2D Design.**
- Coloured lines tell the laser cutter what power and speed settings to use:

**Red lines = cut (vector)**

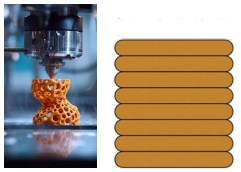
**black lines = engrave (raster)**

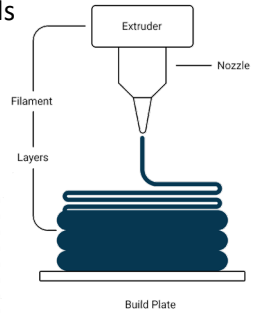
- The file is sent to the **laser cutter**.
- The laser follows the drawing.
- **Power and speed** control how the laser cuts.




## 3D printer

- A **3D CAD model** is created using software such as **Sketchup.**
- The file is **sliced into layers**.
- The file is sent to the **3D printer**.
- Heated plastic **filament** is pushed through a nozzle.
- The printer builds the object **layer by layer** on to a heated bed..






## Advantages of CAD / CAM

- ✓ Very accurate and precise
- ✓ Designs can be edited easily
- ✓ Produces identical parts every time
- ✓ Saves time when making multiple products
- ✓ Can create complex shapes
- ✓ Reduces human error
- ✓ Can be linked directly to machines (laser cutter, 3D printer)

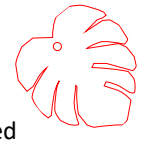
## Disadvantages of CAD / CAM

- Requires training and skill to use software
- Machines are expensive
- Can break down or need maintenance
- Less hands-on making
- Relies on electricity and computers
- Mistakes in CAD affect the final product

**Manufacturing a system –** Manufacturing is a system where products are made through different stages that happen one after another. These stages are grouped into three parts:

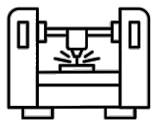
**Input**

2D CAD drawing, power speed settings



**Process**

Laser follows the CAD file and cuts or engraves



**Output**

Accurately cut or engraved product

## JOURNEY AND IDENTITY

We Refugees - Benjamin Zephaniah

Still I Rise - Maya Angelou

| Key Word | Definition |
|---|---|
| **Physical Theatre** | Performance style where movement is the main storytelling method. Includes mime, gesture & dance. |
| **Devised Theatre** | A collaborative theatre-making process involving the whole team. |
| **Spoken Word** | Vocal poetry with rhythm, rap or music. |
| **Refugee** | A person who flees their home country to find safety due to war, persecution or danger. |
| **Displaced** | Forced to leave home or place of living, often suddenly. |
| **Sanctuary** | A safe place or protection given to someone in danger. |
| **Identity** | The qualities, beliefs and characteristics that make a person who they are. |
| **Prejudice** | Judging someone unfairly based on stereotypes or differences such as race, religion or gender. |
| **Journey** | A physical or emotional experience of travelling or developing as a person. |
| **Belonging** | Feeling accepted and part of a community, group or place. |
| **Racism** | Discrimination or unfair treatment towards someone because of their race or ethnicity. |
| **Hope** | A feeling of expectation and positivity about the future. |
| **Devising** | Creating a performance collaboratively without a pre-written script. |
| **Collaborate** | Working together with others to achieve a shared goal. |
| **Freeze Frame** | A still, unmoving stage picture used to show an important moment. |
| **Spoken Word** | A performance style using voice, rhythm and poetry rather than traditional acting. |
| **Narration** | Storytelling through spoken description, often to give background or guide the audience. |
| **Physicality** | Using the body to express ideas, emotions or character. |
| **Movement** | Actions or gestures made by the body on stage to communicate meaning. |
| **Theatre** | A form of storytelling performed live for an audience through acting, movement, sound and design. |
| **Storytelling** | Sharing a narrative to engage others, usually through voice, movement or performance techniques. |

## WONDER.LAND

| Physical and Vocal Key Words | |
|---|---|
| **Skill** | Description |
| **Characterisation** | Using physical/vocal skills to portray a character. |
| **Tone of Voice** | Emotion behind speech. |
| **Pitch** | How high/low voice is. |
| **Pace** | Speed of voice or movement. |
| **Gestures** | Use of hands/head for expression. |
| **Body Language** | Posture and physical behaviour. |
| **Facial Expression** | Emotion shown through face. |

| Design Key Words | |
|---|---|
| **Element** | Description |
| **Designer** | Makes decisions about production elements. |
| **Set** | Scenery and stage furniture. |
| **Props** | Items held/used by actors. |
| **Costume** | What actors wear — reflects character/era/status. |
| **Music & Sound** | Creates atmosphere using audio. |
| **Lighting** | Helps audience see and creates mood. |
| **Levels** | Used to show staging/meaning. |
| **Colour/Fit/Style** | Reflects personality or status. |

| Writing Structure | |
|---|---|
| **WHAT?** | Identify the successful element. |
| **HOW?** | Explain how it was created. |
| **WHY?** | What impact it had on audience. |
| **JUSTIFY** | How it made you feel and why. |

One moment that stood out for me was…

This helped communicate to the audience that…

This effect was created by…

This could be improved by…

The actor/designer used… effectively to…

The impact on the audience was…

This created an atmosphere of…

Overall the cast 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.

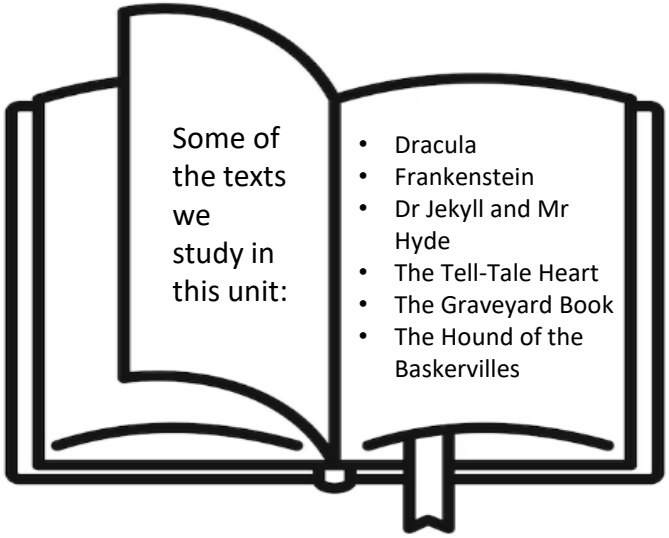
# English – Glace at the Gothic Genre

**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.



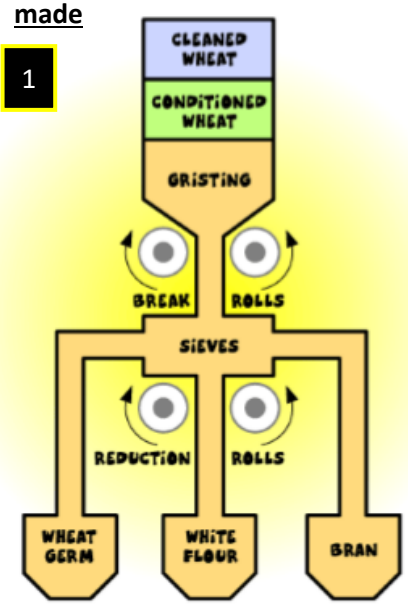

| Conventions of Gothic writing: | |
|---|---|
| **Settings** –castles, graveyards, dungeons or religious buildings such as churches and chapels. They are often old, decaying buildings, usually set in remote, hidden places such as the wilderness of a forest or in the isolation of the mountains. |  |
| **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 topics:** Nutritional needs of others, health issues associated with a poor diet, religious diets and food choices, food origins, organic and intensive farming, food miles and seasonality.

## Farm to Fork – How flour is made

1




| |
|---|
| 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

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

4

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.

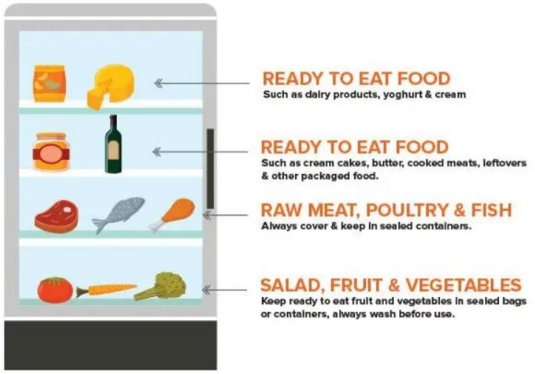
SOIL ASSOCIATION ORGANIC STANDARD

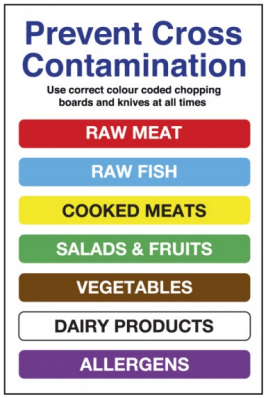
This symbol means that the product is certified to **high organic standards** and provides an assurance of organic authenticity.

# Food Preparation and Nutrition: Special Diets and Food Origins

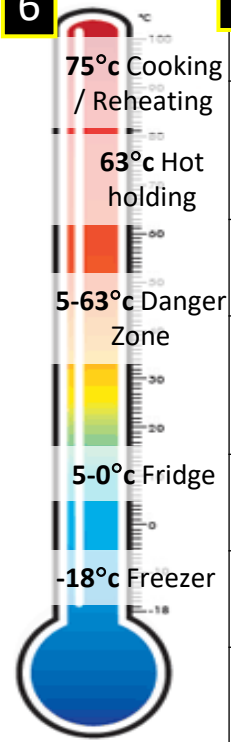
## 5 Food Safety

| | |
|---|---|
| **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. |




## 6




## 7 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. |

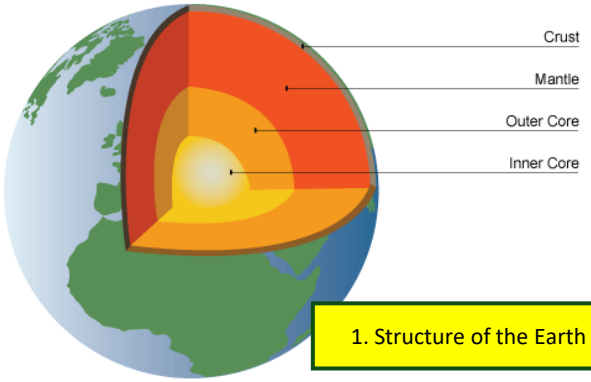
## 8 Diet Related Health Problems

| | |
|---|---|
| **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 – Au Restaurant

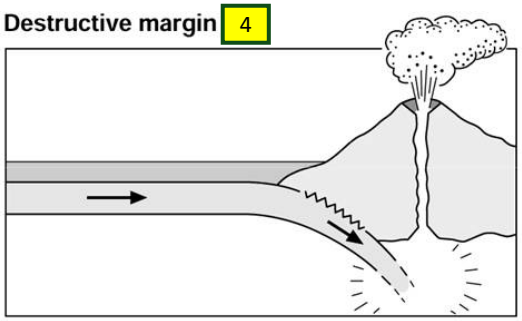
| | | |
|---|---|---|
| **Normalement au petit déjeuner je mange des céréales avec du lait** | **1** | Normally for breakfast I eat cereal with milk |
| **et je bois du thé mais ma mère boit du café.** | **2** | And I drink tea but my Mum drinks coffee |
| **Cependant hier j'ai mangé un pain au chocolat, 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 |

# Geography – Topic 7 – Tectonic Hazards

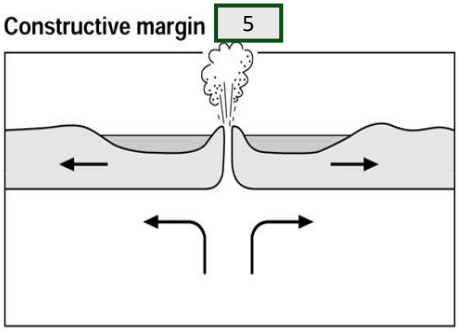



1. Structure of the Earth

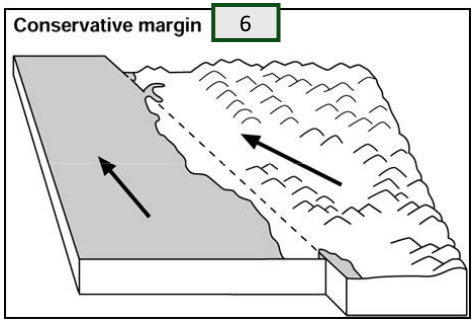
**Destructive margin** 4



**Constructive margin** 5

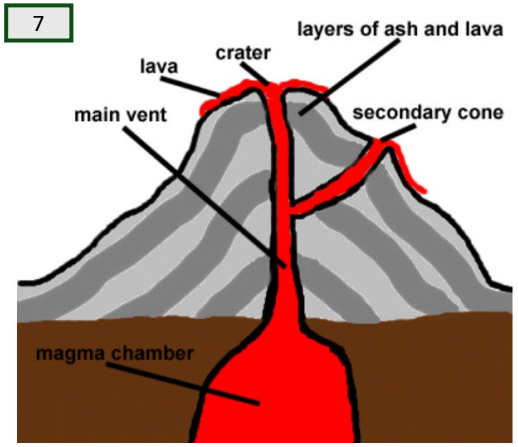


**Conservative margin** 6



**A simple cross section of a volcano**

7




| 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 |

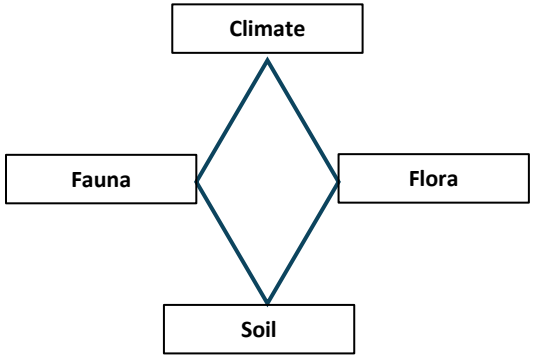
| 10. Managing Volcanic Eruptions | |
|---|---|
| Dams | Blocking the path with a concrete wall |
| Channels | Digging channels to direct lava flow away from settlements |
| Water | Cools the lava to turn rock from molten to solid to slow the flow |
| Education | Teach people how to behave during a hazard 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 |

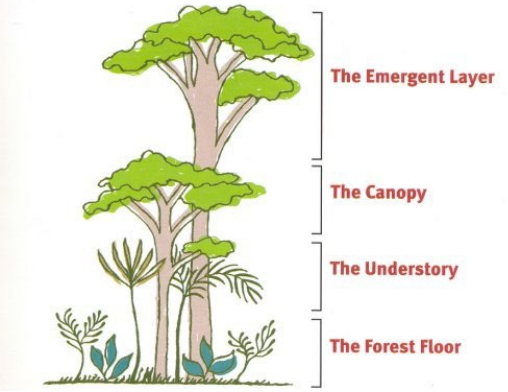
| 2. Biomes of the world | |
|---|---|
| Tundra | Low growing plants and shrubs in cold and windy conditions |
| Taiga | Cone-bearing evergreen trees able to cope with cold winters |
| Temperate deciduous forest | Trees which lose their leaves in autumn to retain moisture during winter |
| Mediterranean | 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 |

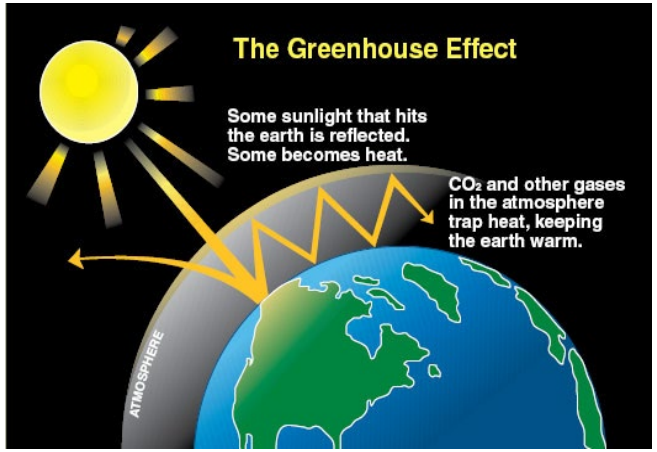
| 12. Coral reef key words | |
|---|---|
| Coral reef | Hard, rocky ridge formed on the seabed from external skeletons of many, tiny coral animals. |
| Coral | Very small animals called polyps with a hard exoskeleton |
| Fringing reef | Form in shallow water close and parallel to the shore |
| Barrier 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 |

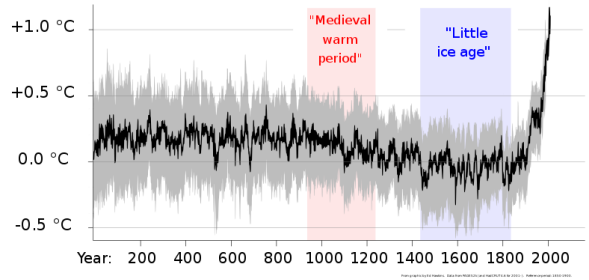
**2. The greenhouse effect**
**The natural process of trapping the sun's warmth in our lower atmosphere which warms the earth**




| 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 – Political Reforms

| 1. Before 1832 | |
|---|---|
| Elections before 1832 | No secret ballots, corruption, bribery and violence. |
| Voters before 1832 | Very rich men who lived in the countryside |
| MPs before 1832 | Very rich men and aristocrats who didn't need to work |

| 2. Nottingham Riots | |
|---|---|
| Causes of the Reform Riots | • Reform Bill was defeated in the House of Commons.<br>• Local Nottingham landowner The Duke of Newcastle had voted against it.<br>• Locals wanted revenge. |
| Events of the Riots | A violent mob attacked Nottingham Castle and Colwick Hall. |
| Consequences of the Reform Riots | • Ring leaders arrested and put on trial with London Judges.<br>• George Beck was sentenced to death<br>• Valentine Marshall was sentenced to transportation. |

| 3. Suffragettes vs Suffragists | |
|---|---|
| Suffragists | Suffragists (NUWSS) use peaceful methods to win support for their cause. They felt that any actions that broke the law would allow their opponents to portray them as irresponsible and not allowed the vote. |
| NUWSS | The NUWSS were led by Millicent Fawcett and were founded in 1897. They aimed to win women's suffrage through debate and campaigning, such as petitions and non-violent marches. |
| Suffragettes | Suffragettes (WSPU) used violent methods to protest for their right to vote such as chaining themselves to Buckingham Palace and burning down homes of MPs. |
| WSPU | The WSPU was formed in 1903 by Emmeline Pankhurst. She had been a member of the Suffragists but had grown impatient and decided to form her own suffrage movement. |

| 4. Emily Davison | |
|---|---|
| Who is she? | Emily Davison was a militant suffragette, who joined the WSPU in 1906. She was frequently arrested, starved herself and resisted force-feeding. |
| What did she do? | On 4th June 1913 she ran out in front of the king's horse as it was taking part in the Epsom Derby whilst wearing an WSPU sash. Her purpose was unclear, but she was trampled on and died on 8 June from her injuries. |

| 5. Changes to Voting in the 19th and 20th Centuries | |
|---|---|
| Great Reform Act 1832 | Voters increased to 4 in every 10 men. |
| Second Reform Act 1867 | In 1866, all voters had to be male adults over 21 years of age, but the right to vote was still based upon if you owned property. |
| Third Reform Act 1884 | Approximately two in three men now had the vote - almost 18 per cent of the total population. |
| Representation of the People Act 1918 | This act gave all men over 21 and all women over 30 the right to vote. This represented 8.5 million women - two thirds of the total population of women in the UK. |
| Equal Franchise Act 1928 | The Equal Franchise Act gave all women over 21 the right to vote. This made the voting age equal amongst men and women. |

# 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. |

| 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 |

| 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. |

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

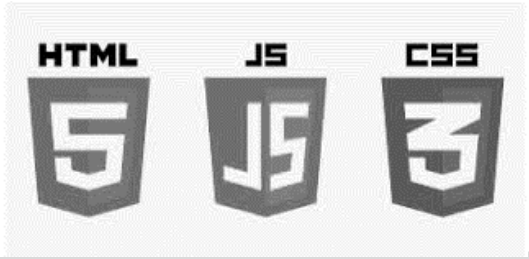
**Variable Rules**

- 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

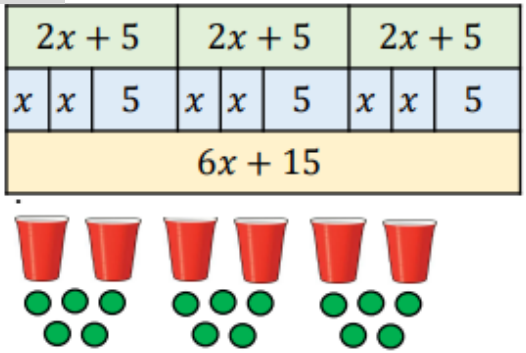
| Python Keywords | Explanation |
|---|---|
| print | Output a message to the display |
| input | Take input from the user |
| if | Branch code depending on if a condition is met |
| while | Loop code depending on if a condition is met |
| int | Convert to an integer |

# 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

$2x + 8 = 14$

$-8 \quad -8$

$2x = 6$

$\div 2 \quad \div 2$

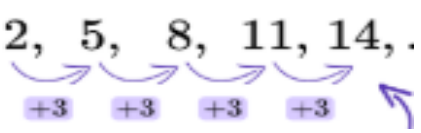
$x = 3$

# Sequences

Sparx Codes M381 M241 M991 M981

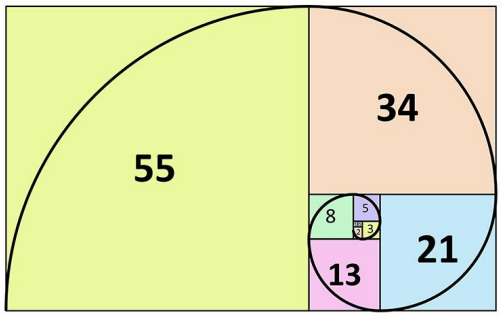
| 1. Key Word | Definition |
|---|---|
| Sequence | An arrangement of objects or set of numbers in a particular order followed by some rule |
| Term | An individual number in a sequence |
| Linear | The difference from one term to the next in a sequence is constant (adding or subtracting the same value) |
| 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

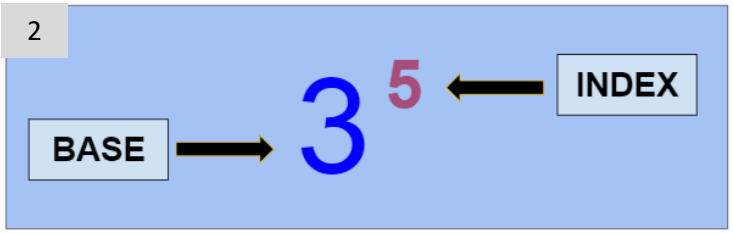


# Indices

## 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 | $2.9 \times 10^1$ |
| 350 | $3.50 \times 10^2$ |
| 4716 | $4.716 \times 10^3$ |
| 600000000 | $6 \times 10^8$ |
| 0.3 | $3 \times 10^{-1}$ |
| 0.09 | $9 \times 10^{-2}$ |
| 0.0071 | $7.1 \times 10^{-3}$ |
| 0.000502 | $5.02 \times 10^{-4}$ |

# Music – Programme Music

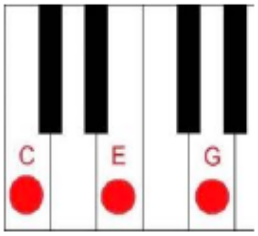
| A. Historical Context (Program Music) | |
|---|---|
| Category | Description |
| Program Music | Music suggesting visual images or "telling a story." The descriptive idea or story-line is known as the programme. |
| Instrumental Music | Instrumental music that is free of a programme and exists purely for its own sake is known as absolute music. |
| Popularity | Orchestral program music became very popular during the Romantic period (roughly the 19th century) when music developed close links with literature and painting. |

| B. Musical Devices Used to Express Story/Inspiration | |
|---|---|
| Device | Purpose/Effect |
| 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. |

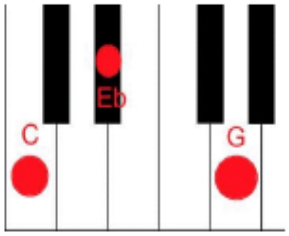
| C. Tempo (Speed) | |
|---|---|
| Term | Effect |
| Largo | Very Slow |
| Adagio | Slow |
| Andante | Walking pace |
| Moderato | Moderate |
| Allegro | Fast |
| Vivace | Lively |
| Presto | Very fast |
| Ritardando | Getting slower |
| Accelerando | Getting faster |

| D. 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 |

| E. Instruments and Common Associations (Musical Cliché's) | |
|---|---|
| Instrument | Natural sounds / Associations |
| 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. |



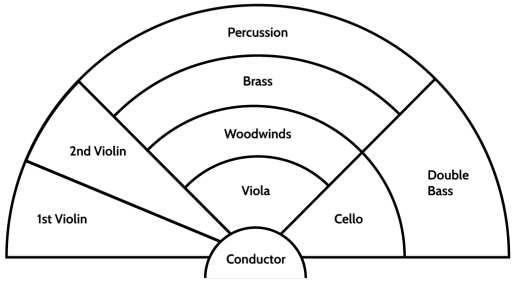

MAJOR CHORD
=
Root Note
+ 4 Semitones
+ 3 semitones




MINOR CHORD
=
Root Note
+ 3 Semitones
+ 4 semitones

# Music – Exploring the Orchestra

| A. Key Words, Terms and Facts about the Orchestra | |
|---|---|
| Orchestra | A large ensemble performing on various musical instruments. Typically 80–100+ performers. Examples include The London Symphony Orchestra, BBC Symphony Orchestra, and Hallé Orchestra. |
| Conductor | Leads using a baton. Sets tempo and beats time. Adjusts dynamics, tempo, and mood. |
| Families/Sections | Strings, Woodwind, Brass, Percussion. |
| Tuning Up | All instruments need to be in tune with each other – the Oboe plays note A for other instruments to tune to. |
| Sonority (Timbre) | Unique sound/tone quality. Descriptive terms: velvety, screechy, mellow, brassy, metallic, wooden, etc. |
| Pitch | Highness or lowness of a sound. |




| B. Layout of the Orchestra and Famous Conductors | |
|---|---|
| Famous Conductors | Sir Simon Rattle, Karina Canellakis. |

| C. Strings Section/Family | |
|---|---|
| Instruments | Violin, Viola, Cello, Double Bass, Harp. |
| Playing Style | Played with a bow (arco) or plucked (pizzicato). |
| Notes | 1st Violins often carry melody; 2nd Violins accompany. |
| Position | Largest section at front of orchestra. |

| D. Woodwind Section/Family | |
|---|---|
| Instruments | Flute, Piccolo, Clarinet, Bass Clarinet, Saxophone, Oboe, Cor Anglais, Bassoon, Double Bassoon. |
| Construction | Originally wood; some now metal or plastic. |
| Playing Style | Flutes blown across lips. Clarinets use single reeds; oboes and bassoons use double reeds. |

| E. Brass Section/Family | |
|---|---|
| Instruments | Trumpet, Trombone, French Horn, Tuba |
| Playing Style | Blown into mouthpiece; pitch changed with valves/slides. |
| Features | Trombones use slides. Often play fanfares or ceremonial music. |

| F. Percussion Section/Family | |
|---|---|
| Tuned Percussion | Piano, Xylophone, Glockenspiel, Timpani, Celesta, Tubular Bells. |
| Untuned Percussion | Bass Drum, Snare Drum, Cymbals, Woodblock, Guiro, Triangle, Gong, Tambourine, Cabasa, Maracas. |
| Note | Located at back. Played by being hit, struck, scraped, or shaken. |

| Key Words | | |
|---|---|---|
| 1 | Emotional Intelligence (EQ) | The ability to understand and manage your own emotions and respond appropriately to others. |
| 2 | Self-Awareness | Recognising your own feelings, strengths, weaknesses and behaviours, and the ways you respond. |
| 3 | Mindfulness | Involves paying full attention to the present moment to feel calmer and more aware. |
| 4 | Depression | A long-lasting low mood that affects how a person thinks, feels and behaves. |
| 5 | Empathy | The ability to understand and share the feelings of another person. |
| 6 | Discrimination | Treating someone unfairly because of who they are, such as disability, race, faith, or sexuality. |
| 7 | Protected Characteristics | The nine personal traits the law protects from unfair treatment (Equality Act 2010). |
| 8 | Reasonable Adjustments | Helpful changes organisations must make so people with disabilities have fair opportunities. |




| Key Facts | |
|---|---|
| 1 | Emotional intelligence helps young people build stronger friendships, reduce conflict and make better decisions. |
| 2 | Self-awareness develops over time, often through reflection, journalling and thinking carefully about personal strengths and weaknesses. |
| 3 | Mindfulness can improve focus, reduce stress and support good mental health, and is widely used in schools, workplaces and healthcare. |
| 4 | Early signs of mental health concerns can include irritability, changes in sleep, loss of interest, or feeling constantly worried. |
| 5 | Talking to a trusted adult is one of the most effective first steps when someone is struggling with low mood or anxiety. |
| 6 | The Equality Act 2010 protects people from unfair treatment in workplaces, schools, shops and public services. |
| 7 | Discrimination can be explicit or hidden, and may occur in social situations, online, or through language and assumptions. |
| 8 | Supporting others begins with listening without judgement, encouraging kindness, and recognising that everyone has dignity and value. |

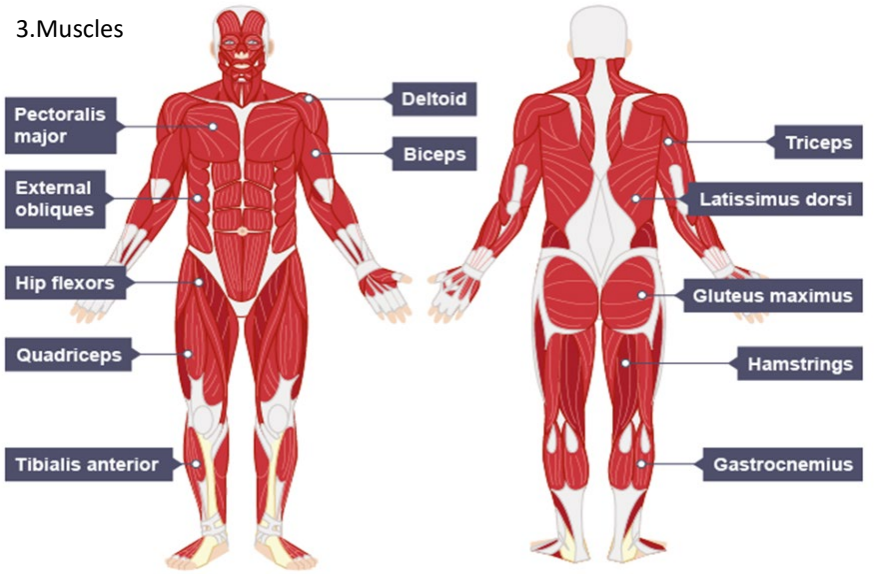
| Key Virtues & Scripture | | | |
|---|---|---|---|
| 1 | Compassion | Showing kindness and a desire to help others, especially those who are suffering. | In modern society, this means we should listen kindly, notice when others need support, and choose gentle and respectful words. |
| 2 | Self-control | Managing emotions, thoughts and actions, especially during difficult situations. | This can be shown today when we pause before reacting, stay calm during conflict, and make thoughtful choices online and in person. |
| 3 | Equality | Believing that all people are of equal value and should be treated fairly. | People live out equality by including others, avoid judging people, and challenge unfair or discriminatory behaviour. |
| “Be kind and compassionate to one another.” Ephesians 4:32 | | | This scripture speaks to the core message of Lent and personal development because it encourages kindness, understanding and care for others. It reminds us to treat people with empathy, support those who are struggling, and challenge unkind behaviour. |

# 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

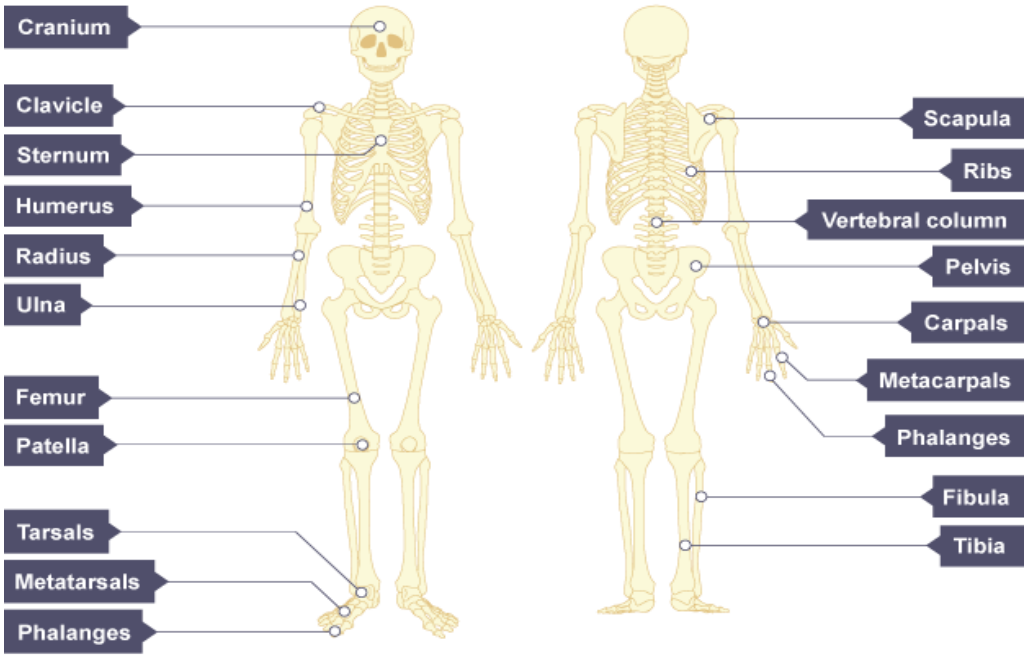



# Training Methods

| | |
|---|---|
| 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

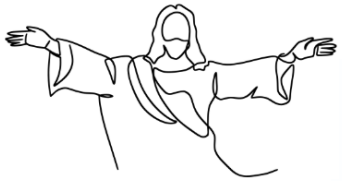
| | |
|---|---|
| 1. | The Olympics was an ancient tradition and originated in Greece. |
| 2. | They were created by a French man called Baron Pierre de Coubertin. |
| 3. | The first modern-day Olympics were held in 1896 and was hosted in Greece. |
| 4. | Each Games' are held every four years and this 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. |

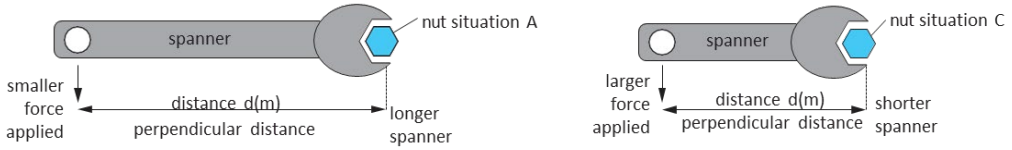
## 1. Work done

- In physics, **work done** is the energy transferred when a force is used to move an object a certain distance
- Like energy, work is measured in **Joules** (J)
- Work can be done in a a range of situations e.g. lifting a book work is done against gravity, when you slide a book along a table work is done against friction
- We calculate work with the equation:

work done (J) = force (N) × distance moved (m)

- A **simple machine** makes it easier to lift things, they reduce the force needed
- A **force multiplier** uses a smaller **input force** (what you apply) to to generate a larger **output force** (what is created)
- If you increase the distance from the pivot, less input force is needed to be used for the same output force as before
- A **lever** is an example of a force multiplier, a longer lever will require a less input force than a shorter lever to produce the same output force

**The physics of unscrewing a tight nut with a spanner**



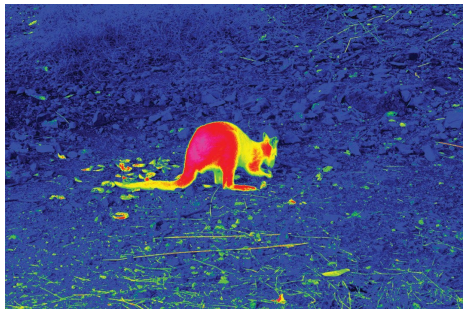

## 2. Energy and temperature

- The **temperature** of a substance is a measure of how hot or cold it is
- Temperature is measured with a **thermometer**, it has the units of degrees Celsius (°C)

- The **thermal energy** of a substance depends on the individual energy of all of the particles, it is measures in Joules (J)
- As all particles are taken into account, a bath of water at 30 °C would have more thermal energy than a cup of tea at 90 °C as there are many more particles
- The faster the particles are moving, the more thermal energy they will have
- When particles are heated they begin to move more quickly
- The energy needed to increase the temperature of a substance depends on:
- the mass of the substance
- what the substance is made of
- how much you want to increase the temperature by

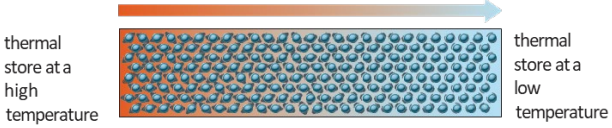
## 3.Radiation

- **Radiation** is a method of transferring energy without the need for particles
- An example of radiation is thermal energy being transferred from the Sun to us through space (where there are no particles)
- This type of radiation is known as **infrared radiation**, it is a type of wave just like light
- The hotter an object is the more infrared radiation it will emit (give out)
- The amount of radiation emitted and absorbed depends on the surface of the object:
  - Darker matte surfaces absorb and emit more infrared radiation
  - Shiny and smooth surfaces absorb and emit less infrared radiation, instead reflecting this
  - The amount of infrared radiation being emitted can be viewed on a **thermal imaging camera**



## 4. Conduction

- **Conduction** is the transfer of thermal energy by the vibration of particles, it cannot happen without particles
- This means that every time particles collide they transfer thermal energy
- Conduction happens effectively in solids as their particles are close together and can collide often as they vibrate around a fixed point
- Metals are also good **thermal conductors** as they contain electrons which are free to move
- In conduction the thermal energy will be transferred from an area which has a high **thermal energy store** (high temperature) to an area where there is a low thermal energy store (low temperature)
- Gases and liquids are poor conductors as their particles are spread out and so do not collide often, we call these **insulators**




## 5. Convection

- **Convection** is the transfer of thermal energy in a liquid or a gas, it cannot happen without particles
- As the particles near the heat source are heated they spread out and become less dense, this means that they will rise
- More dense particles will take their place at the bottom nearest the heat source creating a constant flow of particles
- This is known as a **convection current**
- Convection cannot happen in a solid as the particles cannot flow, they can only move around a fixed point

| Keyword | Definition |
|---|---|
| Conduction | Transfer of thermal energy by the vibration of particles. |
| Convection | Transfer of thermal energy when particles in a fluid rise |
| Convection current | The movement of heated fluids where hot fluid moves upwards, and cold fluid moves downwards |
| Force multiplier | A simple machine that uses a small input force to generate a large output force |
| Input force | The force you apply to make an object move or change shape |
| Insulator | Materials which do not allow thermal energy to pass through them. |
| Infrared radiation | The transfer of thermal energy without the need for particles |
| Lever | A type of machine which is a rigid bar that pivots about a point. It is a force multiplier |
| Output force | The force that is applied to the object moved by the machine |

| | |
|---|---|
| Simple machine | A machine such as a lever or pulley system which changes the size of the force by moving a force over a bigger or smaller distance |
| Temperature | A measure of how hot or cold a substance is |
| Thermometer | An instrument used to measure temperature |
| Thermal conductor | Thermal conductors contain electrons that are free to move |
| Thermal energy store | The energy store associated with an object's temperature |
| Thermal imaging camera | A device used to view, and amount of infrared radiation being emitted from an object |
| Work done | The amount of energy transferred when an object is moved over a distance WD = force x distance |

| 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 |



# Science - Ecosystems

## 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

## 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's 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 |

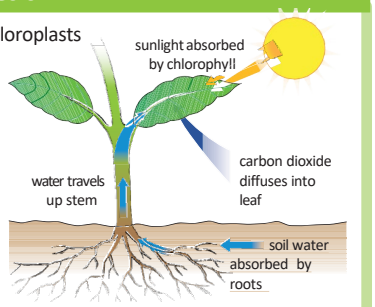
**Fertilisers** can be used to stop plants from suffering with mineral deficiencies

## 4. Photosynthesis

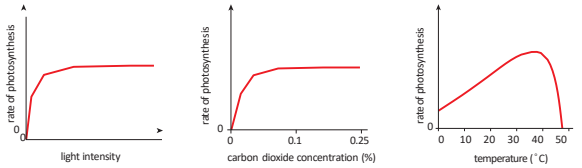
- **Photosynthesis** is the process which occurs in the chloroplasts to produce glucose using sunlight

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**

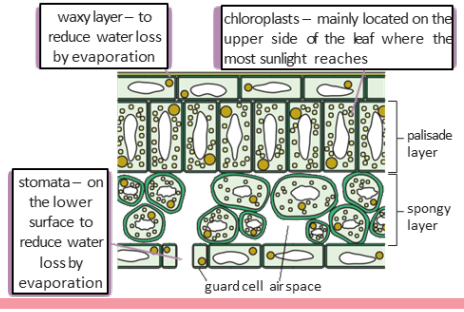



- The rate of photosynthesis can be affected by:
  - Light intensity – the higher the light intensity the higher the rate of photosynthesis up to a point
  - Carbon dioxide concentration – the higher the carbon dioxide concentration the higher the rate of photosynthesis up to a point
  - Temperature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



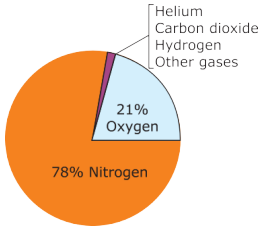

## 5. Leaves

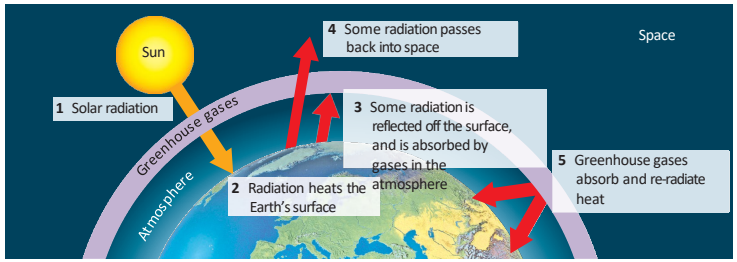
- To best adapt for photosynthesis leaves have a number of adaptations
- They are thin to allow the most light through
- There is a lot of **chlorophyll** to absorb light
- They have a large surface area to absorb as much light as possible



## 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



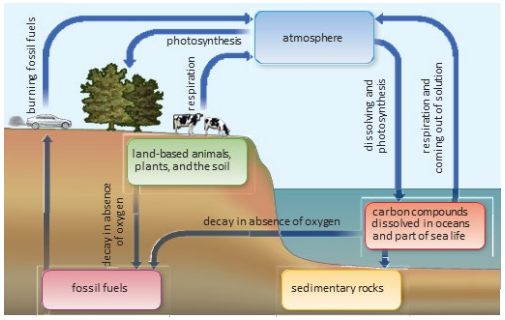




## 2. Global warming

- **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 |
| carbo |
| n zinc |
| iron |
| lead |
| coppe |
| r |

## 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:

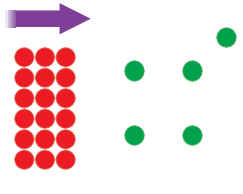
| Advantages | Disadvantages |
|---|---|
| • Resources will last longer<br>• It uses less energy than extracting new materials<br>• It reduces waste and pollution | • Separating rubbish can be seen as a nuisance<br>• The lorries collecting recycling produce pollution<br>• Some materials are easier to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

| 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 |

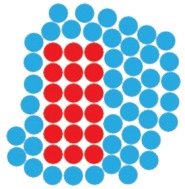
## 1. Friction and drag

- **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.

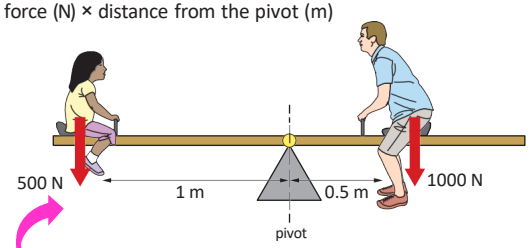
- Both drag and friction are forces so they are measured in **Newtons** (N)

## 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)

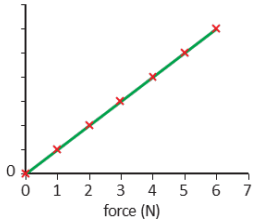
- The size of the moment will increase as the distance from the **pivot** or the size of the force increases
- When an object, such as a seesaw, is balanced, the clockwise and the anticlockwise moments will be equal and opposite, which is known as **equilibrium**
- When forces are equal and opposite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



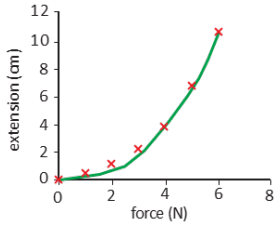

*clockwise moment = force × distance on the right*
*= 1000 N × 0.5 m = 500 Nm*
*anticlockwise moment = force × distance on the left*
*= 500 N × 1m = 500 Nm*

## 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

| 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<br><br>Stress = force/area |

| | | |
|---|---|---|
| **Soy Felipe, tengo el pelo gris y los ojos azules.** | **1** | I'm Felipe and I have grey hair and blue eyes |
| **Mis hijas se llaman Leonora y Sofía y tienen el pelo rubio.** | **2** | My daughters are called Leonora and Sofia, and they have blonde hair. |
| **Mi mujer y yo somos altos y muy guapos.** | **3** | My wife and I are tall and very good looking. |
| **Mi cumpleaños es el treinta de enero.** | **4** | My birthday is the 30th January. |
| **Me encanta la Fórmula 1. Mi piloto preferido se llama Fernando Alonso.** | **5** | I love Formula 1. My favourite driver is Fernando Alonso. |
| **Mi cantante preferida es Rosalía, es muy talentosa.** | **6** | I am serious and ambitious. My favourite singer is Rosalia, she is very talented. |
| **En el futuro, me gustaría ser actor porque me gusta actuar.** | **7** | In the future, I would like to be an actor because I like to act. |
| **Soy Felipe, tengo el pelo gris y los ojos azules.** | **1** | I'm Felipe and I have grey hair and blue eyes |

# 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

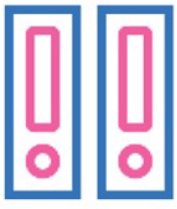
- Take a blank piece of paper/white board and write down everything you can remember about that topic (with no prompts)
- Give yourself a timed limit (e.g 10 minutes)

### 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

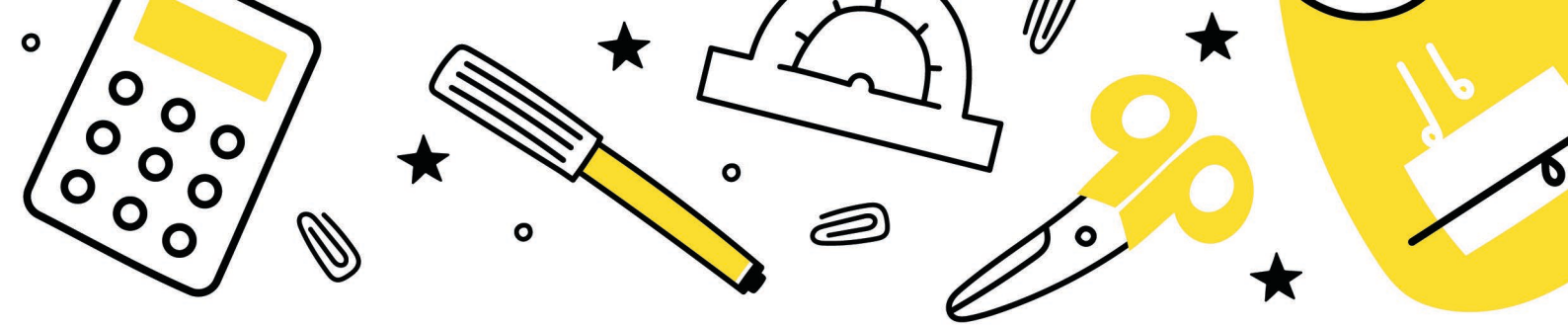
- Cover up your knowledge and answer the questions from memory.
- Take your time and where possible answer in full sentences.

### 4. Self Mark and Reflect

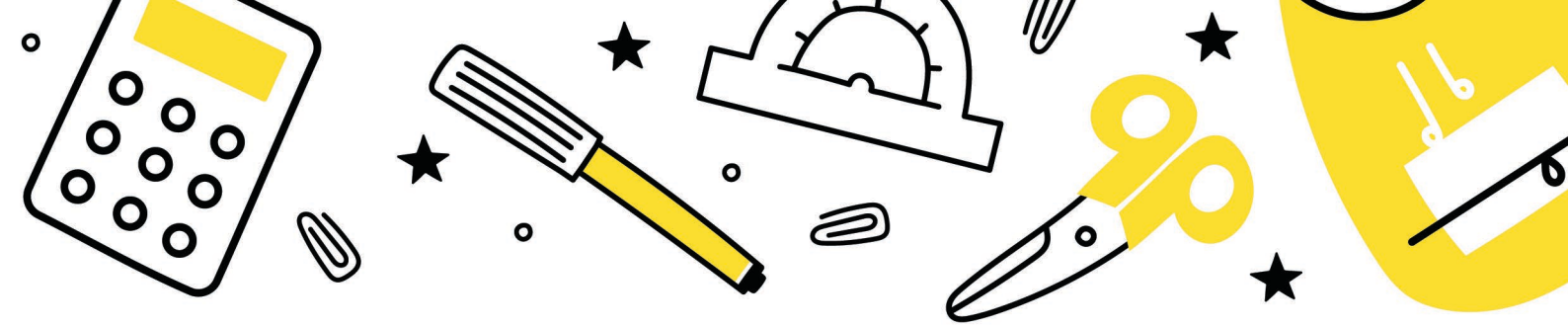
- Go back to the content and self-mark your answers in green pen.

### 5. Next Time

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



## NOTES



## NOTES