

Y10 KNOWLEDGE ORGANISER

SEPTEMBER 2024 TO FEBRUARY 2025

*“ If you are not willing to learn, no one can help you.
If you are determined to learn, no one can stop you. ”*



Morton Academy
The best in everyone™

Part of United Learning

Name:

Tutor Group:

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Your Knowledge Organiser and Self-Quizzing Book

Remember!

You **must** bring your Knowledge Organiser and Self-Quizzing Book to every lesson and place it on your desk at the beginning of each lesson.

You **must** keep all of your Knowledge Organisers and Self-Quizzing Books because the fundamental knowledge required in Year 10 will also be required in Year 11.

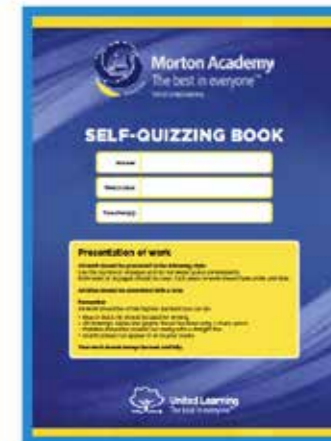
Knowledge Organisers are **NOT** a replacement for revision guides but they include the fundamental knowledge that ALL students in Year 10 require.



Knowledge Organisers

Knowledge Organisers contain critical, fundamental knowledge that you **MUST** know in order to be successful in Year 10 and subsequent years.

They will help you recap, revisit and revise what you have learnt in lessons in order to move the knowledge within from your short-term memory to long-term memory.



Self-Quizzing Book

This is the book that all Knowledge Organiser homework is to be completed in. You must follow the simple rules as to how they are to be used.

How do I complete Knowledge Organiser homeworks?

You will be set a **MINIMUM** of 2 Knowledge Organiser homeworks in every subject each half term

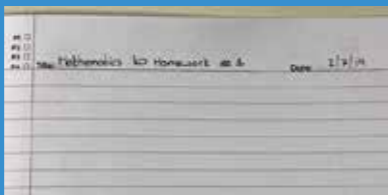
STEP 1

Check SMHW and identify what words/definitions/facts you have been asked to learn.



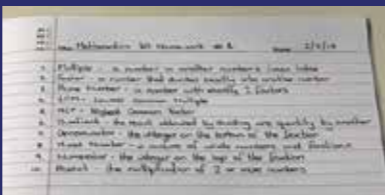
STEP 2

Write today's date and the title from your Knowledge Organiser.



STEP 3

Write out the key words/definitions/facts you have been set from SMHW in FULL.



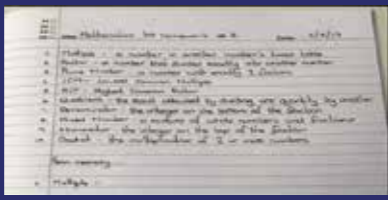
STEP 4

Cover the definitions in your SELF-QUIZZING BOOK, apart from the first. **Read it, Cover it, Say it** in your head, Check it... **REPEAT** until confident.



STEP 5

Cover up ALL the definitions/facts and write them out from memory in your SELF-QUIZZING BOOK.



STEP 6

Check your answers and correct where required. Repeat Steps 4 to 6 until you are confident.

You will be **tested** on the 10 words/definitions/facts as a starter activity in your lesson on the day that the homework is due.

This will be completed in your self-quizzing book and you will mark it in class.

Can I write in paragraphs?

The TIPTOP rule

You move onto a new paragraph when you change **T**ime, **P**lace, **T**opic or **P**erson.

- I always start an essay with an **introduction** which addresses the question.
- I finish an essay with a **conclusion** to summarise the main points of my argument and to address the question again.
- I use **connectives** in each paragraph to link my ideas and to put them in a logical order.

| | | |
|---------------|-----------|-------------|
| Furthermore | But | Meanwhile |
| Whereas | Since | Nonetheless |
| Nevertheless | Yet | However |
| Alternatively | Therefore | Although |
| Consequently | Besides | Moreover |

Have I used the correct grammar?

I am aware that I must use language that is **appropriate to my reader**.

- No slang** that lesson was bangin'
- No informal language** I'm gonna do my homework now

Other things to consider:

- ✓ I am clear about the **purpose** of this piece of writing
- ✓ I know who my **audience** is
- ✓ I will use a suitable **layout** and **text type**

I am proud of my work because...

- I have written clearly so that my reader can understand my writing easily.
- I have checked my **spelling** and corrected any errors.
- I have used full sentences with a subject and a verb.
- I have used correct **punctuation** and **grammar**.
- I have paragraphed my work using **TIPTOP**.
- My writing is suitable for the person I am writing for.

Can I spell familiar words accurately?

Common contractions

We must use an **apostrophe** to replace any **letter(s)** we have left out.

| | | | |
|------------|-----------|---------|----------|
| 11 o'clock | How's | They'd | Where'll |
| Aren't | I'd | They'll | Where's |
| Can't | I'll | They're | Who'd |
| Couldn't | I'm | Wasn't | Who'll |
| Didn't | Isn't | We'd | Who's |
| Doesn't | It'd | We'll | Why'd |
| Don't | It'll | We're | Why'll |
| Hadn't | It's | Weren't | Why's |
| Hasn't | Mightn't | What'd | Won't |
| Haven't | Mustn't | What'll | Wouldn't |
| He'd | Shan't | What's | You'd |
| He'll | She'd | When'd | You'll |
| He's | She'll | When'll | You're |
| How'd | She's | When's | |
| How'll | Shouldn't | Where'd | |

Can I use different sentence types?

Simple sentences: Contains a subject and a verb and can contain an object

- Sarah likes to read in the library.
- Tom enjoys reading at home.

Compound sentences: Joins two simple sentences using the connectives: *for, and, nor, but, or, yet, so*.

- Sarah likes to read in the library but Tom prefers to read at home.

Complex sentences: A complex sentence contains a conjunction such as *because, since, after, although, or when*.

- Because Robert felt tired, he only studied for an hour.
- Although the rain had stopped, the pitch was still water-logged.
- Paul enjoys Music, however, he is more proficient in Art.

Homophones

I have checked that I have not mixed up my homophones.

| | |
|---------------|---------------------------|
| Affect/effect | One/won |
| Bare/bear | Passed/past |
| Brake/break | Peace/piece |
| Buy/by | Practice (n)/practise (v) |
| For/four | Read/red |
| Flour/flower | Sea/see |
| Grate/great | Sight/site |
| Hair/hare | Son/sun |
| Hole/whole | To/too/two |
| Hour/our | Wait/weight |
| Knight/night | Weak/week |
| Know/no | Wear/where |
| Meat/meet | |

Basics:

- Every sentence must start with a capital letter.
- Every sentence must finish with some form of punctuation: .?!)
- Proper nouns need capital letters. These are **unique** people, places or things e.g. there are many cities so 'city' doesn't take a capital letter. However there is only one London, therefore it takes a capital letter.

→ **When writing titles of works such as books, films or plays:**

- Capitalise the first word
- Capitalise any main/important words
- Don't capitalise minor words such as 'and', 'of' or 'the' e.g. The Sound of Music, The Wizard of Oz, Harry Potter and the Goblet of Fire

→ **When writing speech:**

- Go to a new line when a different person speaks e.g. "Good morning," said the headteacher. "It's the afternoon!" replied the student.
- Each person's speech is marked with speech marks e.g. "Walk on the left," said Mr Mathews.

Can I spell accurately?

1. Sound out the word.
2. Think about how it looks.
3. Think about a similar word.
4. Is there a memory sentence for this word? (e.g. big elephants cannot always use small exits).
5. Find the word in a list –
 - Key words list.
 - Frequently used words list.
 - Your own word bank.
6. Look it up in a dictionary/spellchecker.
7. Ask a friend or teacher.
8. To learn it; look, cover, write, check.
9. Once you've solved it, add the correct spelling to your own word bank.

Can I use punctuation?**The Apostrophe**

I always aim to use apostrophes correctly.

There are two main reasons why we use apostrophes: for possession and to replace a letter or letters.

Note: Apostrophes are **NEVER** used to denote plurals

| | | |
|-------------------------|-----|--|
| Full stop | . | indicates that a sentence has finished. |
| Comma | , | indicates a slight pause in a sentence, separates clauses in a complex sentence and items in a list. |
| Question mark | ? | goes at the end of a question. |
| Exclamation mark | ! | goes at the end of a dramatic sentence to show surprise or shock. |
| Apostrophe | ' | shows that letter(s) have been left out or indicates possession. |
| Speech marks | "" | indicate direct speech, the exact words spoken or being quoted. |
| Colon | : | introduces a list, a statement or a quote in a sentence. |
| Semicolon | ; | separates two sentences that are related and of equal importance. |
| Dash / hyphen | - | separates extra information from the main clause by holding words apart. |
| Brackets | () | can be used like dashes, they separate off extra information from the main clause. |
| Ellipsis | ... | to show a passage of time, to hook the reader in and create suspense. |

Can I use punctuation?**Apostrophe for Possession**

(To show that something belongs to another)

If a single thing/person owns anything, add an apostrophe + 's'.

- The dog's bone
- The boy's homework
- Jones's bakery
- Yesterday's lesson

However, if it is plural (more than one), an apostrophe comes after the 's'.

- The dogs' bones
- The boys' homework
- Joneses' bakeries (lots of Jones families)
- Many websites' content is educational

There/their/they're

Note: special care must be taken over the use of there, their and they're as they sound the same but are used quite differently:

- **There** shows position Your seat is over there.
- **Their** shows that 'they' own something *Their blazers are navy blue.*
- **They're** is short for **they are** as in *They're revising every day.*

Its

Note: **its**, which shows that something owns something (like our, his etc), **does not** take an apostrophe: the dog ate its bone and we ate our dinner.

Your/you're

Note: special care must be taken over the use of **your** and **you're** as they sound the same but are used quite differently:

- **Your** is possessive as in *this is your pen.*
- **You're** is short for **you are** as in *you're coming over to my house.*

1. The Formal Elements

- **Line:** Creates shape; the outer edge of something.
- **Tone:** Levels of dark or light on an object, shape or face.
- **Highlight:** The lightest areas on an object, shape or face.
- **Texture:** The feel or appearance of a surface; how rough or smooth it is.
- **Shape and Form:** What is created when a line is enclosed and further techniques are used to make an object, shape or face look 3D.
- **Colour:** When light is reflected off an object, colour is what the eye sees.

3. The Colour Wheel**2. Colour Theory**

- **Colour:** When light is reflected off an object, colour is what the eye sees.
- **The Primary Colours** are red, blue and yellow. The primary colours are combined to create secondary colours.
- **The Secondary Colours** are green, purple and orange. Red + Blue = Purple. Blue + Yellow = Green. Yellow + Red = Orange.
- **Warm Colours:** Colours that give the feeling of warmth – red, orange, yellow.
- **Cool Colours:** Colours that give a cool feeling – blue, green, purple.
- **Complementary Colours:** These colours are **opposite each other** on the colour wheel. When placed together these colours **complement** each other - they contrast and make each other stand out.
- **Harmonious Colours:** These colours are **next to each other** on the colour wheel. When these colours are placed together they work in harmony with each other - these colours look similar to each other.
- **Tint:** When **white** is mixed with a colour to make it lighter.
- **Shade:** When **black** is mixed with a colour to make it darker.

4. Basic Art Forms And Associated Terms

- **Portraiture:** The artistic process of creating a painting, drawing, photograph, or engraving of a person, especially one depicting only the face or head and shoulders.
- **Features:** Eyes, nose, mouth, ears, eyebrows etc.
- **Composition:** the arrangement or layout of features, shapes or objects on the page.
- **Proportion:** The size, shape or position of one element of a portrait in comparison to another.
- **Foreground, Mid-ground, Background:** The areas at the front, middle or back of a drawing or painting.
- **Negative Space:** An area of the portrait without detail.
- **Still Life:** Art depicting mostly inanimate objects, typically common objects which are either natural (food, flowers, dead animals etc.) or man-made (books, vases, jewellery etc.).
- **Cylinder:** A 3D shape with straight parallel sides and a circular or oval cross section.
- **Cuboid:** A 3D shape with six sides at right angles to each other.
- **Landscape:** Landscape painting or drawing refers to an artwork whose primary focus is scenery, such as mountains, trees, rivers, as well as man-made structures such as houses and bridges.
- **Perspective:** This is a drawing method that shows how things appear to get smaller as they get further away. This gives the painting depth and makes the scene look more realistic.



Landscape painting by Vincent van Gogh



Still Life painting by Philippe de Champaigne



Portrait painting by Françoise Nielly

Assessment Objective 1 - DEVELOP

Develop ideas through investigations, demonstrating critical understanding of sources.

This Means:

- The creation of **'Artist Research Pages'** in your sketchbooks.
- You need to research the art work of a **wide range** of artists or cultures; these are known as sources e.g. 'the source' or 'the beginning' of your own ideas.
- Your page should include the artist's name - this will form your title; this should either be handwritten in **suitable lettering** or printed from the computer.
- Your 'Artist Research Page' should be a piece of **artwork** in its own right and should reflect the style of the artist that you are studying. See the examples on the right.
- Present examples (pictures) of your chosen artist's work. These should be printed off, **carefully** cut out and stuck into your book; they need to be **high quality** and not **pixelated**. Presentation is important - you can mount the pictures to create frames or present them creatively.
- Write about the artist** and present the information creatively. See the guide on how to do this.

Assessment Objectives are what your work is marked against. Your body of work must include elements of each of the following four Assessment Objectives.



Examples of Artist Research Pages



Assessment Objective 2 - REFINE

Refine work by exploring ideas, selecting and experimenting with appropriate media, materials, techniques and processes.

This Means:

- Look at the artists that you have researched and try to **imitate their style**.

You can do this by:

- Copying a section or small part of a piece of artwork by your chosen artist.
- Work from your own photographs (primary sources) or photographs found in books, magazines or online (secondary sources) trying to imitate your chosen artist's style.
- You should experiment with different **materials and/or techniques**.
- Refine** your work by repeating processes trying to show **improvements** in your technique.

Assessment Objective 3 - RECORD

Record ideas, observations and insights relevant to intentions as work progresses.

This Means:

- Now that you have studied artists and practised their style, you need to record your **own ideas** - these should be **visual** (drawing/painting), and **written** (explanation of ideas).
- You also need to record your findings from the work you did for AO2 - how well did your experiments go? How effective were your chosen techniques and materials?
- What you write should be purposeful, thoughtful and meaningful.
- You will need to use, **specific art-related** language - use the guide to help you do this.

Assessment Objective 4 - PRESENT

Present a personal and meaningful response that realises intentions and demonstrates understanding of visual language.

This Means:

- Produce **your own, imaginative, high quality** final piece/pieces.
- Your final piece/pieces must show a clear connection to your previous work.
- Your final piece/pieces must show an insightful and meaningful journey from your starting point.
- Your final piece should bring together all the work you have produced for the other three AOs.

Guide to writing about the work of other artists

Use this guide when working on Assessment Objective 1. Study the work of your chosen artist and then try to answer, in order, as many of the questions as you can. Some questions you will be able to answer just by studying the artist's work; others may require you to do further online research. Each of the questions has an example answer and a picture relating to the answer.

1. Start by introducing the artist and how they create their art e.g.

"Vladimir Gvozdev is a Russian artist who mainly works in paint and presents his images on collaged backgrounds. He often uses objects as part of the collage to add to the general feel of the paintings."



2. Tell us about the common themes running through the artist's work. You can do this by studying a collection of their images and highlighting the things in common. Try to be as descriptive as possible e.g.

"My chosen artist is best known for his images of mechanical animals presented on worn out, sometimes burnt, backgrounds surrounded by annotations and small objects."

3. Describe what you like about the artist's work e.g.

"What I find most interesting about James Prosek's paintings is the way that he takes elements from two or more animals and puts them together to create a new creature."



4. Choose one or two pieces that you particularly like and describe them in detail. Describe how the artist has used formal elements - look at how we write about formal elements on the next page e.g.

"I love Sonny's use of contrasting lights and darks, the way the lighter subject matter contrasts with the jet-black background really makes the image jump off the page. His graduated use of tone around the edges of the skull and eye generates effective shape and form and a realistic 3D illusion. The flowing texture of the fur gives the painting movement, like the gorilla is facing into the wind."



5. Look at your chosen pieces. What do you think the meaning behind the artwork is? Is there a message? If the artist is contemporary (alive and working now), is there something happening in the world today that is reflected in the art? If the artist is from the past, what was happening in the world when they were working e.g.

"I think that there is a strong message behind this painting by Richard Ahnert. We see a creature that is part animal, part ship, something natural and something man-made. I think that the artist is trying to tell us that if humans and animals work together then we can live in harmony."



6. Look at your chosen pieces. What is the mood or atmosphere of the artwork? What emotions do you experience looking at it? Look at the list of words to describe moods on the next page e.g.

"I find this to be a particularly powerful piece. It has a very sad and sombre mood to it with both the rider and the horse bowing their heads. The horse seems to be struggling to walk as it pulls a heavy load and it has been sculpted in such a way to give movement and the illusion of a slow, plodding walk."



7. Finally, describe how your chosen artist can influence and inspire your own work e.g.

"I would like to take the idea of using scrap metal to create my own sculpture in the way that Mark Gibbs has here. I also like the way he has put movement into the animal and given it emotion, this is something I'd like to achieve in my own piece."

KEY ART TERMS, 'FORMAL ELEMENTS' AND HOW TO USE THEM

When recording your thoughts about your own experiments and ideas (AO3) and when writing about the work of other artists (AO1), you need to be using some of the terms that we see described on this page. These terms are known as 'formal elements'. Look at your own work and ask yourself which of these terms below applies to your work. Now look at the list of adjectives highlighted in bold italics beneath each description. Select the adjectives that apply to the art you are studying. Can you think of other descriptors to add?

COLOUR

Think about your overall impression of the colours used, how they look and feel, how the colours work together (or not).

Natural, lively, stimulating, subtle, artificial, clashing, depressing, garish, gaudy, violent, bright, brilliant, deep, earthy, intense, rich, strong, vibrant, vivid, dull, flat, pale, muted, subdued, cool, cold, warm, hot, light, dark, blended, muddled, complementary, contrasting, harmonious.

SHAPE AND FORM

Think about the overall shapes in the artwork and the way forms (things) are depicted.

2D, flat, abstracted, simplified, stylised, 3D, realistic, natural, sharp, detailed, blurred, obscured, overlapping, distorted, exaggerated, geometric, hard-edged, soft-edged.

TONE

This refers to the lightness or darkness of something. This could be a shade or how dark or light a colour appears. Tones are created by the way light falls on a 3D object. The parts of the object on which the light is strongest are called highlights and the darker areas are called shadows. There will be a range of tones in between the highlights and the shadows. The wider the range of tones, the more 3D an object looks.

Dark, light, mid, flat, uniform, broken, constant, changing, graduated, fade, gradual fade, subtle, contrasting, dramatic.

TEXTURE

This is to do with the surface quality of something, the way something feels or looks like it feels. There are two types of texture: actual texture and visual texture. Actual texture really exists, so you can feel it or touch it. You can create actual texture in an artwork by changing the surface, such as sticking things down or applying paint thickly. Visual texture is created using marks to represent and give the illusion of actual texture. You can create visual texture by using lines, shapes, colours or tones.

Flat, smooth, raised, rough, coarse, pitted, scratched, uneven, uniform, hairy, sticky, soft, hard, shiny, glossy, flowing, movement.

COMPOSITION

Look at how the elements in the painting are arranged, the structure and relationships between the different parts, and how your eye moves around the composition.

Arrangement, layout, structure, position, landscape format, portrait format, horizontal, vertical, diagonal, foreground, background, middle ground, centred, asymmetrical, symmetrical, balanced, unbalanced, lopsided, off-centre, overlapping, cluttered, chaotic, spacious, empty, negative space.

MARK MAKING

Mark making means making marks on a surface with any tool or material e.g. paint, paintbrush, pencil, pastel etc. In some styles of painting, all brush marks are carefully hidden by the artist; in others, the marks are purposely made clearly visible. Think about words that can be used to describe marks made by any means.

Visible, impasto, blended, smooth, thick, thin, bold, timid, heavy, light, edgy, stippling, hatching, splatters, drips, layered, flat, precise, refined, regular, straight, quick, sketchy, uneven, irregular, vigorous, violent, loose, patterned, movement.

WORDS TO DESCRIBE THE GENERAL MOOD OF A PIECE OF ART

Calm, content, peaceful, relaxed, tranquil. / Cheerful, happy, joyful, romantic. / Depressed, gloomy, miserable, sad, sombre, tearful, unhappy. / Aggressive, angry, chilling, dark, distressing, frightening, violent. / Energetic, exciting, stimulating, thought-provoking. / Dream-like, surreal, ethereal, mysterious. / Strange, bizarre, confusing. / Retro, historical, from the past. / Modern, ultra-modern, futuristic. / Industrial, fantasy, sci-fi. / Playful, childish, comical

Programming

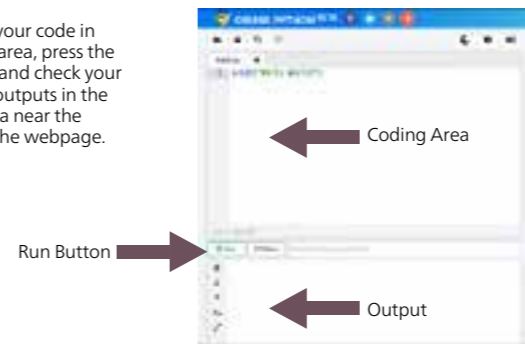
Programming Keywords

| Variable | Variables store information and can be compared to a box that stores things, for example: Name = "Claude" |
|------------|---|
| Algorithm | A set of step by step instructions used to solve a problem. |
| Flowchart | A visual representation of an algorithm. |
| Assignment | The process of storing a value inside a variable, for example: Password = "OXJ91mau" |
| Expression | A combination of operators and operands that is interpreted to produce some other value. |

Accessing Python Development Environment

To access our Python programming environment, open your web browser and go to www.online-python.com

Then, type your code in the coding area, press the run button and check your program's outputs in the outputs area near the bottom of the webpage.



Comparison Operators

| Operator | Meaning | Example | Evaluates to |
|----------|--------------------------|---------|--------------|
| == | Equal to | 7==7 | True |
| != | Not equal to | 6!=7 | True |
| > | Grander than | 7>6 | True |
| < | Less than | 5>6 | False |
| >= | Greater than or equal to | 6>=8 | False |
| <= | Less than or qual to | 7<=7 | True |

Arithmetic Operators

| Operator | Meaning | Example |
|----------|----------------|--------------------|
| + | Addition | num1 = num2 + num3 |
| - | Subtraction | num1 = num2 - num3 |
| * | Multiplication | num1 = num2 * num3 |
| / | Division | num1 = num2 / num3 |

Data Types

| Data Type | Example | Description |
|-----------|-------------|--|
| String | x = "Hello" | Stores combinations of any characters – letters, numbers and symbols |
| Integer | x = 11 | Stores whole numbers |
| Float | x = 11.5 | Stores decimals |
| Boolean | x = True | Stores values True or False |

| Selection | |
|--|---|
| If Statements | |
| Python | Pseudocode |
| <pre>x = 3 if x == 1: print("x is 1")</pre> | store value 3 in variable x if value in x is equal to 1, then: display string "x is 1" on screen |
| If...else Statements | |
| Python | Pseudocode |
| <pre>x = 3 if x == 1: print("x is 1") else: print("x is not 1")</pre> | store value 3 in variable x if value in x is equal to 1, then: display string "x is 1" on screen if the previous condition is not true display string "x is not 1" on screen |
| if...elif...else statements | |
| Python | Pseudocode |
| <pre>x = 10 if x >= 100: print("x is >= 100") elif: x >= 50: print("x is >= 50") elif: x >= 10:: print("x is >= 10") else: print("x is < 10")</pre> | store value 10 in variable x if x is equal to or larger than 100, then: display string "x is >= 100" on screen if x is equal to or larger than 50, then: display string "x is >= 50" on screen if x is equal to or larger than 10, then: display string "x is >= 10" on screen execute if the previous conditions are not true display string "x is < 10" on screen |

| Flowchart Symbols | |
|-------------------|----------------------------------|
| Symbol | Meaning |
| | Start/End |
| | Controls the flow of the program |
| | Input/Output |
| | Process |
| | Selection/Decision |
| | Subprogram |

Comments

To write a comment that will be omitted by Python when the program is running, use # symbol, for example:
If x > 100: #This is an if statement

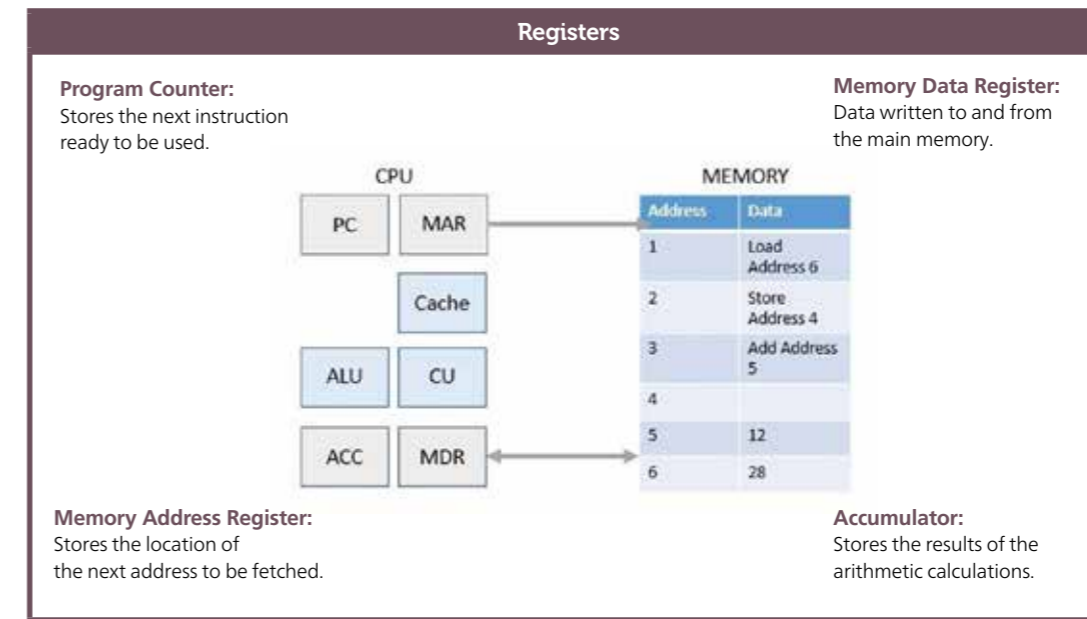
| Loops | | | |
|---|--|--|--|
| While Loops | | For Loops | |
| <pre>count = 0 While count < 9: print("The count is:", count) count = count + 1 print("Thank you")</pre> | While loop repeats while the given condition is true. It tests the condition every time. | <pre>Fruits = ["orange", "apple", "mango"] for i in fruits: print(i)</pre> | For loop repeats a set number of times. In this case, it will happen 3 times – one for each fruit. |

Architecture of the CPU

Purpose

The Von Neumann Architecture consists of the CPU and Memory which are interconnected and can both store instructions and data. The CPU itself consists of different components: Registers, Cache, Control Unit and Arithmetic Logic Unit. The purpose of the CPU is to fetch, decode and execute instructions.

| Purpose | | |
|--|--------------------------------------|--|
| Control Unit | Cache | Arithmetic Logic Unit |
| Decodes instructions and sends signals the other components on how to respond to this instruction. | Stores frequently used instructions. | Used to find similarities and make problems easier to solve. |



What is a register?

A location within the CPU that stores addresses and data which can be accessed quickly.

Did you know?

The clock is another component found in the CPU. This controls the rate in which cycles are processed every second. The rate is determined by the Clock Speed.

Key terms

Fetch Decode Execute
Instructions Data Signals

CPU Performance

Purpose

To get the best out of a CPU, there are a number of characteristics that can determine how well it performs:

- Clock Speed
- Cores
- Cache

Did you know?

CPU's can run at a higher clock speed than it was designed to run. This is known as **overclocking** and is commonly done with PC's designed to play video games.

Revision tip!

If you struggle to remember any of the characteristics that impact the performance of the CPU, remember they all begin with the letter C.

Cache Size

Definition / Meaning:

The cache stores instructions that are previously used or frequently used. It acts as the intermediary between the CPU and Main Memory.



How does an increase in Cache Size impact CPU performance?

- More instructions used can be stored on the CPU.
- This means that data stored in the cache doesn't need to be fetched from main memory.
- As a result, creating a more efficient process

Clock Speed

Definition / Meaning:

This controls how many cycles can be processed per second. The higher the clock speed, the more instructions executed per second.



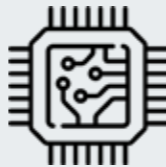
How does an increase in Clock Speed impact CPU performance?

- An increase in Hz (Hertz) can lead to more tasks being executed per second.
- As a result, programs/software will respond faster.

Cores

Definition / Meaning:

It acts as the brain of the CPU and is responsible for executing instructions. Modern CPU's will use a multi-core processor. (i.e. multiple cores)



How does an increase in cores impact CPU performance?

- It allows instructions to be split up between the processors.
- As a result, they can be executed simultaneously.
- This will help to reduce the amount of time required to run a program.

Primary Storage

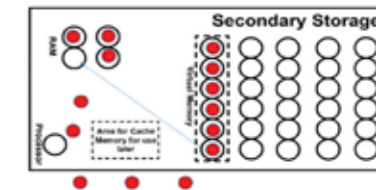
Purpose

A primary storage device is a medium that holds memory for short periods of time while a computer is running. There are two types of primary storage used by computer systems: RAM and ROM.

Virtual Memory

Description:

When the RAM becomes full, the overflow of data normally stored in the RAM will be stored in Virtual Memory which is located on the hard drive. Once space becomes available, data will move from VM and back to RAM. However this is a slow process.



Flowchart Symbols



RAM (Random Access Memory) and ROM (Read-Only Memory) both store data but there are a number of key differences between the two.



| RAM | ROM |
|--|---|
| Volatile memory | Non-volatile memory |
| Read and write data | Reads data |
| Stores programs/data currently in use | Stores instructions required to boot up the computer (BIOS) |
| Expandable | Soldered onto the motherboard |
| Contents change frequently (Temporary) | Contents hardly ever change. (Permanent) |

Difference between volatile and non-volatile memory

Volatile memory means when the computer is switched off, data is lost. Whereas, non-volatile memory has the ability to retain data even when the computer is switched off.

BIOS

BIOS stands for Basic Input/Output System. It designed to boot up the computer using a POST (Power on self-test) and determine what hardware is connected to the system.

Key terms

Volatile Non-volatile Storage
Read Write

Secondary Storage

Definition/Meaning

Secondary storage has the ability to store files even when the computer is switched off. Therefore, it's a non-volatile form of storage.

Magnetic Storage

Description:

The most common example of magnetic storage is a **Hard Drive**. The hard drive contains a number of moving mechanical parts such as a spinning platter with a thin magnetic coating. A "head" moves over the platter, writing 0's and 1's on the platter.



Revision tip!

A common misconception is that secondary storage backs up data. If a duplicate copy is created then the device used to back it up would be classed as tertiary storage.

Review

| Cost | Capacity | Reliability |
|---|---|---|
| Expensive from the outset, but cost per MB represents value for money. | Enough capacity to store different types of files. You can buy hard drives that can hold 4TB of data. | Can perform well for a long period of time but performance will eventually deteriorate. |
| Durability | Portability | Speed |
| If it's external then it can become damaged if dropped because it has moving parts. | Would have to be detached from the computer and it's heavy. | Uses a head that moves over a platter to read and write data so it's not instant. |

Key terms

| | |
|--------------------|--|
| Cost | How much the device costs per MB. |
| Capacity | How much space is available on the storage device. |
| Reliability | Longevity – how well it can maintain the same level of performance over time. |
| Durability | How resistant it is to external factors such as being dropped, scratched and how it responds to being in extreme conditions. |
| Portability | How easy is it to transport from one place to another. |
| Speed | How quickly the data can be read and transferred from the storage device. |

Units

Why do computers use bits?

Binary is a number system that only uses two digits: 1 and 0. All information that is processed by a computer is in the form of a sequence of 1s and 0s. Therefore, all data that we want a computer to process needs to be converted into binary. These digits 1 and 0 are often referred to as bits.

Units of data storage

| Order (Smallest to largest) | Unit | Equivalent |
|-----------------------------|--------|-------------|
| 1 | Bit | 0 or 1 |
| 2 | Nibble | 4 bits |
| 3 | Byte | 8 bits |
| 4 | KB | 1,000 Bytes |
| 5 | MB | 1,000 KB |
| 6 | GB | 1,000 MB |
| 7 | TB | 1,000 GB |
| 8 | PB | 1,000 TB |

Sound file size:



Formula:
Sound file size = sample rate x duration (s) x bit depth

Worked example:

Sample rate = 3
Duration = 1 minute 30 seconds
Bit depth = 2
 $3 \times 90 \times 2 = 540$ bits

Image file size:



Formula:
Image file size = colour depth x image height (px) x image width (px)

Worked example:

An image that is 400 x 400 with a colour depth of 4 bits.
 $(400 \times 400) \times 4 = 640000$ bits
 $640000 / 8 = 80,000$ bytes

Text file size:



Formula:
Text file size = bits per character x number of characters

Worked example:

Document that consists of 56 characters.
 $50 \times 8 = 400$ and $6 \times 8 = 48$
 $(400 + 48 = 448)$ bits

Exam tip!

Use of 1,024 for conversions and calculations would be acceptable. Allowance for metadata in calculations may be used

Component 1: Exploring Media Products

| What are the different types of creative media product? | |
|---|---|
| Audio / Moving Image | <ol style="list-style-type: none"> 1. TV Programmes 2. Films 3. Music Videos 4. Animations 5. TV and Radio Adverts 6. Radio Broadcasts 7. Podcasts |
| Publishing Products | <ol style="list-style-type: none"> 1 Newspapers 2 Magazines 3 Comics 4 Brochures 5 Print Advertisements |
| Interactive Media Products | <ol style="list-style-type: none"> 1 Websites 2 Mobile Apps 3 E-Magazines 4 Mobile Games 5 Online Games 6 Video Games 7 Advertisements |

| How can you identify the audience for a media product? | |
|--|---|
| 1. Gender | Is it aimed more at a male or female audience? Or both? |
| 2. Age | Is it aimed at a particular age group? E.g. children/teenagers. |
| 3. Lifestyle | Is it for a specific group with a shared interest? E.g. extreme sports, knitting, cars. |
| 4. Socio-Economic | Is it aimed at a particular class of people? E.g. upper class - Tatler magazine. |
| 5. Primary Audience | Who is the product mainly aimed at? |
| 6. Secondary Audience | Who else might be interested in the product or be attracted to it? |

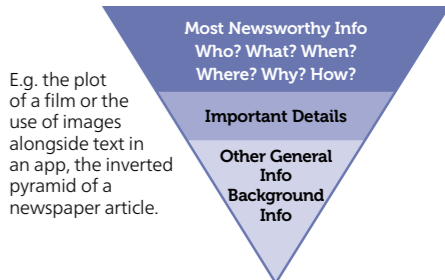
| What are the purposes of different media products? |
|---|
| <p>The features of media products which are common to most similar products.</p> <p>For example - Most Magazine covers feature: A title, a larger central image, information about the articles in the magazine, the price, a barcode etc.</p> |

| What are the purposes of different media products? |
|--|
| To inform the audience |
| To inspire the audience |
| To entertain the audience |
| To benefit the audience |
| To raise awareness for a cause |
| To promote a product/service/person |
| To innovate |
| To provide escapism |
| For the benefit of the community |
| For profit |
| For experimentation |

| What are the different types of creative media product? | |
|---|--|
| 1. Genre | <p>The recognisable type/style of product.</p> <ul style="list-style-type: none"> • For Film this includes: Sci-Fi, Horror, Thriller, Comedy, Animation. • For Games: 1st Person Shooter, Driving, Sports, PVP, Strategy |
| 2. Sub-Genre | Different versions within a genre - perhaps combining two genres to make a new one (Hybrids) e.g. Animated Sci-Fi, First Person Driving Game. |
| 3. Repetition/Difference | How similar/different is the magazine, TV programme, website, game to other similar products in the same genre. |

| Representation of people and places: How does the media product portray people and places? |
|---|
| Are there positive or negative portrayals of the characters and places? |
| Are there stereotypical images/descriptions? |
| Does the producer consider the perspective of the audience? |

| Audience interpretation: How does the audience interact with the product? |
|--|
| 1. Passive interaction: Accepting the message without question. |
| 2. Active interaction: Questioning the message given or using interactive features e.g. the Red Button, voting on celebrity shows like "I'm a Celebrity". |
| 3. Preferred Readings: Where the producer wants to give a particular message or point of view. |

| Narrative: What are the different ways that media producers develop the story? | |
|--|--|
| 1. Storytelling | <p>E.g. the plot of a film or the use of images alongside text in an app, the inverted pyramid of a newspaper article.</p>  |
| 2. Narrative Structure | Does the story have a linear structure? (Start, middle, end) Or a non-linear structure? Is it interactive? Is the storyline circular? |
| 3. Point of view (POV) | From whose point of view is the story told/ experienced? 3rd person? 1st person? |
| 4. Characterisation | This helps in creating a picture of the protagonist and others, in the reader's mind. It talks about the characters - Persona, Looks, Mannerisms, Language, Type of Person, Background etc. |
| 5. Themes | Does the product have an identifiable theme? E.g. Post-apocalyptic, Romance, Zombie invasion, Western, Detective etc. |
| 6. Setting | Where is the product based? This could be the location or background, or in games it could be open-world. |
| 7. Mode of address | There are different ways to address the audience: formal (e.g. a news broadcast), direct (e.g. the cover of a magazine) or informal (e.g. a game). |

Media production techniques

How are media production techniques combined to create meaning for audiences?

Audio/moving image media products:

- **Camera work** e.g. set-up, framing, shot type/length, camera angle, movement of the camera in a shot
- **Mise en scène** e.g. use of costume, hair, makeup, props, setting and expression
- **Lighting set-up** e.g. under, overhead lighting, side lighting, fill, use of shadows
- **Use of sound** e.g. sound effects, voice-overs, dialogue, incidental music, bridges, sound mixing
- **Editing techniques** e.g. flashbacks, transitions, pace, continuity, montage

Publishing media products:

- **Using different layouts and design techniques** e.g. balance, contrast, proximity, repetition, rule of odds, use of white space
- **Style of typography** e.g. serif and sans serif typefaces, fonts and font size, letter spacing and line height, readability
- **Photographic techniques** e.g. composition, image quality, lighting effects, depth of field, aesthetic, rule of thirds
- **Image editing techniques** e.g. adding filters, colour and contrast, layering images, distorting images

Interactive media products:

- **Interactive features** e.g. image galleries, option menus, navigation screens, levels
- **User interface** e.g. screen, interaction, graphics, buttons, layout, colour
- **Usability/playability** e.g. accessibility, navigation, controls, rules, challenge
- **Mise en scène and lighting** e.g. sprites, character models, 3D environments, interactive objects, textures, lighting schemes
- **Sound design** e.g. soundtracks, sound effects, sounds triggered by game events

Start of the exam - 15 minutes

1. Read the glossary.
2. Read the information box and underline:
 - Character
 - Setting
 - Place in Story
3. Read the passage WITHOUT looking at the questions. Focus on just understanding what is going on.

Question 1 – 5 minutes – Information Retrieval

Planning the answer:

1. Read the question and highlight the focus.
2. On the question draw a box around which lines to focus on.
3. Highlight the correct answers in the text.
4. When writing the answer:
 - Use full sentences
 - Start each sentence with the focus from the question
 - Be careful not to repeat points.

Question 2 - 10 minutes - Language

Planning the answer:

1. Read the question and highlight the focus.
2. Highlight powerful words and phrases linked to the question focus.
3. Pick three examples to use and circle your zoom word.
4. Label your examples with subject terminology.

When writing the answer:

1. Write an establishing sentence outlining your three ideas linked to the focus – in your own words.
2. Write three paragraphs.
3. Always use quotation marks.
4. Always zoom in.
5. Always explain why the language feature/word class has been used. Features or structural features. Consider the writer's intention.

Explorations in Creative Reading and Writing
Paper 1 - 1 hour 45 minutes

Question 3 - 10 minutes - Structure

Planning the answer:

1. Decide what the writer focuses on at the beginning, middle and end of the extract and highlight a quotation (piece of evidence) that supports this.
2. Jot down the tone next to the evidence, any questions that come to mind and the effect of the section on the reader.
3. When writing the answer:
 - Write three paragraphs – each one must contain a quotation and structural feature.
 - Do not make reference to language features or zoom in.

Question 4 - 20 minutes - Evaluation

Planning the answer:

1. Draw a box around the section on the extract.
2. Highlight the key words in the statement.
3. Find three pieces of evidence to show that you agree with the statement.
4. Circle your zoom words and label with subject terminology.

When writing the answer:

1. Write an introduction stating how much you agree and give two reasons why – in your own words.
2. Write three paragraphs.
3. The last sentence of each paragraph should always refer back to the statement.

Question 5 - 45 minutes - Writing

Planning the answer: 10 mins

1. Plan your ideas before you start.
2. Order your ideas to show the examiner that you are attempting to structure and craft your work.
3. Write a punctuation list at the top (!?,;-).

When writing the answer: 30 mins

1. Write your description / story
 - Verb: 'ing' / 'ed' word
 - Adverb: 'ly' word
 - Preposition/Place word: 'on' / 'next to' / 'near'
 - Adjectives: describing word.
2. Start each paragraph in a different way:
3. Vary your sentence starts.
4. Litter your work with techniques and use ambitious vocabulary.
5. Use a range of punctuation and sentence types for effect.
6. Proofread each paragraph as you work.
7. Complete a final proofread of your work (5mins).
 - Correct spelling errors.
 - Add missing words and punctuation.
8. Remember that it is okay to cross out and write a better word above a piece of dull or repeated vocabulary.

Writers' Viewpoints and Perspectives Paper 2 - 1 hour 45 minutes

Start of the exam - 15 minutes

1. Read both extracts – do not forget to read the glossaries.
2. Focus on understanding what is going on.

Question 1 – 5 minutes - True or False

Read the INSTRUCTIONS about how to shade VERY carefully (this is marked electronically and must be shaded right!).

Before you answer:

1. Circle the lines you have been directed to.
2. Read each statement.
3. If you find evidence in the extract for the statement, underline it. Answering the question:

1. Shade only the true statements.
2. Choose a maximum of four.
3. Double-check your answers.

Question 2 - 8 minutes - Summary

1. Read the question and highlight the focus.
2. On the sources underline quotations (evidence) that link to the focus of the question.
3. Match the pairs of quotations that allow you to show the most inference (3 pairs).
4. Do not make reference to language or structure.
5. Embed quotations where possible.

Question 3 - 12 minutes - Language

Planning the answer:

1. Read the question and highlight the focus.
2. Highlight powerful words and phrases linked to the question focus.
3. Pick three examples to use and circle your zoom word.
4. Label your examples with subject terminology.

When writing the answer:

1. Write an establishing sentence outlining your three ideas linked to the focus – in your own words.
2. Write three paragraphs.
3. Always use quotation marks.
4. Always zoom in.
5. Always explain why the language feature/word class has been used. Always explain why the language feature/word class has been used. Features or structural features. Consider the writer's intention.

Question 4 - 20 minutes - Viewpoints

Planning the answer:

1. Read the question and highlight the focus of the question. This is the comparison focus.
2. Highlight quotations (evidence) in both sources that answer the question. You need three per source.
3. Next to the evidence, label with correct subject terminology.
4. Pair up the three ideas from Source A with the three from Source B.

When writing the answer:

1. Write an opening statement that clearly refers to the question – name both writers and make reference to each source.
2. Write three paragraphs.
3. Use a comparison word in each paragraph.
4. Zoom into the language feature used and explore why it has been used in relation to the question.
5. Explore the tone of both extracts.
6. Use the writers' names through your response.

Question 5 - 45 minutes - Writing

Planning the answer: 10 mins

1. Underline the purpose/audience/form (PAF) in the question.
2. Plan your ideas before you start.
3. Order your ideas to show the examiner that you are attempting to structure and craft your work.
4. Write the techniques for the purpose (explain, argue, persuade, instruct/advise) at the top of the page.
5. Write a punctuation list at the top (!?,;:-).

When writing the answer: 30mins

1. Write your response.
2. Start each paragraph in a different way:
 - Rhetorical question
 - Use the word 'Imagine'
 - Discourse markers.
3. Vary your sentence starts.
4. Litter your work with techniques and use ambitious vocabulary.
5. Use a range of punctuation and sentence types for effect.
6. Proofread each paragraph as you work.
7. Complete a final proofread of your work (5mins).
 - Correct spelling errors.
 - Add missing words and punctuation.
8. Remember that it is okay to cross out and write a better word above a piece of dull or repeated vocabulary.

KS4 Macbeth – Topic Guide

1. Context

Playwright: Shakespeare (April 23rd 1564 - April 23rd 1616) Dates: Written around 1606 Published: In 'the First Folio', 1623 Era: Jacobean Genre: Tragedy = A play ending with the suffering and death of the main character. Set: Scotland. Structure: Five Act Play

The Divine Right of Kings says that a monarch is not subject to earthly authority and that they have the right to rule directly from the will of God. It implies that only God can judge an unjust king and that any attempt to depose, dethrone or restrict his powers runs contrary to the will of God and may constitute a sacrilegious act. The act of killing a king is called regicide and is considered a terrible crime.

Shakespearean Tragedy. Macbeth is one of Shakespeare's tragedies and follows specific conventions. The climax must end in a tremendous catastrophe involving the death of the main character; the character's death is caused by their own flaw(s) (hamartia) yet the character has something the audience can identify with.

Macbeth. The plot is partly based on fact. Macbeth was a real 11th Century king who reigned Scotland from 1040- 1057. Shakespeare's version of the story originates from the Chronicles of Holinshed (a well known historian). The play was most likely written in 1606 – the year after the Gunpowder Plot of 1605 – and reflects the insecurities of Jacobean politics.

King James I of England (and VI of Scotland) came to the throne in 1603 following the death of Queen Elizabeth I. The play pays homage to the king's Scottish lineage. The witches' prophecy that Banquo will found a line of kings is a clear nod to James' family's claim to have descended from the historical Banquo. James was convinced about the reality of witchcraft and its great danger to him leading to witch trials. The play is probably not written simply to please James, but certainly looks at relevant ideas.

The Great Chain of Being was a belief in a strict religious hierarchy (see key vocabulary) of all things which was believed to have been decreed by God. This idea was important in Elizabethan and Jacobean beliefs. The chain starts from God and progresses downward to angels, demons (fallen/renegade angels), stars, moon, kings, princes, nobles, commoners, wild animals, domesticated animals, trees, other plants, precious stones, precious metals, and other minerals.

Conventions of a Shakespearean Tragedy

A tragic hero who falls from greatness through a flaw of their own **character**.

Hamartia – the flaw in the tragic hero that destroys them.

A hero of status – the central characters are people of importance, with power and status to lose.

External conflict – his tragedies feature conflict between characters, and always lead to death.

Internal conflict – there are frequent moments of selfdoubt or internal torment.

Supernatural elements – Many of Shakespeare's tragedies feature supernatural influences.

2. Key Characters

Macbeth: The eponymous protagonist is the tragic hero of this play. He is both ambitious and ruthless. He falls from loyal and respected warrior to a paranoid, tyrannical king, before dying in battle in Act V.

Lady Macbeth: A strong, ambitious and manipulative woman who exerts pressure on Macbeth to pursue his ambition of becoming king by murdering Duncan. Unable to deal with the guilt of these actions and is driven to madness and suicide.

The Witches/Weird Sisters: Supernatural and manipulative beings who seem to be able to predict the future. They are unearthly and omniscient.

Banquo: Macbeth's close friend and ally is astute and loyal. Macbeth sees him as a threat. He is virtuous, admired by audiences, and mistrustful of the supernatural witches.

Duncan: King of Scotland at the beginning of the play. He is a virtuous, strong and respected leader, held up as the model of good kingship by others in the play. He is murdered by Macbeth in Act 2.

Macduff: A soldier who is loyal to Duncan and is suspicious of Macbeth. His family is murdered by Macbeth's soldiers and he eventually exacts revenge by killing Macbeth. He was born by caesarian section and therefore was "not of woman born".

Malcolm: Duncan's son and next in line to the throne. He is described as a good man in the play.

KS4 Macbeth – Topic Guide continued...

| 3. Central Themes | |
|-------------------------------|---|
| Ambition | The play is about the corrupting power of ambition. Both Lady Macbeth and Macbeth are urged to action by the prophecies of the witches, but they still commit their crimes themselves because they want greater power. Their ambition leads them to violence and death. |
| Kingship and Tyranny | The play contrasts the kind and wise rule of Duncan, who is described as a virtuous (good) king, with the brutal rule of Macbeth, who quickly becomes called a tyrant. The play shows how Macbeth has no divine right to rule and upsets the natural order by killing Duncan. |
| Order and Disorder | The play subverts the natural order of the world. Macbeth's actions are based on a supernatural belief in a prophecy. It depicts an anarchic world: Macbeth inverts the order of royal succession; his wife inverts the patriarchal hierarchy; the unnatural world disrupts the natural. The disruption underpins the conflict that is not only external and violent but internal as Macbeth and his wife come to terms with what they've done. |
| Appearance and Reality | Characters in the play are often not what they seem. Lady Macbeth and Macbeth are duplicitous towards Duncan, the witches equivocate (not say what they really mean) and cannot be trusted, Lady Macbeth seeks to manipulate Macbeth. |

| 4. Key Vocabulary | |
|---------------------|---|
| Ambition | A desire to achieve something e.g. Macbeth and kingship |
| Hubris | Having excessive pride or self-confidence |
| Tyrant | A ruler who rules through fear and violence |
| Corrupt | Acting dishonestly OR being in a state of decay |
| Patriarchal | A society where power is in the hands of men |
| Duplicitous | Lying and being false. Two-faced. Deceitful |
| Façade | A false front, mask or illusion. Hiding one's true feelings |
| Prescient | Having knowledge of things before they happen – the witches |
| Nihilistic | The belief that everything is meaningless |
| Courageous | Being very brave |
| Supernatural | Things that are not a part of the natural world |
| Fate | Events being already decided and out of a person's control |
| Treachery | Betraying someone's trust |
| Regicide | The killing of a king |

| 5. Key Terminology, Symbols and Devices | |
|---|---|
| Motif | A recurring image or idea that has symbolic importance. The best example in Macbeth would be blood. |
| Soliloquy | When a character is alone on stage and speaks their thoughts aloud to themselves. |
| Iambic Pentameter | A line of a play or poem that has ten syllables organised into five pairs of syllables, where the second in each pair is emphasised. e.g. "When you durst do it then you were a man". |
| Foreshadowing | When a hint or warning is given about a later event. |
| Dramatic Irony | When a character is unaware of something that the audience is aware of, so they don't know the full significance of their words. |
| Symbolism | When something symbolises a set of ideas e.g. "The raven himself is hoarse" – raven symbolic of death, supernatural. |
| Aside | When a character pauses in a conversation to speak only to the audience or another character, unheard by the rest. |

Jekyll and Hyde

GCSE English Literature – Paper 1 – Shakespeare and the 19th Century Novel – 1 hour, 45 minutes
'The Strange Case of Dr. Jekyll and Mr. Hyde'

What will I need to do in the examination?

Answer TWO questions.

For this paper, you will be given an extract for each text with a question to answer.

Use the extract as a "springboard" to help you answer the question, including events and evidence

from the whole of the text.

By the end of the examination, you will have written TWO essays.

For each question, spend 10 minutes annotating the extract and planning your answer, then 40 minutes writing your essay.

That leaves you with 5 minutes to read through your answers at the end.

Section A – 30 + 4 marks;

Section B – 30 marks.

'The Strange Case of Dr. Jekyll and Mr. Hyde' Context

Stevenson's father wanted him to be a scientist and Stevenson rejected this, just like Jekyll rejects traditional Science in the novella.

In the late 1800s, London was a city of extremes of wealth and poverty, with a lot of violent crime. It was plagued by thick fog.

Advances in Science in the 19th century changed the way people saw the world and humanity. Psychology – the science of the mind – was just beginning.

Darwin's theory of evolution changed the way some people thought about the origin of humans.

Many people became interested in the paranormal and spirits in the 19th century. Some, like Lanyon, thought it all nonsense. Others remained undecided.

How will I gain marks?

AO1 – Show the examiner that you have read the text and can write about it clearly, using evidence to support your points.

AO2 – Write about the effect of the language and structural features, linking these to the question and using subject terminology.

AO3 – How did people live at the time? What do you know about the writer? What was happening in society and the world at the time? You must link this knowledge to the question.

AO4 – Write accurately and use a variety of vocabulary and sentence structures.

Some Key Terminology

Couplet – a pair of rhymed lines.

Dramatic Irony – when the audience knows more about what is happening than some of the characters.

First-person perspective – a narrative which is told from a character's viewpoint using 'I'.

Foil – something which provides a contrast.

Foreshadow – a warning of something that will follow later.

Gothic Genre – a literary genre originating from the 18th century, which describes a sinister, grotesque or mysterious atmosphere. Such novels are often set in dark places or ruined buildings.

Juxtaposition – when two ideas or events are placed one after the other to create a dramatic effect.

Oxymoron – when contradictory terms are brought together.

Sonnet – a poem of 14 lines generally concerned with a single thought.

Tragedy – a drama dealing with tragic events.

'The Strange Case of Dr. Jekyll and Mr. Hyde' Quotations

"It wasn't like a man; it was like some damned Juggernaut" – Hyde is presented as out of control, almost inhuman in his first appearance when he tramples the young girl.

"If he be Mr. Hyde, he had thought, 'I shall be Mr. Seek.'" – Utterson decides to solve the mystery of Hyde to protect his friend, Jekyll.

"the moment I choose, I can be rid of Mr. Hyde" – Early in the novella, Jekyll believes that he can control Hyde – it becomes apparent that Hyde is gradually taking over as the novella progresses.

"with ape-like fury, he was trampling his victim under foot" – Hyde's attack on Sir Danvers Carew is savage and violent; it links to Darwin's theory.

"there's a rather singular resemblance" – When Mr. Guest says that the two sets of handwriting are quite similar, this is an early clue that Jekyll and Hyde are the same person, which creates mystery, suspense and tension.

"He had his death-warrant written legibly upon his face" – Dr. Lanyon is shocked to death by his experience of watching Hyde transform into Jekyll.

"as froze the very blood of the two gentlemen below" – Utterson and Enfield are shocked and quite traumatised when they witness the transformation of Jekyll into Hyde, although they don't know this has happened.

"Nowhere was there any trace of Henry Jekyll dead or alive" – Utterson and Poole cannot find Jekyll, either dead or alive. This is when Utterson stops narrating the novella, creating mystery, suspense and tension.

"My life is shaken to its roots; sleep has left me" – Lanyon explains his reaction to seeing Hyde transform – he cannot continue to live.

"The powers of Hyde seemed to have grown with the sickness of Jekyll" – Jekyll explains that the more Hyde was released, the stronger he became.

Paper 1: Living with the physical environment: Section A: The challenge of natural hazards
 Definition of natural hazards, Types of natural hazards, Factors affecting hazards risk

A Natural Hazard is a threat to people and property

- A natural hazard is a natural process which could cause death, injury or disruption to humans e.g. it could destroy property and possessions.
- A natural disaster is a natural hazard that has already happened.
- Extreme events which do not pose any threat to human activity are not counted as a hazard.

Types of Natural Hazards

| | | |
|--|--|--|
| Geological Hazards caused by land and tectonics (examples include: volcanoes, earthquakes, tsunamis, landslides and avalanches) | Atmospheric Hazards (aka Meteorological Hazards) caused by weather and climate (examples include: tropical storms, extreme weather like heatwaves, snow, rain, drought and climate change). | Water-based Hazards created by rivers, seas and oceans (examples include flooding). |
|--|--|--|

Different factors affecting hazard risk:

Hazard risk is the **probability (chance)** that a natural hazard occurs. There are several factors affecting hazard risk. Some places are more **VULNERABLE** to natural hazards and some places have a lower **CAPACITY TO COPE** as they have weaker infrastructure, poor government organisations and agencies (such as the army or police) or low quality equipment.

1. **Natural Factors** - rock/soil type, height of land hit by a tsunami;
2. **Education**; 3. **Time**; 4. **Magnitude** – how strong the event is affects the impact it has;
5. **Frequency** - how often the hazard occurs. If a hazard occurs more frequently, the more prepared people are and they are more used to coping by adjusting their buildings and lives to cope with the risk;
6. **Population density and distribution** – the more people in the area, the greater the risk. This can be applied to urbanisation;
7. **Level of development** - this determines how much money is available to predict, prepare, and respond to the event. HIC (high income countries) are generally much better at this because of: Governments which are stable and democratic, Technology, Planning Laws;
8. **Management** - 3xPs: Predict, Prepare and Prevent.

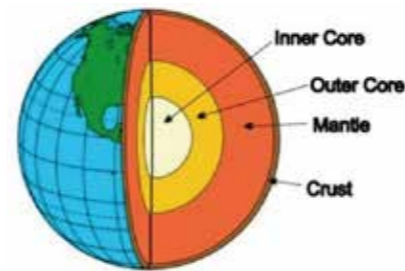
Lots of people live in areas at risk from Tectonic Hazards:

There are a few reasons why people choose to live close to volcanoes and in areas vulnerable to earthquakes.

1. Earthquakes and Volcanic eruptions don't happen very often. Not seen as a great threat.
2. They've **always lived there** – moving away would mean leaving friends and family.
3. Better building design, can mean people are at less risk.
4. Better **monitoring** of volcanoes and tsunamis, enables people to receive warnings and evacuate before events happen.
5. People living in **poverty** have other things to think about on a daily basis like food, water and security.
6. Plate Margins often coincide with very **favourable areas** to settle such as coastal areas where there are ports, thus jobs have developed.
7. Volcanoes can bring benefits such as very **fertile soils**, rich **mineral deposits** and **natural hot water (geothermal)**.
8. Some people may **not be aware of the risks**.
9. Dramatic landscapes like Iceland create many jobs in **tourism**.

Paper 1: Living with the physical environment: Section A: The challenge of natural hazards
 Plate Tectonics: Earth structure, plate tectonics theory, differences in oceanic and continental plates.
 Global distribution of earthquakes and volcanic eruptions.

Earth Structure



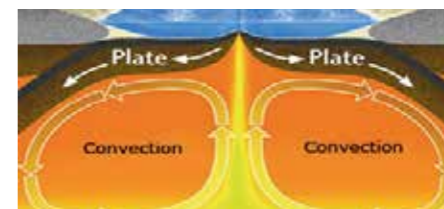
- The core of the earth is a solid inner and liquid outer.
- Around the core is the mantle, which is semi molten rock and moves very slowly.
- The outer layer of the earth is the crust.
- The crust is divided into slabs called tectonic plates (they float on the mantle).
- The tectonic plates are moving because of convection currents in the mantle underneath the crust. These tectonic plates are moving very slowly. The tectonic plates vary in size. The major plates are the Pacific, Eurasian, African, North American, South American and Indo-Australian. The places where plates meet are called plate margins or plate boundaries.
- Plate margins or plate boundaries is where most of the world's volcanic and earthquake activity occurs.
- Plates are made up of two types of crust: Oceanic and Continental:
 - **Oceanic** – newly formed, more dense, thinner (subducts).
 - **Continental** – Older, thicker, less dense.

Plate Tectonic Theory

Is the theory that tries to explain that plates move. Here are two theories:

1: Convection Current Theory

Plates move by Convection Currents in the mantle: Heat from the core causes the molten rock (magma) to rise, as it rises it cools, and then sinks, it is then heated at it gets closer to the core and rises – this process continues and this movement of mantle is called convection currents. This movement in the mantle, moves the plates on top of the mantle.



2: Slab Pull Theory

Plates movement is driven by the weight of denser, heavier tectonic plates sinking into the mantle at ocean trenches. This drags the rest of the plate with it and it is called slab pull theory.

Three types of plate margin or boundary:

- Two plates moving apart from each other – **Constructive**
- Two plates sliding past each other – **Conservative**
- Two plates moving towards each other – **Destructive**
- (Continental + Continental = Fold Mountains
Continental + Oceanic = Composite Volcano, earthquakes, ocean trench, mountains)

Global Distribution

- Volcanoes are formed at constructive and destructive plate margins, especially around the edge of the Pacific Ocean known as the Ring of Fire. Also found in the middle of the Atlantic Ocean called the Mid Atlantic Ridge. Some anomalies away from plate margins are called hot spots.
- Earthquakes occur on plate margins, especially along the western coast of North and South America. Also around the Pacific Ocean.

A Timeline of Ideas and Treatments of Disease

MEDIEVAL: 500 - 1450

The ideas of **Hippocrates** (460-370 BC) and **Galen** (129-216 AD) are dominant throughout the Medieval period and Renaissance.

The 'Four Humours' theory is that the body is made of four 'elements': blood, black bile, yellow bile and phlegm and these need to be balanced.

As Galen believed in the idea of one God (Monotheism) his ideas are championed by the Church, which means to criticise his theory is to criticise the Church itself.

Treatments include: blood-letting, vomiting, drinking wine and using certain diets.

The power of the Church in everyday life also means that many people understand that **illness is a punishment from God**.

Treatments include: prayer, pilgrimage, confession and acceptance that death is part of 'God's Plan'.

Another supernatural idea is that the signs of **the Zodiac influence the body and the Four Humours**. For example, certain illnesses are likely under certain Zodiac signs.

Treatments include: consulting with the stars and balancing the Humours at different times based on the position of the stars.

Medieval understanding of **natural remedies** is fairly advanced. In particular, Islamic medicine had used many natural remedies such as those included in Ibn-Sina's 'The Canon'

Treatments include: opium, mandrake, onions, mint, burdock

RENAISSANCE: 1450 - 1700



KEY:

ANATOMY & THE BODY

OPERATIONS & TREATMENTS

A Timeline of Ideas and Treatments of Disease continued...

KEY:

ANATOMY & THE BODY

OPERATIONS & TREATMENTS

18th CENTURY

More scientific ideas based on evidence and observation are beginning to be used. This means that theories such as the Four Humours as well as supernatural ideas that God or the position of the stars cause illness become less common.



Edward Jenner (1749-1823) created a vaccine in 1796 when he discovers that Cowpox gives people immunity to the deadly disease Smallpox. Although there is resistance at first to the treatment, its effectiveness is proven and later vaccination is supported by the government. However, Jenner cannot explain why it works.



Miasma Theory is that 'bad air' (caused by pollution, bad smells or sick people) moves around and spreads disease. Although this is incorrect, it does lead doctors and scientists to believe cleanliness is important to being healthy.



INDUSTRIAL: 1800 - 1900

Thanks to microscopes scientists are able to see germs. A theory is developed in which germs appear as a result of disease or decay. Although we know this is scientifically incorrect today, it becomes a widely-accepted theory of disease. This is known as Spontaneous Generation.

French scientist Louis Pasteur (1822-1895) conducts his 'swan-neck flask' experiment in 1862, which proves that germs are the cause of decay and this is known as Germ Theory. His idea faces a lot of opposition, but is over time accepted.

He conducts research into animal diseases and creates vaccines for chicken Cholera, Anthrax and Rabies. Pasteur and his team also successfully trial a Rabies vaccine on humans. Rivalry between Pasteur and Koch spur on many discoveries.



After Pasteur's breakthrough with Germ Theory the German scientist Robert Koch (1843-1910) develops his ideas further. Koch and his team identify the germs responsible for Anthrax, Cholera and Tuberculosis. Koch also develops new methods of researching germs such as growing microbes on agar, staining bacteria and photographing bacteria.



Chemical cures known as 'Magic Bullets' are when chemicals are used to kill specific germs. For example, Paul Ehrlich, who had worked with Robert Koch, uses Salvarsan 606 to cure Syphilis.

MODERN: 1900 +

Alexander Fleming (1881-1955) discovers by chance in 1928 that the antibiotic Penicillin kills Staphylococcus bacteria. However, he does not develop this scientific discovery into a medical breakthrough.



Howard Florey and Ernst Chain test Penicillin on mice and prove its medical potential. A test on a human patient in 1941 is successful but the patient dies when the limited supply of Penicillin runs out. It isn't until WWII that US and UK mass production is used to create Penicillin on an industrial scale.



Subsequent scientific breakthroughs lead to understanding of DNA and stem cells. These in turn develop new treatments and cures.

A Timeline of Surgery

KEY:

ANATOMY & THE BODY

OPERATIONS & TREATMENTS

PAIN RELIEF

MEDIEVAL: 500 -1450

Galen (2nd & 3rd century AD) had proved that the brain controls the body through his pig experiment. Galen's understanding of anatomy is based on animals but is used until the 1600s.

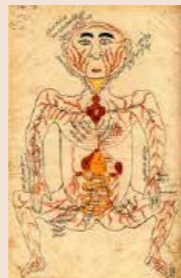
In the 14th century there are limited number of dissections at universities. If a body goes against what Galen wrote, then Medieval surgeons say that the body is wrong, not Galen!



Islamic surgeon, Abulcasis (10th century AD) writes a guidebook to surgery called Al Tasrif. He explains cauterisation and even eye surgery.

Hugh of Lucca (13th century) criticise the view that pus was good for a wound. However, this goes against Hippocrates and so this good advice is ignored.

Medieval operations include: amputations, blood-letting and trepanning. Cauterisation with burning oil is used to burn wounds shut.



Painkillers such as alcohol, mandrake and opium are used - many of these come from Ibn-Sina's The Canon

RENAISSANCE: 1450 -1700

Andreas Vesalius (1514-64) promotes use of dissections for surgeons. He disproves many ideas of Galen and publishes them in the beautifully illustrated The Fabric of the Human Body (1543)



William Harvey (1578-1657) researches the circulation of the blood. He disproved Galen's ideas about blood and proves the heart is a pump and how much blood is in the body. Published his ideas in The Motion of the Heart (1628)



Ambroise Paré (1510 - 90) develops new operations thanks to his wartime experience. By chance he discovers that a soothing cream works better than painful burning oil. He also uses ligatures to tie-off blood vessels which is much less painful than cauterisation. His ideas are published in Works on Surgery (1575).



18th CENTURY

John Hunter (1728 - 93) not only improves surgical understanding but encourages a more scientific approach to medicine. He learns how to restrict blood to aneurysms instead of amputating limbs, and shows that gunshot wounds should not be 'cut out' of the skin. Published his ideas in Blood Inflammation and Gunshot Wounds (1794) and kept a museum of anatomical specimens.



A Timeline of Surgery continued...

KEY:

ANATOMY & THE BODY

OPERATIONS & TREATMENTS

PAIN RELIEF

INDUSTRIAL: 1800 -1900



Joseph Lister (1827-1912) was inspired by the work of Louis Pasteur to use the chemical carbolic acid to prevent infection during and after surgery. Although there were downsides to Carbolic Acid, its use showed that antiseptics could drastically reduce deaths. However, his work was not immediately accepted.



New developments in chemistry meant that there were new, more effective anaesthetics. **Nitrous Oxide** was used by dentists from 1844. Ether was used from 1846 despite it causing vomiting and being highly flammable.

The first safe and effective anaesthetic **Chloroform** was pioneered by Dr James Simpson in 1847 after he discovered its effects by chance.

MODERN: 1900 +

X-Rays are discovered in 1895 but first used on a mass-scale during WW1



Blood transfusions are possible after Karl Landsteiner discovers that there are 'blood groups'. In 1914

Albert Hustin discovers how to store blood which allows for the use of blood transfusions during WW1.

In 1938 the National Blood Transfusion Service is set up, and huge blood banks are using in WW2.

Skin grafts and plastic surgery is used in WW1 to treat soldiers suffering from severe facial wounds. This is pioneered by **Harold Gillies**.



Heart surgery is experimented with by US army surgeon Dwight Harken during WWII leading to huge improvements in surgery

Modern medicine can involve laser surgery, organ and even face transplants, radiation therapy and much more.



A Timeline of Public Health

KEY:

HOSPITALS & TREATMENT

PUBLIC HEALTH

EPIDEMICS

MEDIEVAL: 500 -1450

Christian Hospitals care for sick people but there isn't a serious attempt to cure patients or research illness. Hospitals are mostly funded by the Church or wealthy patrons.

Islamic Hospitals called Bimaristans treat patients and not simply caring for them.

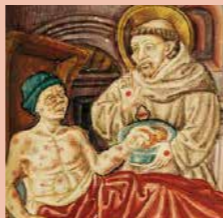


Medieval Towns are breeding grounds of disease. Few have sewers, rubbish is thrown onto the street and trade waste pollutes rivers and streams. Some local action is made, but doesn't stop unhygienic conditions.

Monasteries and abbeys are far more hygienic. Monks and nuns understand the importance of cleanliness and good sanitation - they have fresh running water, keep privies away from water sources, have infirmaries and understand herbal remedies for illness. Lastly, they are isolated away from towns.



The Black Death 1348 was a combination of the bubonic and pneumonic plague spread by rats and fleas, and contact with breath or blood. It spread rapidly in cities and there was no understanding of the cause or a cure - many believed it was a punishment from God or the result of outsiders such as Jews or beggars. Almost 2 million people in Britain died.



RENAISSANCE: 1450 -1700

The Great Plague 1665 was a return of the plague. Around 100,000 people died in London alone. However there was a greater attempt to control the epidemic: victims were quarantined with watchmen to stop people breaking quarantine. Houses with the plague were marked with an 'X'. Homeowners were made to tidy the street in front of their houses and animals were banned from the streets. Bodies were removed at night and thrown into plague pits.



New hospitals are opened in the 1700s. Between 1720 -50 there are 5 new hospitals in London. Specialist hospitals are also set up for maternity care, venereal disease and mental health care.

A Timeline of Public Health continued...

KEY:

HOSPITALS & TREATMENT

PUBLIC HEALTH

EPIDEMICS

18th CENTURY

Industrial Towns are breeding grounds of disease. Cities like Manchester grow to around 100,000 inhabitants in half a century. People live in crowded terrace housing without enough toilets, without running water or waste removal. Diseases such as Cholera, Typhoid and Tuberculosis spread rapidly in these conditions.



Cholera regularly kills tens of thousands in London. In 1831 a cholera outbreak kills 50,000.



INDUSTRIAL: 1800 -1900

Edwin Chadwick publishes a report in 1842 about conditions in Britain. Although he wrongly believes disease is caused by Miasma, he identifies the need for cleaner streets and clear water and his report is widely read, however no action is taken.



John Snow in 1854 makes the discovery that Cholera is spread through contaminated water after researching a water pump in Broad Street, London.



The 1858 'Great Stink' heat wave causes the filthy Thames river to smell worse than ever. Even politicians are affected as Parliament is on the river. Finally, politicians call for a sewer to be built to improve the condition of the Thames. This is built by Joseph Bazalgette and bring a better sanitation to London.

Public Health Act 1848 gives councils the power to spend money on improving hygiene in towns. Only some towns make improvements and in 1854 the Central Board of Health is closed down because laissez-faire ideas mean that many politicians are against government action.

Public Health Act 1875 forces councils to appoint Medical Officers and to provide sewers, fresh water and to collect rubbish. Hygiene rapidly improves.

MODERN: 1900 +

Reports by Charles Booth (1889) and Seebohm Rowntree (1901) reveal that working class people remain stuck in lives of poverty and ill health. In 1899 during the Boer War, some 40% of volunteers for the army are found to be unfit to serve.

Liberal Reforms 1906 - 1914 introduce School Meals, School Clinics and Doctors, Unemployment Benefits and Old Age Pensions. All of these improve the standard of living and health for the British working classes.

The Welfare State emerges after the **1942 Beveridge Report** identifies 'The Five Giants' which still ruin the lives of the working classes - such as disease, squalor and idleness.

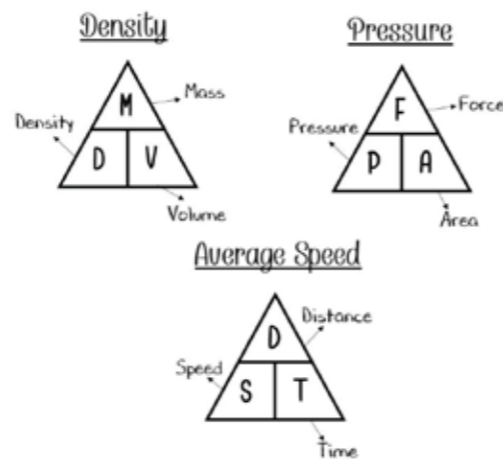


The NHS is set up by the Labour Government and spearheaded by Aneurin Bevan in 1948. It provides free medical care for all -previously in the 1940s over 8 million people had never seen a doctor because they couldn't afford to.

Maths Year 10 Foundation Autumn 1

| | | | |
|--|--|---|---|
| Rearrange Formulae | Formula | A special type of equation that shows the relationship between variables | A = bh is the formula for the area of a rectangle (area = base x height) A is the subject of the formula. |
| | Formulae | Plural of formula | |
| | Subject | The variable that is being worked out. It is the letter on its own on one side of the equals sign | |
| | Inverse Operation | The opposite operation | Multiply is the inverse operation to divide |
| | Expression | Contains numbers, operations and one or more variables | 4x + 3y |
| | Factorise | Rewrite an expression into brackets | 6x + 3 = 3(2x + 1) |
| | Rearrange | Move terms around using inverse operations | t + u = v → t = v - u |
| Change the subject of a formula | Isolate a term using inverse operations, rearranging the formula | Make y the subject of the formula: t = 3y + 4x | |
| Linear Graphs | Axes | The horizontal and vertical lines on a graph (singular axis) | The x axis is horizontal, the y axis is vertical. |
| | Coordinates | A pair of numbers which show a point on a graph | The x coordinate tells us how far along you go, the y coordinate tells us how far up or down you go |
| | Equation | The rule for finding coordinates for your graph | y = 3x - 4 |
| | Plot linear graphs | Plot all points and join with a straight line | Remember to label x and y axes |
| | Midpoint of a line | The middle of a line segment | Formula: Add x coordinates ÷ 2, Add y coordinates ÷ 2 |

| | | | |
|--------------------------|-----------------------|---------------------------------------|---|
| y = mx + c | Gradient | How steep the line is | m in y=mx+c |
| | Y intercept | Where the graph crosses the y axis | c in y = mx + c |
| | Parallel | Parallel lines have the same gradient | m in y=mx+c |
| Compound Measures | Standard Units | One unit | time, mass, length, money, volume, area |
| | Compound Units | Made of two or more units | speed, rates of pay, prices |
| | Speed | Speed = distance ÷ time | 30 miles per hour |
| | Density | Density = mass ÷ volume | 6 g/litre |
| | Pressure | Pressure = force ÷ area | N/m ² |

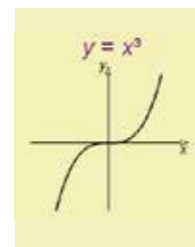


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|---|--------------------------------------|--|---|
| Quadratic Graphs, Turning Points and Roots | Squared | To the power 2 | 4 squared means 4 ² = 4x4 |
| | Quadratic Graphs | Equations in the form y = ax ² + bx + c | The graphs are a U shape |
| | Roots | Where the graph crosses the x axis | |
| | Turning Points | The coordinate of where the graph turns | It is the bottom or the top of the graph |
| | Factorising | Rewrite the equation in brackets | When we solve it tells us the roots of the equation |
| | Linear Simultaneous Equations | Simultaneous | Things that happen at the same time |
| Equation | | The rule for finding coordinates for your graph | |
| Solve Simultaneous Equations | | Simultaneous equations are two equations with two unknowns. They are called simultaneous because they must both be solved at the same time. | |
| | | Use the elimination method: | |
| | | <ol style="list-style-type: none"> 1) Get rid of the terms that are the same. 2) If the operation signs are the same then subtract the remaining terms. If the operation signs are NOT the same you have to add the remaining terms. 3) Solve the equation to find the variable x or y. 4) Substitute your known variable back into one of the equations to find the remaining variable. | |
| Graphically | Solve something on a graph | | |

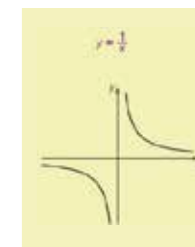
| | | |
|-----------------------|---------------------------|---|
| Further Graphs | Cubic | An equation with the highest power of x is x ³ |
| | Reciprocal | An equation where x is in the denominator |
| | Numerator | The top number in a fraction |
| | Denominator | The bottom number in a fraction |
| | Direct proportion | As one quantity increases, so does another at the same rate |
| | Inverse Proportion | As one quantity increases, the other decreases |



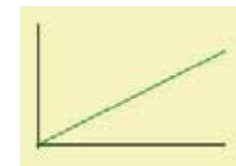
Quadratic Graph



Cubic Graph



Reciprocal Graph



Direct Proportion Graph



Inverse Proportion Graph

Maths Year 10 Foundation Spring 1

| | | |
|----------------------|--|---|
| Probability | Probability | How likely something is to happen. Always given as a Fraction, Decimal or Percentage |
| | Probability Scale words | Impossible, Unlikely, Even chance, Likely, Certain |
| | Probability Scale numbers | Impossible = 0, Even chance = 0.5 or ½ or 50%, Certain = 1 or 100% |
| | Two Way Table | Used when there are two categories |
| | Frequency Trees | Used when there are two or more categories |
| | Sample Space | Listing all of the possible outcomes from two events, for example flipping a coin and rolling a dice |
| | Mutually Exclusive Events | Mutually exclusive events cannot happen at the same time. Events sum to 1 |
| | Venn Diagrams | Comparing 2 or more sets of data that share some things in common |
| | Element | A list of numbers, objects or outcomes |
| | Universal Set | Contains all of the elements for our question |
| | Set notation | A - all elements in A A' - all elements not in A B - all elements in B B' - all elements not in B |
| | Intersection | $A \cap B$ all the elements in both A and B |
| | Union | $A \cup B$ all the elements in A or B or both |
| Tree Diagrams | Used when there are two or more events Each pair of branches add to 1 (mutually exclusive) To find the probabilities we multiply along the branches | |

| | | |
|-------------------------|---|---|
| Standard Form | Write number in standard form | A way of writing large or small numbers $a \times 10^b$ $1 \leq a < 10$ |
| | 10^8 | Positive power, multiply |
| | 10^{-4} | Negative power, divide |
| | Base | The number that will be multiplied by itself (eg 5^3 the base is 5) |
| | Power | The small number in 10^3 , tells you how many times you multiply the base by itself. 10^3 means $10 \times 10 \times 10$ |
| | Index number | Another word for power , plural is indices |
| | 10^4 | Ten to the power four , means $10 \times 10 \times 10 \times 10$ because the power is 4 |
| | 10^3 | Ten Cubed , means $10 \times 10 \times 10$ because the power is 3 |
| | 10^2 | Ten squared, means 10×10 because the power is 2 |
| | 10^1 | Ten to the power one , just means 10 because the power is 1 |
| | 10^0 | Ten to the power zero. Anything to the power zero always equals 1 |
| | 10^{-1} | Ten to the power negative 1 = 0.1 |
| | 10^{-2} | Ten to the power negative 2 = 0.01 |
| Multiply indices | Numbers with the same base , add the indices $10^6 \times 10^4 = 10^{6+4} = 10^{10}$ | |
| Divide indices | Numbers with the same base , subtract the indices $10^9 \div 10^7 = 10^{9-7} = 10^2$ | |

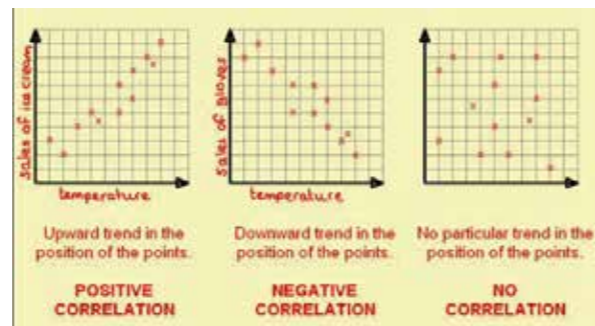
| | | |
|-----------------|---|--|
| Simple Interest | Cent | Means 100 in Latin, for example a century is 100 years |
| | Percentage | Means out of 100 |
| | Percentage of an Amount (Need to know) | 1% = $\div 100$ 10% = $\div 10$ 5% = halve 10% 20% = double 10% 50% = $\div 2$ 25% = halve 50% 75% = $50\% + 25\%$ |
| | Percentage of an Amount | (Amount $\div 100$) x Percentage Example, find 30% of £210 $(210 \div 100) \times 30 = 2.1 \times 30 = £63.00$ |
| | Convert percentage to decimal | Decimal = percentage $\div 100$ |
| | VAT | Value Added Tax A tax that is added to goods that you buy |
| | Income Tax | Tax that you pay from your wages |
| | Simple Interest | Calculate the percentage amount and multiply it by the number of periods that the money will be invested for |
| | Simple interest steps | 1. Find the percentage of the amount 2. Multiply by how many months/years it asks for in the question 3. Add this answer to the original amount |

| | | |
|------------------|--------------------------------------|---|
| Ratio (Further) | Ratio | How much of one thing there is compared to another, usually written as 3 : 4 |
| | Parts | The numbers in the ratio , 3 parts : 4 parts |
| | Simplify | Make the numbers smaller, divide by the Highest Common Factor |
| | Writing a Ratio as a Fraction | Each part of the ratio is the numerator , add the parts to make denominator. Example 3 : 4 written as a fraction . The parts are 3 and 4 so these are the numerators $3 + 4 = 7$ so the denominator is $7/3$ and $4/7$ |
| | Scale | The ratio between the distance on a map and that in real life |
| Growth and Decay | Growth | Getting bigger |
| | Decay | Getting smaller |
| | Appreciation | The value of something increasing |
| | Depreciation | The value of something decreasing |
| | Interest Rate | Money that is paid regularly as a percentage , this is usually by a bank when money is saved or borrowed |
| | Compound Interest | Interest that gets added regularly (e.g. monthly, annually), changes the value of money each time so a new calculation has to be completed |
| | Multiplier Method | Amount x (1 + percentage as a decimal)^{number of years} Example £4000 saved for 3 years at 2% interest rate $2\% = 0.02$ as a decimal $1 + 0.02 = 1.02$ $4000 \times 1.023 = £4161.60$ |

Maths Year 10 Foundation Summer 1

| | | |
|--------------|---|--|
| Statistics | Data | Information that is collected |
| | Quantitative Data | Numerical answers |
| | Qualitative Data | Descriptive answers, for example eye colour |
| | Discrete Data | Whole number answers, like how many people walk to school |
| | Continuous Data | Measured on a scale, like weight or height |
| | Primary Data | Data that you have collected |
| | Secondary Data | Data that someone else has collected |
| | Bar Chart | Shows discrete data , there are gaps between the bars |
| | Pictogram | Shows discrete data , pictures are used to show frequencies, must have a key |
| | Time Series Graphs | Frequencies plotted over time. Points are joined with straight lines |
| | The Product Rule | Used to find the intersection of 2 or more probabilities, e.g. PA and $PB = PA \times PB$ |
| | Mean | Add up your numbers and divide by how many numbers there are |
| | Median | Put your numbers in order from smallest to largest, the median is the middle number. If there are two middle numbers then the answer is halfway between them |
| Mode | The most common number | |
| Range | The difference between the smallest and largest numbers | |

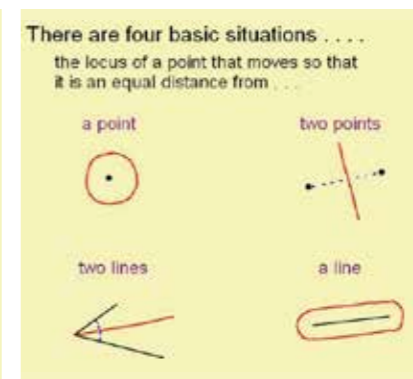
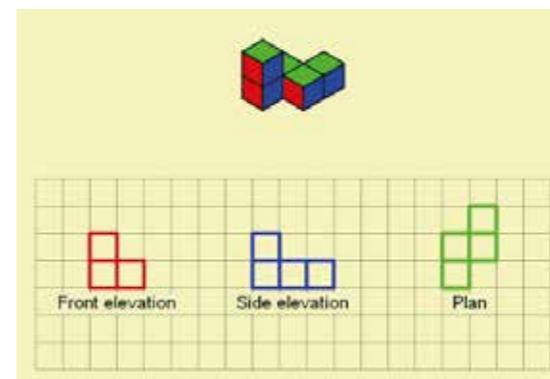
| | | |
|------------|-----------------------------|--|
| Statistics | Scatter Graphs | A graph of plotted points that compares two sets of information |
| | Line of best fit | A line on your scatter graph that best describes the relationship between the two sets of data <ul style="list-style-type: none"> • A straight line • Goes roughly through the middle of the points on your scatter graph • There should be an equal number of points above and below your line |
| | Correlation | The relationship between two variables |
| | Positive Correlation | As one variable increases so does the other variable |
| | Negative Correlation | As one variable increases the other decreases |
| | No Correlation | No relationship between the two variables |
| | Trend | A pattern in a set of results |
| | Outliers | A point that is far from the line of best fit |



Maths Year 10 Foundation Summer 2

| | | |
|----------------------|------------------|--|
| Plans and Elevations | Plan | The view from directly above a 3D shape. You will see a 2D shape. |
| | Elevation | The view from the front and side of a 3D shape. You will see a 2D shape. |
| | Sketch | To roughly draw a shape. Always label the sides and write any measurements on. |

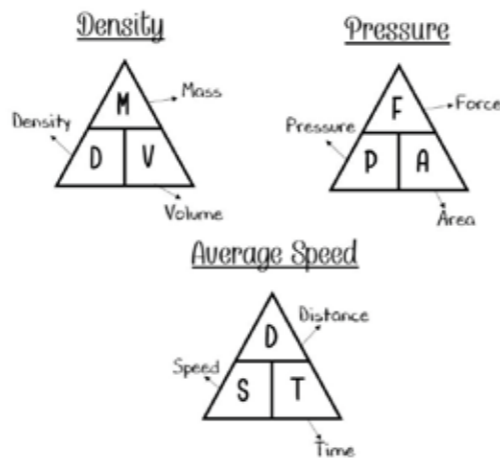
| | | |
|------------------------|---|---|
| Constructions and Loci | Perpendicular | Two lines that meet at 90° (right angle) |
| | Bisect | To cut something equally in two parts |
| | Line Segment | Part of a line that connects 2 points, it is the shortest distance between 2 points |
| | Locus | A path that is formed by a rule, e.g. 2cm from a point. Plural is loci |
| | Region | The area you shade in, defined in your question |
| Construction | An accurate diagram using a compass and ruler | |



Maths Year 10 Higher Autumn 1

| | | | |
|--------------------|--|---|---|
| Rearrange Formulae | Formula | A special type of equation that shows the relationship between variables | A = bh is the formula for the area of a rectangle (area = base x height) A is the subject of the formula. |
| | Formulae | Plural of formula | |
| | Subject | The variable that is being worked out. It is the letter on its own on one side of the equals sign | |
| | Inverse Operation | The opposite operation | Multiply is the inverse operation to divide |
| | Expression | Contains numbers, operations and one or more variables | 4x + 3y |
| | Factorise | Rewrite an expression into brackets | 6x + 3 = 3(2x + 1) |
| | Rearrange | Move terms around using inverse operations | t + u = v → t = v - u |
| Linear Graphs | Change the subject of a formula | Isolate a term using inverse operations, rearranging the formula | Make y the subject of the formula: t = 3y + 4x |
| | Rearrange complex formulae | Isolate a term using inverse operations, requires more steps | If the subject appears more than once you will need to factorise |
| | Equation | The rule for finding coordinates for your graph | y = 3x - 4 |
| | Plot linear graphs | Plot all points and join with a straight line | Remember to label x and y axes |
| | Midpoint of a line | The middle of a line segment | Formula: Add x coordinates ÷ 2, Add y coordinates ÷ 2 |

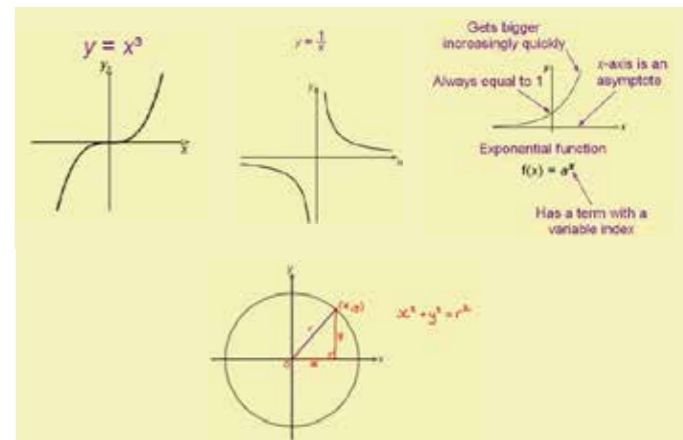
| | | | |
|--------------------------|-----------------------|---------------------------------------|---|
| y = mx + c | Gradient | How steep the line is | m in y=mx+c |
| | Y intercept | Where the graph crosses the y axis | c in y = mx + c |
| | Parallel | Parallel lines have the same gradient | m in y=mx+c |
| Compound Measures | Standard Units | One unit | time, mass, length, money, volume, area |
| | Compound Units | Made of two or more units | speed, rates of pay, prices |
| | Speed | Speed = distance ÷ time | 30 miles per hour |
| | Density | Density = mass ÷ volume | 6 g/litre |
| | Pressure | Pressure = force ÷ area | N/m ² |



Maths Year 10 Higher Autumn 2

| | | | | |
|---|--------------------------------------|---|---|--|
| Quadratic Graphs, Turning Points and Roots | Quadratic Graphs | Equations in the form y = ax ² + bx + c | The graphs are a U shape | |
| | Roots | Where the graph crosses the x axis | | |
| | Turning Points | The coordinate of where the graph turns | It is the bottom or the top of the graph | |
| | Factorising | Rewrite the equation in brackets | When we solve it tells us the roots of the equation | |
| | Linear Simultaneous Equations | Coefficient | The number multiplying a term | The 4 in 4x |
| | | Expanding brackets | Rewrite the equation without brackets, using multiplication | Remember to simplify |
| | | Completing the Square | A way of solving quadratic equations | Also tells us the coordinates of the turning point |
| | | The Quadratic Formula | Quadratic equations of form ax ² + bx + c = 0 can be solved using the formula: 'minus b plus/minus the square root of b squared minus four ac divided by two a | $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ |
| | | Numerator | The top number in a fraction | a/b |
| | | Denominator | The bottom number in a fraction | a/b |
| Simplify | | Dividing the numerator and denominator by the highest common factor | 6/18 divide both numerator and denominator by 6 to get 1/3 | |
| Algebraic Fractions | | To simplify we factorise the numerator and denominator | Cancel any common factors | |

| | | |
|--------------------------------------|-------------------------------------|---|
| Linear Simultaneous Equations | Solve Simultaneous Equations | Simultaneous equations are two equations with two unknowns. They are called simultaneous because they must both be solved at the same time. Use the elimination method: 1) Get rid of the terms that are the same 2) If the operation signs are the same then subtract the remaining terms. If the operation signs are NOT the same you have to add the remaining terms. 3) Solve the equation to find the variable x or y 4) Substitute your known variable back into one of the equations to find the remaining variable. |
| | Cubic | An equation with the highest power of x is x ³ |
| Further Graphs | Reciprocal | An equation where x is in the denominator |
| | Exponential | An equation where x is in the index (power) |
| | Circle | The equation of a circle with the centre at the origin is: x ² + y ² = r ² The equation (x - a) ² + (y - b) ² = r ² Where the centre is at (a, b) and r is the radius |



Maths Year 10 Higher Spring 1

| | | |
|-----------------------|----------------------------------|--|
| Probability | Mutually Exclusive Events | Mutually exclusive events cannot happen at the same time. Events sum to 1 |
| | Venn Diagrams | Comparing 2 or more sets of data that share some things in common |
| | Element | A list of numbers, objects or outcomes |
| | Universal Set | Contains all of the elements for our question |
| | Set notation | A - all elements in A A' - all elements not in A B - all elements in B B' - all elements not in B |
| | Intersection | $A \cap B$ all the elements in both A and B |
| | Union | $A \cup B$ all the elements in A or B or both |
| | Tree Diagrams | Used when there are two or more events Each pair of branches add to 1 (mutually exclusive) To find the probabilities we multiply along the branches |
| Capture and Recapture | Population | The whole group that you are looking at, e.g. all the students in school |
| | Sampling | A smaller group that is taken from the population |
| | Random Sampling | Every member of the population is equally likely to be chosen |
| | Stratified Sampling | Represents the population, the numbers in the sample are proportional for each category Number selected from each strata = $\frac{\text{strata size}}{\text{total population}} \times \text{sample size}$ |
| | Capture/recapture | Population size = $\frac{\text{number in 1st sample} \times \text{number in 2nd sample}}{\text{number in 2nd sample that are marked}}$ |

| | | |
|----------------------|--------------------------------------|---|
| Standard Form | Write number in standard form | A way of writing large or small numbers $a \times 10^b$ $1 \leq a < 10$ |
| | 10^8 | Positive power, multiply |
| | 10^{-4} | Negative power, divide |
| | Base | The number that will be multiplied by itself (eg 5^3 the base is 5) |
| | Index number | Another word for power, plural is indices |
| | Multiply Indices | Numbers with the same base, add the index numbers |
| Proportion (further) | Divide Indices | Numbers with the same base, subtract the index numbers |
| | Direct Proportion | As one amount increases, so does another at the same rate, e.g. the number of hours worked and your pay |
| | Direct Proportion Formula | $y \propto x$ $y = kx$ for a constant k |
| | Inverse Proportion | As one amount increases, another decreases, e.g. the more decorators you have will reduce time it will take to paint a wall |
| | Inverse Proportion Formula | $y \propto \frac{1}{x}$ $y = \frac{k}{x}$ for a constant k |

Maths Year 10 Higher Spring 2

| | | |
|----------------------------------|-----------------------------------|---|
| Surd | Rational number | A number that can be written as a fraction For example: $1.5 = \frac{3}{2}$ |
| | Irrational number | A number that cannot be written as a fraction. For example: $\pi = 3.14\dots$ and does not repeat |
| | Surd | A square root that gives an irrational answer. A surd is an exact answer. For example: $\sqrt{16} = 4$ so is not a surd (it is rational $\sqrt{2} = 1.4142\dots$ and never repeats so is a surd (it is irrational)) |
| | Simplify surds | $\sqrt{a} \times \sqrt{a} = a$ $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$ $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ |
| | Expand brackets with surds | Multiply each term in the first bracket by each term in the second bracket |
| | Recurring Decimals | Rationalise the Denominator |
| Difference of two squares | | $a^2 - b^2 = (a + b)(a - b)$ |
| Recurring decimal | | When a decimal number repeats forever $0.\dot{3}$ means 0.333333... |
| Terminating decimal | | A decimal that ends, it has a finite number of digits, e.g. 0.25 |
| Recurring Decimals | Dot notation | Two dots show the beginning and end of a recurring group of numbers $0.\dot{3}1\dot{2}$ is equal to 0.312312312... |

| | | |
|------------------|--------------------------|--|
| Bounds | Inequalities | $x < y$ x is less than y $x > y$ x is greater than y $x \leq y$ x is less than or equal to y $x \geq y$ x is greater than or equal to y |
| | Estimate | Round all numbers to 1 significant figure |
| | Truncate | To shorten a number, you do not round Eg. 4.7685 truncated to 1dp is just 4.7 |
| | Upper bound | The largest number that would round to a given value |
| | Lower bound | The smallest number that would round to a given value |
| Growth and Decay | Error Interval | The range of values between the upper and lower bounds that the precise answer could be |
| | Growth | Getting bigger |
| | Decay | Getting smaller |
| | Appreciation | The value of something increasing |
| | Depreciation | The value of something decreasing |
| | Interest Rate | Money that is paid regularly as a percentage, this is usually by a bank when money is saved or borrowed |
| | Compound Interest | Interest that gets added regularly (e.g. monthly, annually), changes the value of money each time so a new calculation has to be completed |

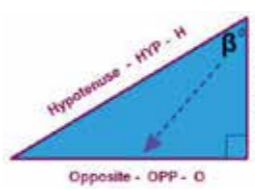
Maths Year 10 Higher Summer 1

| | | |
|------------|-----------------------------|---|
| Statistics | Mean | Add up your numbers and divide by how many numbers there are |
| | Median | Put your numbers in order from smallest to largest, the median is the middle number. If there are two middle numbers then the answer is halfway between them |
| | Mode | The most common number |
| | Range | The difference between the smallest and largest numbers |
| | Scatter Graphs | A graph of plotted points that compares two sets of information |
| | Line of best fit | A line on your scatter graph that best describes the relationship between the two sets of data <ul style="list-style-type: none"> • A straight line • Goes roughly through the middle of the points on your scatter graph • There should be an equal number of points above and below your line |
| | Positive Correlation | As one variable increases so does the other variable |
| | Negative Correlation | As one variable increases the other decreases |
| | Trend | A pattern in a set of results |
| | Outliers | A point that is far from the line of best fit |
| | Time Series Graphs | Frequencies plotted over time. Points are joined with straight lines |
| | The Product Rule | Used to find the intersection of 2 or more probabilities, e.g. PA and $PB = PA \times PB$ |

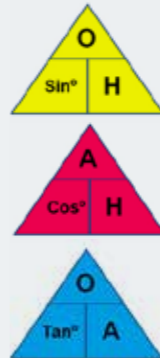
| | | |
|-----------------|--------------------------|---|
| Simple Interest | VAT | Value Added Tax A tax that is added to goods that you buy |
| | Income Tax | Tax that you pay from your wages |
| | Simple Interest | Calculate the percentage amount and multiply it by the number of periods that the money will be invested for |
| Ratio (Further) | Ratio | A way of comparing two or more quantities E.g. to make purple paint I mix red and blue in the ratio 3:4 |
| | Ratio to fraction | To find the denominator you add the parts together |
| | HCF | Highest Common Factor The largest number that is a factor of two or more numbers |
| | Simplify | Divide the numbers in your ratio by the Highest Common Factor |
| | Share in a ratio | Steps to share in a ratio Share £40 in the ratio 3:7 <ul style="list-style-type: none"> • Add the parts together $3 + 7 = 10$ • Divide the amount by the total $£40 \div 10 = £4$ • Multiply by the parts $£4 \times 3 = £12$, $£4 \times 7 = £28$ Answer: £12: £28 |

Right angled Trigonometry

| Hypotenuse | The longest side in a right angled triangle, across from the right angle | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|---|----------------------|----------------------|----------------------|-----------|-----|-----|-----|---|---------------|----------------------|----------------------|---|-----|---|----------------------|----------------------|---------------|---|-----|---|----------------------|---|------------|-----------|
| Adjacent | The side next to the given angle and the right angle | | | | | | | | | | | | | | | | | | | | | | | | |
| Opposite | The side opposite the given angle | | | | | | | | | | | | | | | | | | | | | | | | |
| Sine | $\text{Sine } \theta = \text{opposite} \div \text{hypotenuse}$ | | | | | | | | | | | | | | | | | | | | | | | | |
| Cosine | $\text{Cosine } \theta = \text{adjacent} \div \text{hypotenuse}$ | | | | | | | | | | | | | | | | | | | | | | | | |
| Tangent | $\text{Tangent } \theta = \text{opposite} \div \text{adjacent}$ | | | | | | | | | | | | | | | | | | | | | | | | |
| Exact Values | <table border="1"> <thead> <tr> <th></th> <th>0°</th> <th>30°</th> <th>45°</th> <th>60°</th> <th>90°</th> </tr> </thead> <tbody> <tr> <td>sin</td> <td>0</td> <td>$\frac{1}{2}$</td> <td>$\frac{\sqrt{2}}{2}$</td> <td>$\frac{\sqrt{3}}{2}$</td> <td>1</td> </tr> <tr> <td>cos</td> <td>1</td> <td>$\frac{\sqrt{3}}{2}$</td> <td>$\frac{\sqrt{2}}{2}$</td> <td>$\frac{1}{2}$</td> <td>0</td> </tr> <tr> <td>tan</td> <td>0</td> <td>$\frac{\sqrt{3}}{3}$</td> <td>1</td> <td>$\sqrt{3}$</td> <td>Undefined</td> </tr> </tbody> </table> | | 0° | 30° | 45° | 60° | 90° | sin | 0 | $\frac{1}{2}$ | $\frac{\sqrt{2}}{2}$ | $\frac{\sqrt{3}}{2}$ | 1 | cos | 1 | $\frac{\sqrt{3}}{2}$ | $\frac{\sqrt{2}}{2}$ | $\frac{1}{2}$ | 0 | tan | 0 | $\frac{\sqrt{3}}{3}$ | 1 | $\sqrt{3}$ | Undefined |
| | 0° | 30° | 45° | 60° | 90° | | | | | | | | | | | | | | | | | | | | |
| sin | 0 | $\frac{1}{2}$ | $\frac{\sqrt{2}}{2}$ | $\frac{\sqrt{3}}{2}$ | 1 | | | | | | | | | | | | | | | | | | | | |
| cos | 1 | $\frac{\sqrt{3}}{2}$ | $\frac{\sqrt{2}}{2}$ | $\frac{1}{2}$ | 0 | | | | | | | | | | | | | | | | | | | | |
| tan | 0 | $\frac{\sqrt{3}}{3}$ | 1 | $\sqrt{3}$ | Undefined | | | | | | | | | | | | | | | | | | | | |



Hypotenuse - HYP - H
Opposite - OPP - O
Adjacent - ADJ - A



SOHCAHTOA

| | | |
|---------------------------------|--------------------------------|--|
| Plans and Elevation | Plan | The view from directly above a 3D shape. You will see a 2D shape |
| | Elevation | The view from the front and side of a 3D shape. You will see a 2D shape |
| | Sketch | To roughly draw a shape. Always label the sides and write any measurements on |
| Constructions and Loci | Perpendicular | Two lines that meet at 90° (right angle) |
| | Bisect | To cut something equally in two parts |
| | Line Segment | Part of a line that connects 2 points, it is the shortest distance between 2 points |
| | Locus | A path that is formed by a rule, e.g. 2cm from a point Plural is loci |
| | Region | The area you shade in, defined in your question |
| Similar Shapes | Construction | An accurate diagram using a compass and ruler |
| | Similar Shapes | Two triangles are similar if the angles are the same size or the corresponding sides are in the same ratio |
| | Enlargement | A transformation which changes the size of the original shape |
| | Scale Factor | How much the shape has been enlarged, this is the multiplier |
| | Scale factor of a line | The multiplier |
| | Scale factor of an area | The multiplier ² |
| Scale factor of a volume | The multiplier ³ | |

Order of the Sharps and Flats

| | |
|-------------|--------------|
| F – Father | B – Battle |
| C – Charles | E – Ends |
| G – Goes | A – And |
| D – Down | D – Down |
| A – And | G – Goes |
| E – Ends | C – Charles' |
| B – Battle | F – Father |

Key Signatures – Number of #s and bs.

| | |
|----------------|--------------------|
| 1 – Good (G) | 1 – Flowers (F) |
| 2 – Dogs (D) | 2 – Bloom (Bb) |
| 3 – Are (A) | 3 – Early (Eb) |
| 4 – Easily (E) | 4 – And (Ab) |
| 5 – Bought (B) | 5 – Die (Db) |
| 6 – For (F#) | 6 – Gradually (Gb) |
| 7 – Cash (C#) | 7 – Charlie (Cb) |

Dynamics

| | | | | | |
|------------|----------|--------------------------|-------------|----------|------------|
| <i>pp</i> | <i>p</i> | <i>mp</i> | <i>mf</i> | <i>f</i> | <i>ff</i> |
| Pianissimo | Piano | Mezzo piano | Mezzo forte | Forte | Fortissimo |
| Very quiet | Quiet | Medium quiet | Medium loud | Loud | Very loud |
| | | Crescendo | | | Diminuendo |
| | | Gradually getting louder | | | |

Theory

4/4 → Number of beats
4/4 → Type of beats

Degrees of the Scale

| | |
|--------------|-----|
| Tonic | I |
| Supertonic | II |
| Mediant | III |
| Sub-dominant | IV |
| Dominant | V |
| Sub-mediante | VI |
| Leading Note | VII |

Lower pitch ← Higher pitch

Theory

Pitch – How high or low a note is. Pitch increases and decreases by steps of a scale.

Scales can be major or minor. **Tempo** – Tempo describes the speed of the music. We use Italian terms to describe speed.

Rhythm – Notes have different lengths – some long, some short. When we combine long and short notes it creates a rhythm.

Form/Structure – Music is divided into sections. These sections are put together to create a structure.

Texture – Music is made up of layers. We have different names depending on how many layers there are and how they work together.

Timbre/Sonority – We use the word timbre to describe the different sounds made by the instruments.

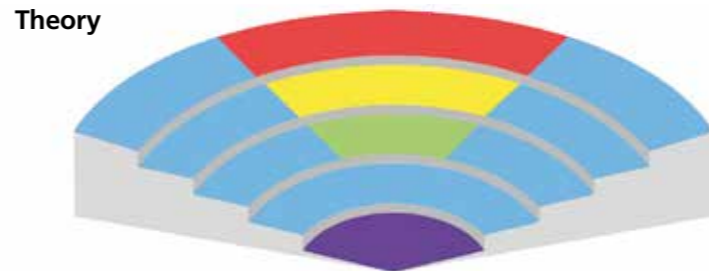
Tonality – Whether the piece is major or minor. Major sounds 'happy', minor sounds 'sad'.

Dynamics – Dynamics is volume in music. Varying dynamics make music more interesting. We use Italian terms to describe dynamics.

😊 Major 😞 Minor

Rhythm – Notes and Note Values

| | | | | |
|-----------|---------|----------|--------|-------------|
| | | | | |
| Semibreve | Minim | Crotchet | Quaver | Semi-quaver |
| 4 beats | 2 beats | 1 beat | ½ beat | ¼ beat |
| | | | | |



| | | | | |
|------------------|---|--|--|--|
| Conductor | Strings Violin Viola Cello Double Bass | Woodwind Flute Clarinet Saxophone Bassoon | Brass Trumpet Trombone French Horn Tuba | Percussion Drum Kit Tambourine Timpani |
|------------------|---|--|--|--|

| | | | | |
|--|---|---|--------------------------------------|-------------------------------------|
| Staff | Treble Clef | Bass Clef | Sharp | Flat |
| | | | | |
| 5 lines where notes are placed to determine pitch. | Symbol placed on the staff. Used for high pitch – right hand piano. | Symbol placed on the staff. Used for low pitch – left hand piano. | Black key to the right on the piano. | Black key to the left on the piano. |

Rhythm – Rhythms into Syllables

| | | |
|-----------|-----------|----------|
| | | |
| Tea | Coffee | Lemonade |
| | | |
| Coco-cola | Pineapple | |

Articulation

Articulation refers to how you play a note.

| | | | |
|------------------|---------------|---------------|-----------------|
| | | | |
| Staccato - Short | Tenuto - Long | Slur - Smooth | Accent - Strong |

Performance

Requirements

It must be 4-6 minutes. One piece must link to one area of study. One piece must be an ensemble piece.

Top Tips!

The standard required is Grade 3. Choose a piece you can polish off and deliver accurately, even if it is a slightly lower standard.

How to Practise

- Don't rush your practice.
- Make sure you have a quiet space. Slow and steady is best!
- Always have a warm-up.
- Plan your practice.
- Practise the hard parts first.
- Use your practice diary to show progress.
- Record yourself and listen back to it.
- Keep a pencil handy to mark up your score.

Composition

Requirements

2 compositions – one set to a brief, one free. Must last between 3 and 6 minutes.

Composition Log

You are required to keep a log for both compositions explaining what you composed and when.

Responding to a Brief

You are required to respond to a brief, which are set by the exam board and based on the four areas of study.

Free Composition

You must set your own brief for your free composition. This can be anything you wish.

AOS 1 – Musical Forms and Devices

Devices

Repetition – exact repeat of a musical idea.

Contrast – a change in the music.

Anacrusis – a note before the first beat.

Imitation – when another part copies a musical idea.

Sequence – a repeated idea but at a different pitch.

Ostinato – a repeated pattern or phrase.

Syncopation – off-beat.

Dotted rhythms – lengthening a note by half of its value by placing a dot after it.

Drone – a long held note.

Pedal – a held or repeating note against which harmonies change.

Canon – melody is repeated in another part whilst the original melody continues to play.

Conjunct movement – (mainly) stepwise melody.

Disjunct movement – leaping melody.

Broken Chord/Arpeggio – notes of a chord are played separately one after the other.

Alberti bass – broken-chord accompaniment (I, V, III, V).

Regular phrasing – balanced melody.

Motif – short melodic or rhythmic idea.

Chord progressions – a series of related chords.

Modulation – changing key.

Important Musical Periods & Composers

The Baroque Era (1600-1750) – Bach, Handel, Vivaldi, Corelli, Lully, Purcell.

The Classical Era (1750-1810) – Haydn, Mozart, Beethoven.

The Romantic Era (1810-1910) – Schubert, Mendelssohn, Chopin, Schumann, Liszt, Wagner, Verdi, Brahms, Tchaikovsky, Dvorak.

Musical Forms

Binary – A, B

Ternary – A, B, A

Rondo – A, B, A, C, A

Variation – T, V1, V2, V3

Strophic – A, A, A

Minuet and Trio – M, T, M

Reading A Score – Clefs



Treble Clef – Violin
Alto Clef – Viola
Bass Clef – Cello

AOS 2 – Music for Ensemble

Texture

Monophonic – single melodic line for an instrument or voice or when instruments/voices are unison.

Homophonic – one main melody plus harmonic accompaniment of chords (inc. broken chords).

Polyphonic Texture – number of melodic lines heard independently of each other.

Texture Devices

Unison – Two or more musical parts sound at the same pitches at the same time - can be in octaves (monophonic).

Chordal – Parts move together producing a series or progression of chords (homophonic).

Melody and Accompaniment – The tune is the main focus of interest and importance, and it is 'accompanied' by another part/ parts which support the tune (homophonic).

Canon or Imitation – The melody is repeated exactly in another part while the initial melody is still being played (polyphonic).

Counter melody – A new melody played at the same time as a previous melody.

Layered – When more parts are added on top of each other.

A musical ensemble is a group of people who perform instrumental or vocal music together.

A duet – A piece for 2 performers

A trio – A piece for 3 performers

A quartet – A piece for 4 performers

A quintet – A piece for 5 performers

A sextet – A piece for 6 performers

A septet – A piece for 7 performers

An octet – A piece for 8 performers

Ensembles

Chamber Music – Baroque (Sonata, Trio Sonatas), Classical (String Quartet) and Romantic.

Musical Theatre – duets, trios, quartets, chorus.

Jazz and Blues

Sonority and Timbre

Sonority or timbre means 'tone colour' associated with different instrument and musical sounds. The tone colour of different instrument combinations can result in different effects.

AOS 3 – Film Music

Leitmotif – A frequently recurring short melodic or harmonic idea which is associated with a character, event, concept, idea, object or situation.

Mickey-Mousing – Used in cartoons and animated films where the music attempts to represent every little physical movement on screen.

Sequencing – Where a melodic idea (often a leitmotif) is repeated growing louder and louder and consistently rising either a tone or a semitone higher during each repetition.

Diegetic Music – Music that is included in the film, and that the characters would be able to hear.

Non-diegetic Music – Music which has been composed to accompany events on screen but that the characters can't hear, but the audience can. Also referred to as Underscore or Incidental Music.

Synchronisation – The process of marrying up music and film.

Soundtrack – The music and sound recorded on a motion-picture film.

Motif – A short thematic strand of only a few notes.

Visual Narrative – The process of describing a story or storyline using visual images. Musical narrative is therefore the process of describing a story or storyline using music and sound.

Film Music

Film Music is a type of Descriptive Music that represents a mood, story, scene or character through music; it is designed to support the action and emotions of the film on screen.

Film Music

Film music today often blends popular, electronic and classical music in a flexible way that suits the needs of the particular film. Nevertheless, Hollywood still creates superstar composers whose film music often takes on a life of its own away from its original context, on CDs, downloads and in the concert hall.

AOS 4 – Popular Music

Pop Music

Is generally regarded as a commercial genre which has mass audience appeal.

Rock Music

Is generally accepted as a genre which sounds more aggressive, but also of significance are the more gentle and reflective rock balladtype tracks.

Musical Features of Pop and Rock Music

Instruments – Lead guitar, bass guitar, drum kit, vocals keyboard and synthesiser.

Melody – The melody is the part that is usually, though not always, sung. It is often regarded as the most important part of any pop or rock song.

Rhythm – Rhythm is such an important element in rock and pop music – it is consistent and strong with the use of the drum kit and the rhythm section driving the music forward.

Harmony – Harmony does not work in rock and pop music the same way as it does in classical. Most chords are root position or 7th chords.

Riffs – A repeated chordal pattern, series of notes or musical phrase.

Power Chords – The name given to a chord that uses the root and the 5th (i.e. no 3rd). It is used by rock guitarists.

MIDI – A digital and technical system that allows electronic instruments and computers to communicate with each other.

Chest Voice – The lower, more powerful part of the voice.

Head Voice – One of the higher registers of the voice when singing.

Falsetto – Male vocal technique used to extend the vocal range into a higher range than usual.

Range – The distance between the highest and lowest note that can be played or sung.

Remixing – Change a musical piece stylistically through electronic manipulation.

Panning – Adjusting the sound levels between the left and right hand speakers.

Looping – Part of the music is repeated indefinitely.

Abduction – Movement where a part of the body is taken away from the midline of the body, for example, moving the legs apart.

Adduction – Movement where a part of the body is brought towards the midline of the body, for example, bringing the arms into the sides.

Aerobic Energy System – Uses/is dependent on oxygen; used for long-duration, low intensity activities.

Aerobic Training Zone – Working at 60% – 80% of maximal heart rate.

Agility – The ability to move and change direction quickly (at speed) while maintaining control.

Agonist – The contracting muscle; the muscle that causes movement.

Alveoli – Minute air sacs in the lungs.

Anaerobic Energy System – Not dependent on oxygen and used for short duration; used for high intensity activities.

Anaerobic Training Zone – Anything over 80% of maximal heart rate.

Antagonist – Muscle that relaxes to allow the agonist to contract.

Aorta – Blood vessel carrying oxygenated blood from the left ventricle to the body.

Appendicular Skeleton – The outer part of the skeleton.

Artery – Blood vessel carrying blood away from the heart.

Articulating Cartilage – Protective covering on ends of bones.

Atria – Upper chambers of the heart that collect blood from the veins.

Axial Skeleton – The central part of the skeleton.

Balance – The maintenance of the centre of mass over the base of support.

Biceps – Located on the front of the upper arm; cause flexion at the elbow.

Body Composition – A comparison of the percentage of bone, fat, water and muscle within the body.

Bradycardia – Lower resting heart-rate as a result of training.

Bronchi – Two tubes that carry air from the trachea into each lung.

Bronchioles – Tiny tubes that carry air to the alveoli.

Capillary – Very thin blood vessels that allow gaseous exchange to happen.

Cardiac Output – Amount of blood leaving the heart each minute.

Cardiovascular Endurance – The ability of the heart and lungs to supply oxygen to the working muscles.

Cartilage – A firm connective tissue.

Cervical – Neck vertebrae, supports the head.

Circuit Training – A series of exercises performed one after the other to complete a 'circuit', with a rest in between each circuit.

Coccyx – Lowest part of the spine; allows attachment of ligaments and muscles.

Concentric – Isotonic contraction where the muscle shortens.

Coordination – The ability to use different (two or more) parts of the body together smoothly and efficiently.

Deltoid – Located on the shoulder; causes abduction of the arm.

Deoxygenated Blood – Blood returning to the heart/ lungs lacking oxygen.

Diastolic Pressure – The blood pressure in the arteries when the heart rests between beats.

Diffusion – Movement of substances from a high concentration to a lower concentration.

DOMS – Delayed onset of muscle soreness.

Eccentric – Isotonic contraction where the muscle lengthens – used to control downward movement.

Ectomorph – Body shape characterised by lean, skinny, low muscle mass. Ectomorphs are often tall.

Endomorph – Body shape characterised by large fat content.

Energy Systems – Aerobic (with oxygen) and Anaerobic (without oxygen).

Exhalation – Breathing air out.

Extension – Straightening a joint. This occurs when the angle of a joint increases, for example, at the elbow when putting a shot.

Factors that affect blood pressure – Activity levels, Diet, Age and Stress.

Fitness – The ability to cope with the daily demands without suffering undue fatigue. In other words, your body is fit enough to do what it needs to do.

Flexibility – The range of movement possible at a joint.

Flexion – Bending a joint. This occurs when the angle of a joint decreases. For example, the elbow flexes when performing a biceps curl.

Frequency – Increase how often you train.

Functions of the Skeleton – Support, Movement, Protection of vital organs, Storage of minerals, Blood cell production and Shape.

Gastrocnemius – Located on the back of the lower legs; causes straightening of the ankle.

Gluteus Maximus – Located on the buttocks; causes extension of the hips.

Gravity – The natural pull towards the earth's core.

Hamstring – Located on the back of the upper leg; cause flexion at the knee.

Health – A state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity.

Heart Rate – The number of times the heart beats in a minute.

High Blood Pressure – Blood pressure above 140/90mmHg.

Hip Flexors – Located on the front of the upper legs; cause flexion of the legs at the hip.

Hypertrophy – Increase in size due to training (e.g. hypertrophy of the left ventricle in the heart).

Ideal Blood Pressure – Blood pressure between 90/60mmHg and 120/80mmHg.

Inspiration – Breathing air in.

Intensity – Increase how hard the training is.

Involuntary Muscle – Muscle that we have no control over.

Isometric – Muscle action where the muscle stays the same length – used in balances.

Isotonic – Muscle action where the muscle changes length – causes movement.

Joint – Where two or more bones meet.

Joint Capsule – Holds bones in place.

Kyphosis – Excessive outward curve of thoracic region of the spine.

Lactic Acid – Fatiguing waste product of the anaerobic energy system.

Larynx – Voice box.

Latissimus Dorsi – Located on the back; causes adduction at the arm.

Left Atrium – Heart chamber receiving oxygenated blood from the pulmonary vein.

Left Ventricle – Heart chamber pumping oxygenated blood into the aorta.

Ligaments – Joins bone to bone; supports and reinforces joint capsule.

Lordosis – Excessive inward curve of lumbar region of the spine.

Low Blood Pressure – Blood pressure less than 90/60.

Lumbar – Lower back vertebrae; weight bearing.

Maximal – Working with 100% effort.

Maximal Heart Rate (MHR) – Calculated as 220 – Age.

Mesomorph – Body shape characterised by large muscular shoulders.

Mouth and Nose – Air enters the body through these.

Muscular Endurance – The ability of a muscle or muscle group to undergo repeated contractions avoiding fatigue.

Muscular Strength – The ability to apply force against a resistance.

- Static Strength – Maximal strength that can be applied to an immovable object.
- Dynamic Strength – Repeated contractions applied to a moving object.
- Explosive Strength – Sometimes called Power. A combination of strength x speed.

Overload – Working harder than normal.

Oxygenated Blood – Blood leaving the heart/lungs rich in oxygen.

Pectoralis Major – Located on the chest; causes adduction of the arm.

Pharynx – Chamber at the back of the throat.

Power – Explosive strength or anaerobic power is the product of strength and speed i.e. strength x speed.

Principles of Training – Specificity, Progression, Overload, Reversibility and Tedium.

Principles of FITT – Frequency, Intensity, Time and Type.

Progression – Gradually increasing the intensity of training.

Pulmonary Artery – Blood vessels carrying deoxygenated blood from the right ventricle to the lungs.

Pulmonary Vein – Blood vessels carrying oxygenated blood from the lungs to the left atrium.

Quadriceps – Located on the front of the upper leg; causes extension at the knee.

Reaction Time – The time taken to initiate a response to a stimulus.

Recovery – What a performer does to allow repair of the body.

Rectus Abdominus – Located on the stomach wall; causes flexion of the trunk and hips.

Red Blood Cell – Carries oxygen in the blood.

Residual Volume – Amount of air left in the lungs after a maximal exhalation.

Rest – A time when a performer undertakes little or no exertion.

Reversibility – You lose fitness if you stop or reduce training.

Right Atrium – Heart chamber receiving deoxygenated blood from the vena cava.

Right Ventricle – Heart chamber pumping deoxygenated blood into the pulmonary artery.

Rotation – Movement where a whole limb or part of the body turns or revolves around its length.

Sacrum – Attached to pelvis.

Scoliosis – A sideways curve of the spine.

Set – A collection of repetitions (reps) that occur before a rest period.

Soleus – Located on the back of the lower legs; causes straightening of the ankle.

Specificity – Training must be relevant to your chosen activity.

Speed – The maximum rate at which an individual is able to perform a movement or cover a distance in a period of time. Putting body parts into action as quickly as possible.

Strength – The ability to overcome a resistance.

Striated – Striped muscle.

Stroke Volume – Amount of blood leaving the heart each beat.

Synovial Joints – Pivot, Condyloid, Saddle, Gliding, Ball & Socket and Hinge.

Synovial Membrane – Produces synovial fluid.

Synovial Fluid – Lubricates joint.

Systolic Pressure – The blood pressure in the arteries during the contraction of your heart.

Tedium – Training needs to be varied to avoid boredom.

Tendons – Attach muscle to bone.

Thoracic – Chest vertebrae; attached to ribs.

Tidal Volume – Amount of air that enters the lungs during normal inspiration at rest.

Time – Increase the duration of your training.

Trachea – Often called the windpipe, lined with rings of cartilage and carries air from the pharynx to the bronchi.

Trapezius – Located on the neck; causes extension of the head.

Triceps – Located on the back of the upper arm; causes extension at the elbow.

Type – Vary the type of training.

Types of Bones – Long, Flat, Irregular, Short and Sesamoid.

Types of Joints – Fixed, Slightly moveable and Synovial.

Types of Muscle – Cardiac, Smooth and Skeletal.

Type 1 Slow Twitch Fibres – Muscle fibre that is red, contracts slowly and resists fatigue.

Type 2 Fast Twitch Fibres – Muscle fibre that is white, contracts rapidly and fatigues easily.

Unstriated – Unstriped muscle.

Vascular Shunt – Mechanism that directs blood to where there is greater demand and away from where there is less demand.

Vasoconstriction – Reducing the diameter of small arteries to reduce blood flow to tissues.

Vasodilation – Increasing the diameter of small arteries to increase the blood flow to tissues.

Vein – Blood vessel carrying blood towards the heart.

Vena Cava – Blood vessels carrying deoxygenated blood from the body to the right atrium.

Ventricles – Lower chambers of the heart that pump blood out of the heart to the arteries.

Vital Capacity – Maximum amount of air you can exhale after taking the deepest possible inspiration.

Voluntary Muscle – Muscle that we can control (Skeletal).

BTEC Tech Award in Performing Arts - Component 1: Exploring the Performing Arts



Styles to write about when analysing the 3 chosen performances. Is the piece a theatre drama, a musical or a traditional piece?

Creative stylistic qualities to include:

- Treatment of theme/issue: for example love, comedy etc.
- Production elements: for example costume
- Form/structure/narrative - this is the plot
- Response to stimulus
- Genre - this is the type of performance
- Contextual influences
- Collaboration with other practitioners - think about Brecht
- Influences by other practitioners

Component 1: Exploring the Performing Arts

There are 3 components in this course and they all focus on the assessment of knowledge, skills and practices. The components are interrelated. Both Components 1 and 2 are assessed through internal assessment. In Year 10, in the first component, learners will develop their understanding of the performing arts by examining practitioners' work and the processes used to create performance. There are two learning aims:

- Examine professional practitioners' performance work.
- Explore the interrelationships between constituent features of existing performance material.

When reviewing the live performance, you can comment on the dance and musical theatre skills used in the performance. Acting styles such as comedy, naturalism. Dance styles such as ballet, jazz, contemporary. Musical Theatre styles such as Jukebox Musicals, Rock Musicals, comic.

Component 1: Exploring the Performing Arts

A live performance

After a trip to the theatre we will be reviewing a live performance. This could be a musical, a play or a pantomime. Students have previously been on theatre trips to watch The Lion King at the Edinburgh Playhouse and also to watch the pantomime at the Theatre Royal.

Component 1

Learning Aim A: Examine professional practitioners' performance work.

Learners will examine live and recorded performances in order to develop their understanding of practitioners' work in one or more of acting, dance and musical theatre, with reference to influences, outcomes and purpose. Learners will gain a practical appreciation of practitioners' work in using existing performance material in acting, singing, dance or musical theatre and how they may respond to or treat a particular theme or issue. How they use/interpret/modify a pre-existing style, and how they communicate ideas to their audience through stylistic qualities.

Key words

| | | |
|----------|------------------|---------------|
| Staging | Musician | Practitioner |
| Costume | Director | Brecht |
| Sound | Musical director | Artaud |
| Lighting | Theatre | Stanislavski |
| Actors | Drama | Collaboration |
| Dancer | Genre | |

Purpose and its influences on stylistic qualities to include:

| | | |
|--------------|--------------|-------------|
| To educate | To raise | To organise |
| To inform | awareness | To arrange |
| To entertain | To celebrate | To decide |
| To provoke | To entertain | To create |
| To challenge | To excite | |
| viewpoints | To motivate | |

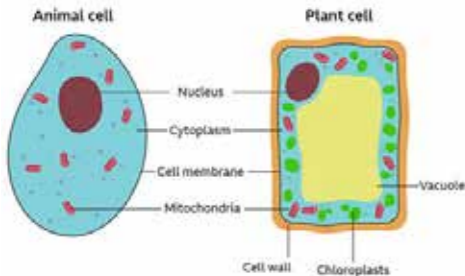


Above is an image of an actress performing a monologue; a monologue is a part of a script in which a character speaks.

B1 – Cell Biology

Eukaryotic Cells

They have a nucleus to contain the chromosomes. These can be animal, plant or fungus or protist cells. Animal and plant cells are shown below.



RP1 – Microscopy: Observing Plant Cells



Preparing the slide:

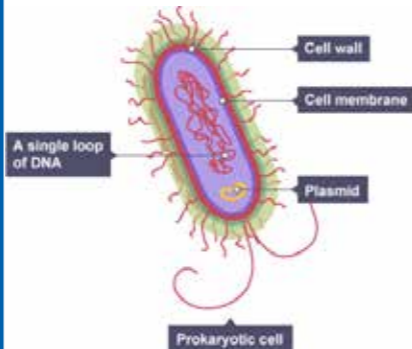
1. Place a thin layer of onion membrane on a glass slide with forceps.
2. Use a drop of iodine to stain the cells.
3. Gently place a glass cover slip over the same and tap carefully to remove air bubbles.

Viewing the slide:

1. Place the slide on the stage and turn on the light.
2. Select the lowest magnification objective lens.
3. Look through the eyepiece and turn the coarse focus until the image can be seen.
4. Turn the fine focus until a clear image is formed.
5. Change the objective lens to another with a higher magnification and turn the fine focus to re-focus the image.

Prokaryotic Cells

They do not have a nucleus, they are usually a lot smaller and may contain plasmids.



Microscopes

The development of microscopes of the last 200 years has allowed us to study cells and the structures inside them in more and more detail.

| Light Microscope | Electron Microscope |
|-------------------|---------------------|
| Low resolution | High resolution |
| Low magnification | High magnification |
| Cheap | Expensive |

Calculating Magnification

Units for image and actual size may need to be converted before using the equation below.

$$\text{Magnification} = \frac{\text{image size}}{\text{actual size}}$$

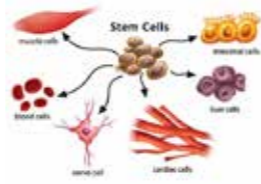
| | | |
|----|----|--------|
| mm | µm | x 1000 |
| µm | mm | ÷ 1000 |

Cell

| Cell | Features | |
|--------|------------------|---|
| Animal | Sperm | High number of mitochondria Enzyme coated head |
| | Nerve | Long Lots of branches |
| | Muscle | High number of mitochondria High number of ribosomes |
| Plant | Xylem | Walls thickened with lignin to strength the cells into a tube |
| | Phloem | Sections between cells called sieves to help transport substances like dissolved sugars |
| | Root hair | Large surface area Lack of chloroplasts Large vacuole |

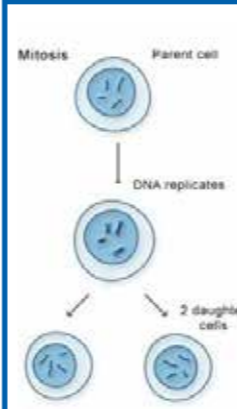
Cell Differentiation

As an organism develops, cells differentiate to form different types of cells. This is an example in animals.



B1 – Cell Biology

Mitosis

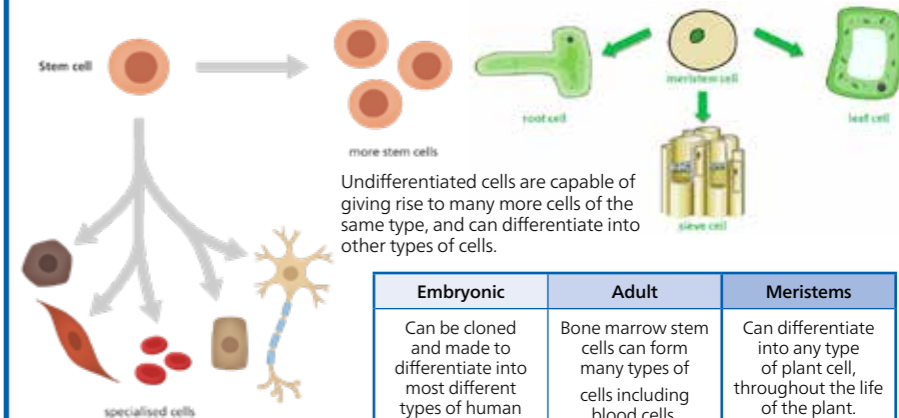


Before a cell can divide it needs to grow and increase the number of sub-cellular structures such as ribosomes and mitochondria. **The DNA replicates** to form two copies of each chromosome.

In mitosis one set of chromosomes is pulled to each end of the cell and the **nucleus divides**.

Finally the **cytoplasm and cell membranes divide** to form **two identical cells**.

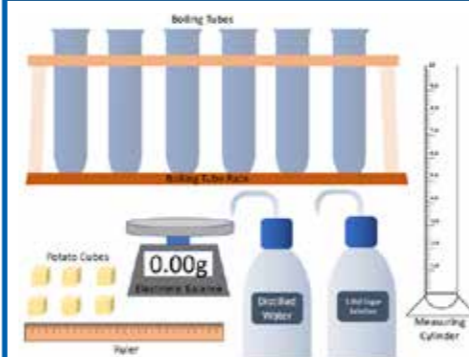
Stem Cells



Undifferentiated cells are capable of giving rise to many more cells of the same type, and can differentiate into other types of cells.

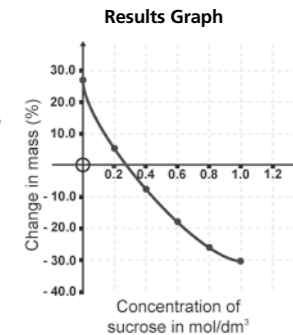
| Embryonic | Adult | Meristems |
|---|--|--|
| Can be cloned and made to differentiate into most different types of human cells. | Bone marrow stem cells can form many types of cells including blood cells. | Can differentiate into any type of plant cell, throughout the life of the plant. |

RP2 – Osmosis: Conc. of Solution affecting mass of plant tissue



1. Use a cork borer to create 5 cylinders of plant tissue (usually potato) and cut them all to the same length.
2. Measure the mass of each piece using a top pan balance and the length of each piece with a ruler. Record in a table.
3. Measure out 100cm³ of each concentration of salt/sugar solution into labelled boiling tubes.
4. Place each piece of potato into a boiling tube for 24 hours.
5. Remove the pieces and blot with a paper towel.
6. Measure the mass of each piece using a top pan balance and the length of each piece with a ruler. Record in a table.
7. Calculate the percentage change in mass.

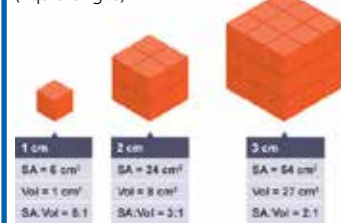
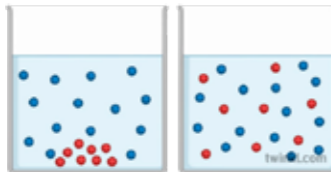
$$\% \text{ change in mass} = \frac{\text{change in mass (g)}}{\text{initial mass of potato (g)}}$$



B1 – Cell Biology

Diffusion

Substances move a higher concentration of that substance (red particles pictured) to where there is a lower concentration of that substance. (High → Low)
This happens because of the random movement of the particles in a fluid (liquid or gas).



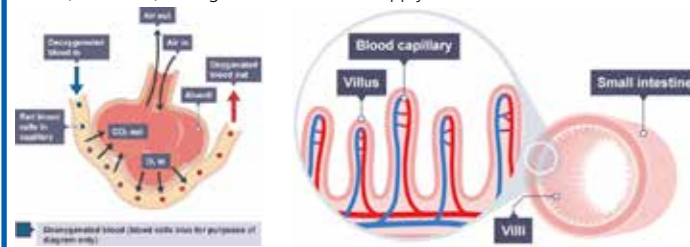
There are ways the rate of diffusion can be changed;

- The difference in concentrations (concentration gradient)
- The temperature
- The surface area of the membrane

Examples

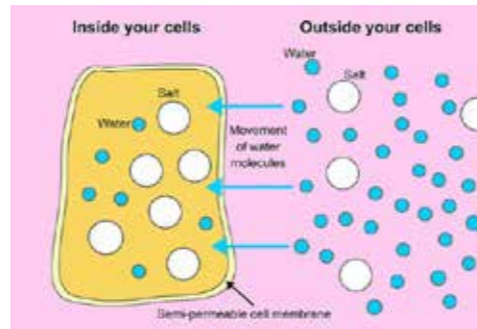
Alveoli in the lungs and villi in the small intestine are both structured in similar ways so diffusion can happen at a high rate (fast):

- Having a large surface area
- A membrane that is thin, to provide a short diffusion path
- (In animals) having an efficient blood supply



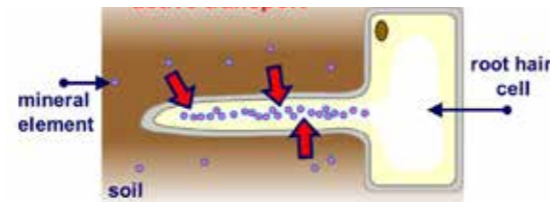
Osmosis

Water may move across cell membranes via osmosis. Osmosis is the diffusion of water from a dilute solution to a concentrated solution through a partially permeable membrane (H → L).



Partially permeable means small molecules can move through but large molecules cannot.

Active Transport

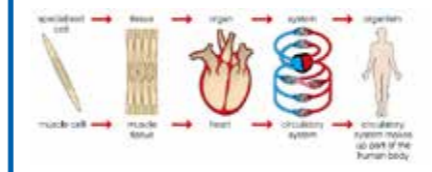


- Active transport is moving substances against the concentration gradient (L H) so requires energy.
- This means that cells that carry out a lot of active transport (root hair cells, epithelial cells on villi in the small intestine) contain a lot of mitochondria.

B2 – Organisation

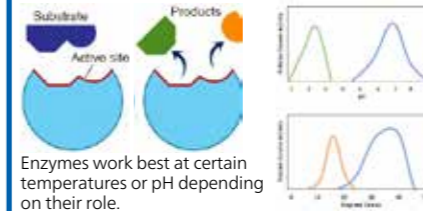
Levels of Organisation

Cells = basic building blocks of all living organisms. A tissue = group of cells with a similar structure and function.
Organs = aggregations of tissues performing specific functions.
Organ systems = organs organised to form organisms.



Enzymes

- Biological catalysts.
- Digestive enzymes speed up the breakdown of insoluble food molecules.
- Specific shape active site that matches substrate.



Enzymes work best at certain temperatures or pH depending on their role.

Bile

The liver makes an alkaline solution called bile. Stored by the gall bladder.

Has two jobs:

- Emulsifies fats,
- Neutralises stomach acid.



| Enzyme | Salivary glands | Stomach | Pancreas | Small intestine |
|----------|-----------------|---------|----------|-----------------|
| Amylase | X | | X | X |
| Protease | | X | X | X |
| Lipase | | | X | X |

Digestive System

| Organ | Function |
|------------------------|--|
| Mouth | Teeth and tongue to chew food. |
| Salivary Glands | Releases saliva containing enzymes. |
| Oesophagus | Muscle tube to squeeze food along. |
| Stomach | Contains enzymes and hydrochloric acid. Is made of muscle to churn food. |
| Small Intestine | Releases enzymes and absorbs soluble food particles (glucose, amino acids, fatty acids, glycerol). |
| Large Intestine | Absorbs water. |
| Liver | Releases bile. |
| Gall Bladder | Stores bile. |
| Pancreas | Releases enzymes. |

Digestive Enzymes

Starch → **amylase** → Glucose
 Protein → **protease** → Amino Acids
 Fats → **lipase** → Fatty acids + Glycerol

RP3 – Food Tests


Summaries of the four food tests.

| | |
|--|--|
| Protein Chemical: Biuret reagent Positive test: Purple | Starch Chemical: Iodine Positive test: Black |
| Fats Chemical: Ethanol Positive test: Cloudy | Glucose Reagent: Benedict's Positive test: Brick red |

B2 – Organisation

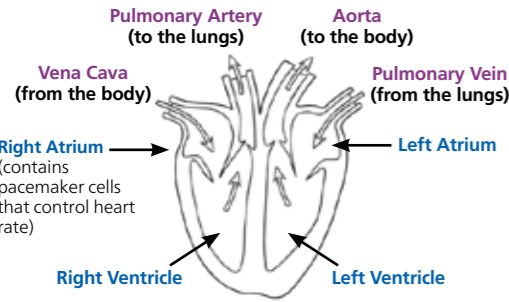
RP4 – Food Tests: effect of pH on the rate of reaction of amylase

1. Add 2cm³ amylase solution, 2cm³ of starch solution and 2cm³ of pH2 buffer to a water bath (37°) in separate test tubes. Wait 10 minutes.
2. While waiting, add 2 drops of iodine solution to each well on the spotting tile.
3. Once the solutions in the water bath have reached 37°, pour the amylase and PH2 buffer into the starch solution.
4. Immediately take a sample with a pipette and add to the first well of the spotting tile.
5. Repeat Step 4 every 30 seconds until there is no colour change when testing with iodine solution.
6. Repeat Steps 1-5 with pH4, pH6, pH8 and pH10 buffers.




The Human Heart

Double circulatory system = higher blood pressure = blood gets to cells quicker.



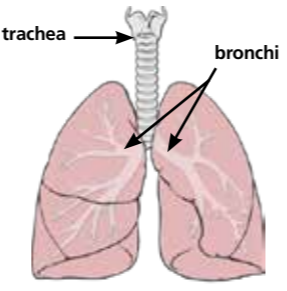
Blood Vessels



| Arteries | Capillaries | Veins |
|---|---|---|
| Blood carried away from heart Thick muscular and elastic walls = withstands high pressure Small lumen = maintains high pressure | Locations of substance exchange Walls only one cell thick = shorter diffusion pathway Lumen just bigger than red blood cell | Blood carried back to heart Thin walls as blood is low pressure Large lumen – lower resistance for blood passing through Valves to prevent back flow |

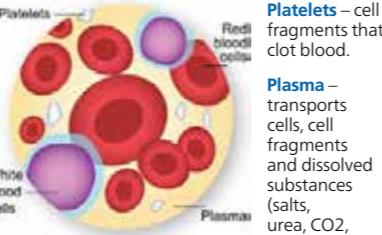
Respiratory System

Structures that cannot be seen on this diagram are the **alveoli and capillary network** – see 'Unit 1 - Diffusion'.



Blood – 4 components

Red blood cells – contain haemoglobin to carry oxygen. More detail...
White blood cells – fight disease (see Unit 3 – Infection and Response).




Platelets – cell fragments that clot blood.
Plasma – transports cells, cell fragments and dissolved substances (salts, urea, CO₂, hormones...).

Red Blood Cells (RBCs)

- Contain chemical 'haemoglobin'.
- This reacts with oxygen to be carried around the body.
- RBCs are ~8µm (relative small animal cell), allows them to fit through capillaries.
- Bi-concave disc shape for large SA:V.

Coronary Heart Disease (CHD)


- Coronary arteries supply heart muscle with blood (containing glucose and oxygen for respiration).
- Can become narrowed/blocked by fatty deposits if cholesterol high.
- Reduced muscle contraction in heart.



B2 – Organisation


CHD Treatment – Statins vs Stents

| Statins | Stents |
|---|---|
| <ul style="list-style-type: none"> • Medication to be taken every day • Lowers blood cholesterol • Does not work immediately | <ul style="list-style-type: none"> • Mesh tube to be inserted into artery to hold it open • Surgery required • Works immediately |



Faulty Valves

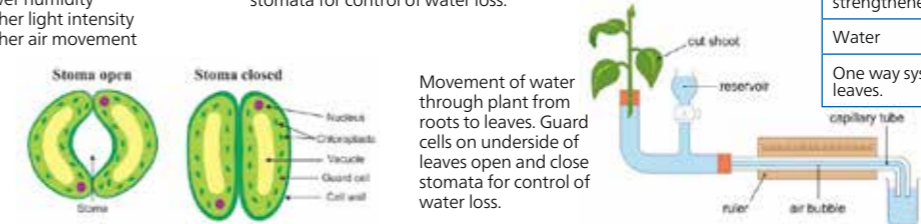
- Valves in veins and the heart prevent backflow of blood.
- Faulty valves = don't open or close fully.
- Can be replaced with man-made valves or transplanted.



Transpiration

Increasing the rate of transpiration:
 Higher temperature
 Lower humidity
 Higher light intensity
 Higher air movement

Movement of water through plant from roots to leaves. Guard cells on underside of leaves open and close stomata for control of water loss.



Movement of water through plant from roots to leaves. Guard cells on underside of leaves open and close stomata for control of water loss.

| Transpiration | Translocation |
|--|--|
| Xylem - hollow tubes strengthened by lignin. | Phloem – tubes of elongated cells. |
| Water | Dissolved sugars |
| One way system - roots to leaves. | Two way system - sugars taken to wherever they are needed. |

Cover the stomata with Vaseline, turn on a fan, or heat the room to see how factors affect rate of transpiration.

Cancer

Uncontrolled cell growth
Benign tumours = abnormal cells, contained in one area, in a membrane, do not invade other parts of body.
Malignant tumours = cancer cells, invade neighbouring tissue, and spread into blood, form secondary tumours.

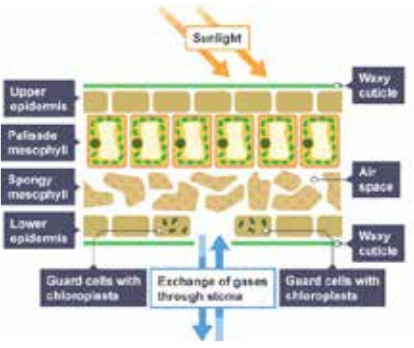
Risk Factors

Lifestyle factors can be risk factors for certain diseases e.g. obesity is a risk factor for Type 2 Diabetes, or drinking and smoking while pregnant affects the development of the foetus.

Interaction of Diseases

- Defects in the immune system - individual is more likely to suffer from infectious diseases.
- Viruses can trigger cancers.
- Immune reactions caused by pathogen can trigger allergies.
- Severe physical ill health can lead to depression and other mental illness.

Leaf Structure



B3 – Infection and Response

Communicable Diseases

| Disease | Pathogen | Symptoms | Spread by | Prevent spread | Treatment |
|-------------------------------|----------|--|--|---|---------------------------------------|
| Salmonella | Bacteria | Fever, cramps, vomiting, diarrhoea | Contaminated food | Vaccinating poultry, clean cooking conditions | Antibiotics or management of symptoms |
| Gonorrhoea | Bacteria | Yellow/green discharge, pain when urinating | Sexual Contact | Using condoms | Antibiotics |
| Measles | Virus | Red rash and fever | Breathing in droplets from coughs/ sneezes | Vaccination | No cure – only management of symptoms |
| HIV | Virus | Flu-like symptoms, develops into AIDS | Sexual contact | Using condoms | Antiretroviral drugs |
| Tobacco Mosaic Virus (plants) | Virus | 'Mosaic' pattern of discolouration on the leaves | Soil | Destroy infected plants | No treatment |
| Rose Black Spot (plants) | Fungus | Black spots on leaves | Wind or water | Remove and destroy infected leaves | Fungicides |
| Malaria | Protist | Recurrent episodes of fever | Insect bites (mosquitoes) | Mosquito nets, bug sprays | Antimalarial drugs |

Antibiotics & Painkillers

Antibiotics = kill bacteria (specific antibiotic for specific bacteria) **THEY DO NOT KILL VIRUSES** e.g. penicillin

Painkillers = stop pain (don't kill microbes, just help with symptoms) e.g. paracetamol It is difficult to develop drugs that kill viruses without also damaging the body's tissues.

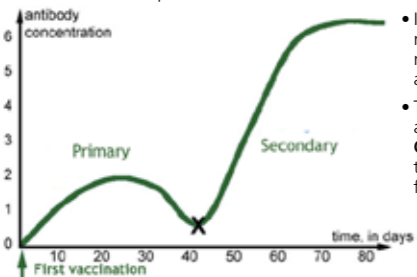
Development of Drugs

- Testing for:
- Safety
 - Efficacy (does it work?)
 - Dosage (how much is needed)

| Stage | Description |
|-------|--|
| 1 | PRE-CLINICAL Tested on cells and tissues. Side effects? Efficacy? |
| 2 | |
| 3 | CLINICAL Clinical trials = tested on humans. 1st health volunteers, 2nd patients with the illness. Dosage gradually increased to optimum. |

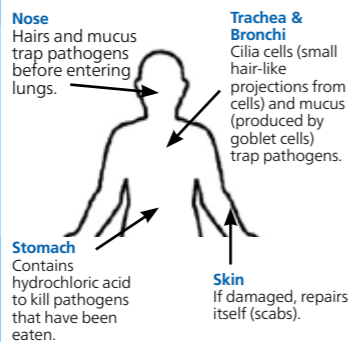
The Human Heart

- Introducing small quantities of dead or inactive forms of pathogen into the body.
- Stimulates WBCs to produce antibodies



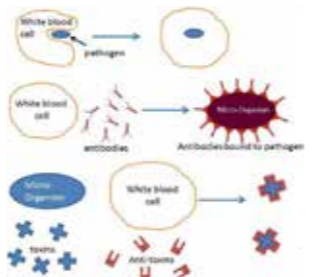
- If same pathogen returns (X), WBCs make same antibodies rapidly.
- They make **MORE** antibodies, **QUICKER**, and they stay in body for **LONGER**.

Non-specific Defence Systems



White Blood Cells (WBCs)

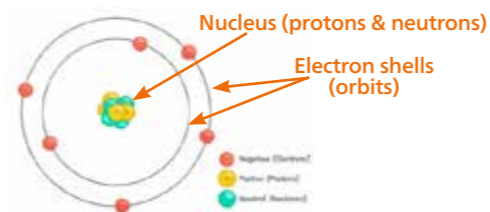
1. Phagocytosis – engulfing the pathogen
2. Producing antibodies – specific to the antigen
3. Producing antitoxins – to neutralise toxins



C1 – Atomic Structure and The Periodic Table

Atoms

- Smallest part of an element that can exist.
- Made up of **protons, electrons** and **neutrons**.



| Subatomic particle | Relative Mass | Charge |
|--------------------|---------------|----------|
| Proton | 1 | Positive |
| Neutron | 1 | Neutral |
| Electron | Very small | Negative |

Atoms have a radius of about 0.1nm ($1 \times 10^{-10}m$)

Radius of nucleus = about $1 \times 10^{-14}m$

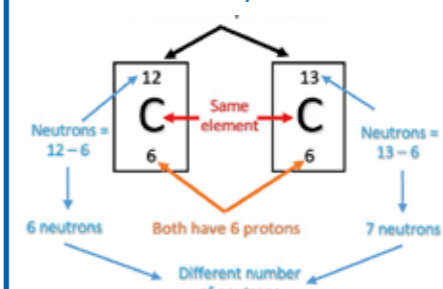
Compounds

- Two or more elements chemically combined.
- Formed by chemical reactions.
- For example: CO_2 H_2O CH_4 HCl $NaCl$

Isotopes

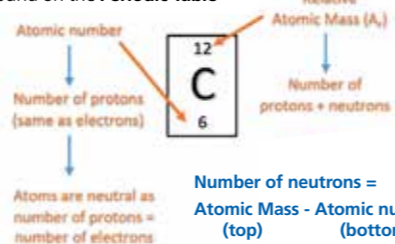
Isotope = atoms of the **same element** which have the **same number of protons**, but a **different number of neutrons**.

These are isotopes because..



Elements

- Made up of **one type** of atom
- Found on the **Periodic Table**



Chemical Equations

- Shown by using a word equation. e.g. magnesium + oxygen → magnesium oxide
- Left of the arrow = reactants. Right of the arrow = products.
- Also can be shown by a symbol equation e.g. $2Mg + O_2 \rightarrow 2MgO$

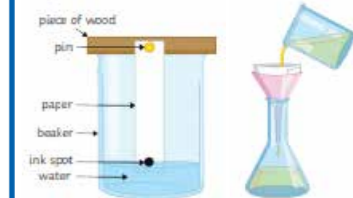
Mixtures and Separation

Mixtures – two or more elements or compounds not chemically combined

Air – mixture as it contains oxygen, nitrogen, carbon dioxide etc. which are not chemically combined

Chromatography

To separate out mixtures (usually liquids) (e.g. colours in ink)



Filtration

To separate insoluble solids from liquids (e.g. sand and water)



Evaporation

To quickly separate soluble solids from a solution (e.g. salt and water)



Crystallisation

To slowly separate a soluble salt from a solution (e.g. copper sulfate crystals)



C1 – Atomic Structure and The Periodic Table

Distillation

Simple distillation – separating a liquid from a solution.

- Liquid is heated and evaporates
- Vapours travel up into the condenser
- Condenser has cold water travelling around it
- Vapours hit the cold surface and condense (turn back into a liquid)

Electronic Structure

Electrons are found on shells (orbits) orbiting the nucleus. There is a maximum number of electrons allowed on each shell:
 First shell = 2 electrons
 Second shell = 8 electrons
 Third shell = 8 electrons.

11 electrons

23 Na 11

1st shell = 2
 2nd shell = 8
 3rd shell = 1

Total = 11 electrons

History of the atom

Plum Pudding model

| Scientist | Time | Discovery |
|--------------------------|---------------------------|--|
| John Dalton | Start of the 19th century | Atoms were first described as solid spheres. |
| JJ Thomson | 1897 | Plum pudding model – atom is a ball of charge with electrons scattered. |
| Ernest Rutherford | 1909 | Alpha scattering experiment – mass concentrated at the centre; the nucleus is charged. Most of the mass is in the nucleus. Most atoms are empty space. |
| Niels Bohr | Around 1911 | Electrons are in shells orbiting the nucleus. |
| James Chadwick | Around 1940 | Discovered that there are neutrons in the nucleus. |

Differences to nuclear model

- Electrons scattered inside
- Ball of positive charge (no protons)
- No nucleus
- No neutrons
- Evenly distributed mass

Rutherford tested the plum pudding model

Rutherford's scattering experiment

alpha particles are positively charged

fired at gold foil

some alpha particles are deflected/repelled

most alpha particles pass straight through

WHAT HAPPENED?

CONCLUSION

- supported Rutherford's new nuclear model as: those that were reflected – this was due to the small, dense positive centre of the atom
- supported Rutherford's new nuclear model as most went straight through (so actually mainly empty space)
- refuted the plum pudding model as if it was a ball of positive charge the alpha particles should all be deflected

Rutherford named this particle the **proton**

C1 – Atomic Structure and The Periodic Table

Development of the Periodic Table

John Newlands – Law of Octaves

- Elements ordered by **atomic weight**.
- Noticed a pattern with every eighth element.
- Some elements placed inappropriately – metals and non-metals grouped together.
- Rejected by other scientists.

John Newlands' Law of Octaves

| | | | | | | |
|--------|----|----|--------|----|--------|--------|
| H | Li | Be | B | C | N | O |
| Cl | Na | Mg | Al | Si | P | S |
| F | K | Ca | Cr | Ti | Mn | Fe |
| Co, Ni | Cu | Zn | Y | In | As | Se |
| Br | Rb | Sr | Ce, La | Zr | Di, Mo | Ro, Ru |

Dimetri Mendeleev

- Still ordered by atomic weight.
- Left gaps for undiscovered elements.
- Could predict properties of **undiscovered elements**.
- Some elements didn't fit pattern – switched them to keep pattern of **similar properties**.

Eventually, knowledge of isotopes explained why elements could not be ordered by atomic weight.

Dimetri Mendeleev left gaps for undiscovered element

The Modern Periodic Table

- Ordered by **atomic (proton) number**.
- Columns = groups
- Group number = number of electrons in outer shell. Elements in each group have similar properties.

Rows = periods

Period number = number of electron shells the atom has.

Group 0 (Nobel Gases)

- Full outer shell – unreactive
- Stable atoms

He As you go down

- Boiling point increases
- More electron shells
- Bigger atoms
- More intermolecular forces
- More energy needed to break forces.

Ne

Ar

Kr

Xe

Rn

Group 1 (Alkali Metals)

- Similar properties as all have 1 electron in outer shell.
- Very reactive.
- Soft, grey, shiny metals. Stored in oil as would react with oxygen in air.
- Produce an alkali when reacting in water (hence alkali metals).

Reactivity of Group 1 Metals

As you go down the group... Elements are more reactive because:

- More electron shells
- Outer electron = further from nucleus
- Less electrostatic force of attraction between outer electron and nucleus
- Easier for outer electron to be lost for atom to react.

Li

Na

K

Rb

Cs

Fr

Group 7 (Halogens)

- 7 electrons in outer shell – all react similarly.
- Diatomic – go around in pairs as more stable (e.g. Cl₂).
- Non-metals – form halides when reacted with a metal.
- A more reactive halogen can replace a less reactive halogen in a reaction (**displacement**).
- Reactivity of Group 1 Metals

Reactivity of Group 7

As you go down the group... Elements are less reactive because:

- More electron shells
- Free electron = further from nucleus
- Less electrostatic force of attraction between free electron and nucleus
- Harder to attract the free electron onto the outer shell.

F

Cl

Br

I

At

C2 – Bonding, structure, and the properties of matter

Formation of Ions

- **Ions** = a charged particle made from losing or gaining electrons
- **Positive ion** = lost electrons
- **Negative ion** = gained electrons.

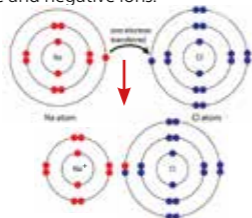
Metals form positive ions
Non-metals form negative ions

| Group | Ions | Example |
|-------|------|--|
| 1 | +1 | $\text{Li} \rightarrow \text{Li}^+ + \text{e}^-$ |
| 2 | +2 | $\text{Ca} \rightarrow \text{Ca}^{2+} + 2\text{e}^-$ |
| 6 | -2 | $\text{O} + 2\text{e}^- \rightarrow \text{O}^{2-}$ |
| 7 | -1 | $\text{Br} + \text{e}^- \rightarrow \text{Br}^-$ |

Lost electrons (pointing to positive ions)
Gained electrons (pointing to negative ions)

Formation of Ions

- Between a metal and non-metal.
- Metals give electrons to non-metals so both have a full outer shell.
- **Electrostatic force of attraction** between positive and negative ions.



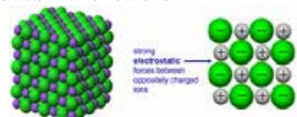
Metallic Bonding

- Happens between **metals only**.
- Positive metal ions surrounded by **sea of delocalised electrons (can move)**.
- Ions tightly packed in rows.
- Strong **electrostatic forces of attraction** between positive ions and negative electrons.



Ionic Compounds

- Form giant lattices, as the attraction between ions acts in all directions.



Alloys

- **Alloys** = mixture of two or more metal atoms.
- Pure metals are too soft for many uses.
- Atoms same size
- Layers slide
- Softer
- Different sized atoms
- Layers cannot slide
- Stronger



Properties of Ionic Compounds

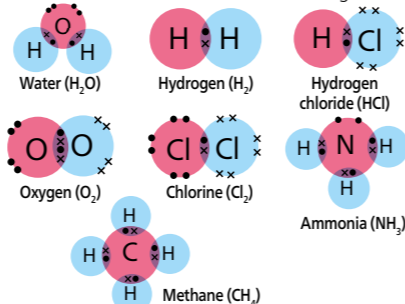
- **High melting point** – lots of energy needed to overcome electrostatic forces.
- **High boiling point.**
- **Cannot conduct electricity as solid** – ions cannot move.
- **Conducts electricity when molten or dissolved** – ions are free to move.

Covalent Bonding

- **Covalent bonding** = sharing a pair or pairs of electrons for a full outer shell.
- Between non-metals only.

Dot and Cross Diagrams

- Show the bonding in simple molecules.
- Uses the outer shell of the atoms.
- Crosses and dots used to show electrons.
- You should be able to draw the following:



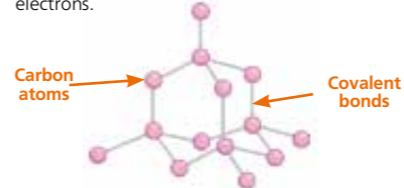
Simple Covalent Molecules

- Form when all atoms have full outer shells so bonding stops.
- Examples are the molecules shown above.
- Have **low melting and boiling points**.
- Due to **weak intermolecular forces**.
- Do not conduct electricity.

C2 – Bonding, structure, and the properties of matter

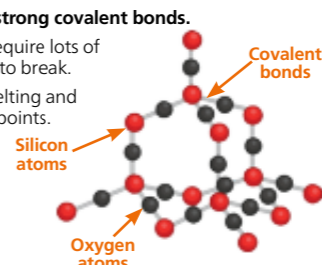
Giant Covalent Structure – Diamond

- Each carbon atom **covalently** bonded to **four** others.
- This makes diamond **strong** – a lot of **energy** needed to break strong bonds.
- **Does not conduct electricity** – has no free electrons.



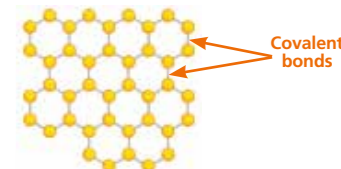
Silicon Dioxide

- Similar structure to diamond.
- Giant covalent structure.
- Lots of **strong covalent bonds**.
- These require lots of **energy** to break.
- High melting and boiling points.



Graphene

- Graphene = one layer of graphite.
- Very strong → lots of strong covalent bonds.



- Each carbon bonded to three others.
- One **free delocalised electron** can move to **carry electrical current** throughout the structure.

Giant Covalent Structure – Graphite

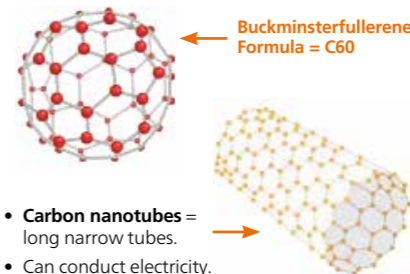
- Layers of **carbon** arranged in **hexagons**.
- Each carbon bonded to three other carbons.
- Leaves **one delocalised electron** → moves to carry electrical charge **throughout structure**.



- Layers held together by **weak intermolecular forces**.
- Layers can **slide** over each other easily.
- Makes graphite **soft/slippery** good lubricant.
- Has **high melting point** as has many strong covalent bonds.

Fullerenes and Nanotubes

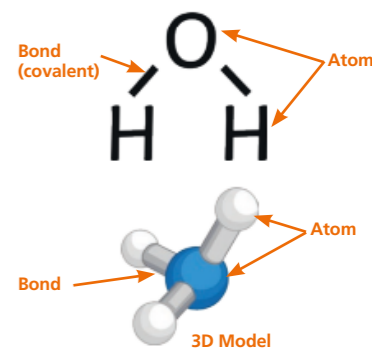
- Molecules of carbon shaped into hollow tubes or balls.
- Used to **deliver drugs into body**.



- **Carbon nanotubes** = long narrow tubes.
- Can conduct electricity.
- Can strengthen materials without adding weight
- Used in electronics and nanotechnology.

Molecular Models

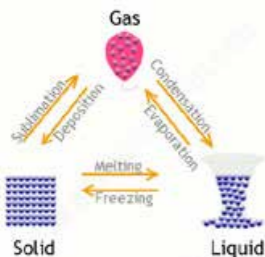
- There are different ways to show a molecule other than dot and cross diagrams.



C2 – Bonding, structure, and the properties of matter

States of Matter

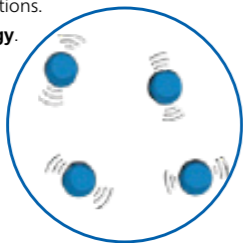
- Three states of matter: **solid**, **liquid** & **gas**.
- To change state, **energy** must be **transferred**.



- When heated, particles **gain energy**.
- **Attractive forces** between particles begin breaking when melting or boiling points are reached.
- **Amount of energy** needed to change state depends on how strong forces are.

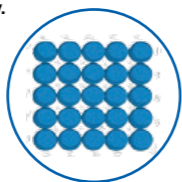
Gas

- Randomly arranged.
- Particles **move quickly** – all directions.
- Highest **amount of kinetic energy**.
- Gases **are able to flow** – fill containers.
- **Can be compressed**.



Solid

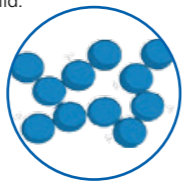
- **Regular** pattern (rows and columns).
- Particles **vibrate** in a **fixed position**.
- Particles have **low amount of kinetic energy**.



- Have a **fixed shape** – cannot flow.
- **Cannot be compressed** – particles close together.

Liquid

- Particles **randomly** arranged touching.
- Particles can **move around**.
- **Greater amount of kinetic energy** than solid.



- Liquids **able to flow** – take shape of containers.
- **Cannot be compressed** – particles close together.

State Symbols

- States of matter shown in chemical equations:
- Solid (**s**)
- Liquid (**l**)
- Gas (**g**)
- Aqueous (**aq**)
- **Aqueous solutions** = substance dissolved in water.

Identifying Physical State of Substances

- Temp is **lower** than melting point – substance is **solid**.
- Temp is **between** the melting point and boiling point – substance is **liquid**.
- Temp is **higher** than the boiling point – substance is **gas**.

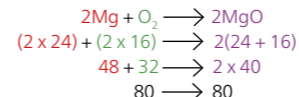
Limitations of Particle Model (HT)

- No chemical bonds are shown.
- Particles shown as solid spheres – not the case, particles are mostly empty space like atoms.
- The diagrams don't show any of the forces between particles

C3 – Quantitative Chemistry

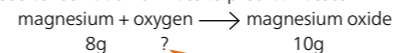
Conservation of Mass

- Atoms cannot be created or destroyed during reactions.
- **Mass of reactants = mass of products**.
- To show mass is conserved in a reaction:
- Mr on the left side must be same as the right side.



Reacting masses

Use conservation of mass to predict masses:



Both sides need to be equal:
 $10\text{g} - 8\text{g} = 4\text{g}$ of oxygen

Percentage Mass

- Percentage mass of an element in a compound

$$\frac{\text{Mass of the element in compound}}{\text{Total mass of compound}} \times 100$$

Example Question:

Find the percentage mass of oxygen in magnesium oxide (MgO).

$$A_r \text{ of magnesium} = 24 \quad A_r \text{ of oxygen} = 16$$

$$\text{Mr of MgO} = 24 + 16 = 40$$

$$\% \text{ mass} = \frac{A_r}{M_r} = \frac{16}{40} = 0.4 \times 100 = 40\%$$

X 100 to make a %
40% of the mass of MgO is oxygen

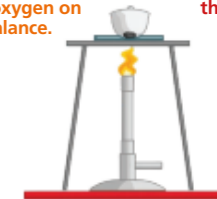
Mass Changes

- Mass should stay the same in a reaction.
- Sometimes it will look like the mass has increased/decreased.
- If a **reactant** is a gas – mass will **increase**.

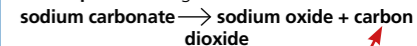


Oxygen is in the air before it combines with magnesium – you cannot find the mass of oxygen on the balance.

It will look like the mass has increased when it is re-weighed at the end.



If a **product** is a gas – mass will **decrease**.



It will look like the mass has decreased as some of the atoms have been given off as gas – so cannot be re-weighed.



Relative Formula Mass (M_r)

Relative formula mass (M_r) = all the **relative atomic masses**

(A_r) of the atoms added up

| | |
|----|----|
| 16 | 12 |
| O | C |
| 8 | 6 |

Example

$$\text{CO}_2$$

$$12 + (16 \times 2) = 44$$

Concentrations of Solutions

- Concentration = amount of substance in specific volume
- More substance dissolved = more concentrated solution

$$\text{Concentration} = \frac{\text{mass}}{\text{volume}}$$

$$(\text{g/dm}^3) \quad (\text{g}) \quad (\text{dm}^3)$$

Can be rearranged to find mass dissolved:

$$\text{mass} = \text{concentration} \times \text{volume}$$

$$(\text{g}) \quad (\text{g/dm}^3) \quad (\text{dm}^3)$$

C3 – Quantitative Chemistry

The Mole (HT only)

- Avogadro constant** – 6.02×10^{23} is the number of molecules of substance that make up one mole of the substance.

Iron has a A_r of 56, so 1 mole of iron (6.02×10^{23} atoms of iron) has a mass of 56g.

Oxygen (O_2) has an M_r of 32, so 1 mole of oxygen (6.02×10^{23} molecules of oxygen) has a mass of 32g. Ammonia (NH_3) has an M_r of 17, so 1 mole of ammonia (6.02×10^{23} molecules of ammonia) has a mass of 17g

$$\text{number of moles} = \frac{\text{mass in g (of an element or compound)}}{M_r \text{ (of the element or compound)}}$$

Main equations to remember

- Mass (g) = moles x M_r**

Rearrange: moles = Mass/ M_r
 M_r = Mass/moles

$$1000\text{cm}^3 = 1\text{dm}^3$$

$$\text{cm}^3 \rightarrow \text{dm}^3 = \text{divide by } 1000$$

- Mass (g) = concentration (g/dm³) x volume (dm³)**

Rearrange: concentration = mass/volume
 volume = mass/concentration

- Moles (mol) = concentration (mol/dm³) x volume (dm³)**

Rearrange: concentration = moles/volume
 volume = moles/concentration

Moles and Equations (HT only)

- You can use moles to help you write balanced symbol equations.

Example Question

Write a balanced symbol equation for the reaction in which 5.6g of iron reacts with 10.65g of chlorine to form iron chloride.

- Work out the M_r of all the substances.
 A_r of Fe = 56 and A_r of Cl = 35.5

- Divide the mass of each substance by its A_r to calculate how many moles of each substance reacted or produced.
 (Moles = mass / M_r)

Moles of Fe = $5.6 / 56\text{g} = 0.1$ moles
 Moles of Cl = $10.65 / 35.5\text{g} = 0.3$ moles

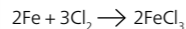
- Divide by the smallest number of moles.

$$\text{Fe} = \frac{0.1}{0.1} = 1 \quad \text{Cl} = \frac{0.3}{0.1} = 3$$

- Use the numbers to write the balanced symbol equation.

Fe + 3Cl

- Chlorine exists as Cl₂ so the whole thing needs to be multiplied by 2.



Limiting Reactants (HT only)

- If one reactant gets used up in a reaction before the other, then the reaction will stop.
- The reactant that has been used up is limiting.
- If you halve the amount of the reactant, then the amount of product will also be halved.

P2 - Electricity

Equations and Maths

Equations

Charge: $Q = It$
 Potential difference: $V = IR$
 Energy transferred: $E = Pt$
 Energy transferred: $E = QV$
 Power: $P = VI$
 Power: $P = I^2R$

Maths

1kW = 1000W
 0.5kW = 500W

Charge

- Electric current is the flow of electric charge.
- It only flows when the circuit is complete.
- The charge is the current flowing past a point in a given time.
- Charge is measured in coulombs (C).
- Current is measured using an ammeter (A)

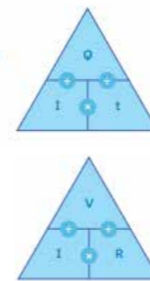
Calculating Charge

charge flow (C) =
 current (A) x time (s)
 $Q = It$

potential difference (V) =
 current (I) x resistance (R)

$V (V) = I (A) \times R (\Omega)$

Potential difference is measured using a voltmeter



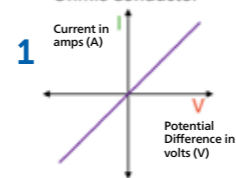
Resistance

voltage (V) = current (A) x resistance (Ω) $V = IR$

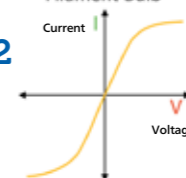
Graphs of I-V Characteristics for Components in a Circuit

- Ohmic conductor:** the current is directly proportional to the potential difference - it is a straight line (at a constant temperature).
- Filament lamp:** as the current increases, so does the temperature. This makes it harder for the current to flow. The graph becomes less steep.
- Diode:** current only flows in one direction. The resistance is very high in the other direction which means no current can flow.

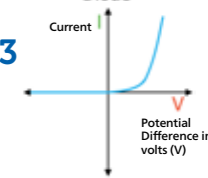
Ohmic Conductor



Filament Bulb



Diode



Current and Circuit Symbols

Current: the flow of electrical charge.

Potential difference (voltage): the push of electrical charge.

Resistance: slows down the flow of electricity.

| | | | | | |
|-------------------|--|---------------|--|------------|--|
| cell | | closed switch | | fuse | |
| resistor | | ammeter | | LDR | |
| battery | | voltmeter | | LED | |
| variable resistor | | bulb | | thermistor | |
| open switch | | diode | | | |

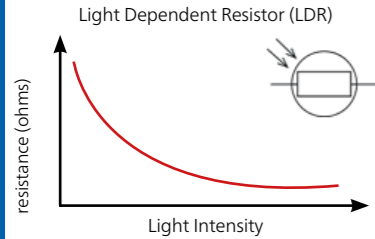
P2 - Electricity

Circuit Devices

LDR – Light Dependent Resistor

- An LDR is **dependent** on **light intensity**.
- In bright light the **resistance falls** and at night the resistance is higher.

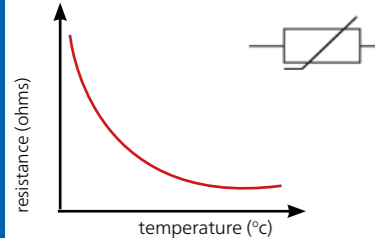
Uses of LDRs: outdoor night lights, burglar detectors.



Thermistor

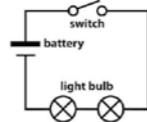
- A thermistor is a **temperature dependent** resistor.
- If it is hot, then the **resistance is less**.
- If it becomes cold, then the **resistance increases**.

Uses of thermistors: temperature detectors.



Series Circuits

- Once one of the components is broken then all the components will stop working.



- One loop of circuit.

Potential difference – the total p.d. of the supply is shared between all the components.

$$V_{\text{total}} = V_1 + V_2$$

Current – wherever the ammeter is placed in a series circuit the reading is the same.

$$I_1 = I_2 = I_3$$

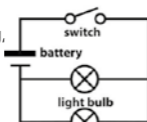
Resistance – In a series circuit, the resistance will add up to make the total resistance.

$$R_{\text{total}} = R_1 + R_2$$

Parallel Circuits

They are much more common – if one component stops working, it will not affect the others.

This means they are more useful.



Potential Difference – same for all components.

$$V_1 = V_2$$

Current – the total current is the total of all the currents through all the components.

$$I_{\text{total}} = I_1 + I_2 + I_3$$

Resistance – adding resistance reduces the total resistance.

Required Practicals

Investigating Resistance in a Wire

Independent variable: length of the wire.

Dependent variable: resistance.

Control variables: type of metal, diameter of the wire.

Conclusion: As the length of the wire increases, the resistance of the wire also increases.

Investigating Series and Parallel Circuits with Resistors

Independent variable: circuit type (series, parallel).

Dependent variable: resistance.

Control variables: number of resistors, type of power source.

Conclusion: Adding resistors in a series increases the total resistance of the circuit. In a parallel circuit, the more resistors you add, the smaller the resistance.

Investigating I-V Relationships in Circuits

(Using a filament bulb, ohmic conductor, diode.)

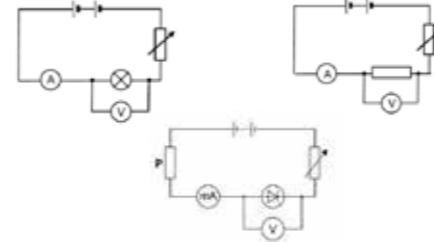
Independent variable: potential difference/volts (V).

Dependent variable: current (A).

Control variable: number of components (e.g. 1 filament bulb, 1 resistor, type of power source.)

- Set up the circuits as shown below and measure the current (I) and the potential difference (V).

- Draw graphs when done showing V and I.



P2 - Electricity

Electricity in the home

AC – alternating current. Constantly changing direction - UK mains supply is 230V and has a frequency of 50 hertz (Hz).

DC – direct current. Supplied by batteries and only flows in one direction.

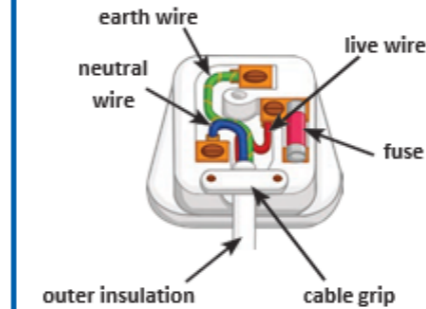
Cables – most have three wires: live, neutral and earth. They are covered in plastic insulation for safety.

Live wire (brown) – provides the potential difference from the mains.

Neutral wire (blue) – completes the circuit.

Earth wire (yellow/green) – protection. Stops the appliance from becoming live. Carries a current if there is a fault.

Touching the live wire can cause the current to flow through your body. This causes an electric shock.



Energy Transferred – this depends on how long the appliance is on for and its power.

energy transferred (J) = power (W) × time (s)

$$E = Pt$$

Energy is transferred around a circuit when the charge moves.

energy transferred (J) = charge flow (C) × potential difference (V)

$$E = QV$$

power (W) = potential difference (V) × current (A)

$$P = VI$$

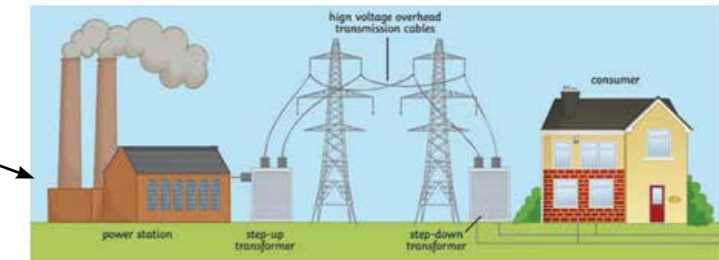
power (W) = current² (A) × resistance (Ω)

$$P = I^2R$$




The National Grid

- The National Grid is a system of cables and transformers.
- They transfer electrical power from the power station to where it is needed.
- Power stations are able to change the amount of electricity that is produced to meet the demands.
- For example, more energy may be needed in the evenings when people come home from work or school.
- Electricity is transferred at a low current, but a high voltage so less energy is being lost as it travels through the cables.
- Step-up transformers** – increase the voltage as the electricity flows through the cables.
- Step-down transformers** – decrease the potential difference to make it safe.

At the power station, fossil fuels are burnt which produces vapours to turn the generator which produces electricity.


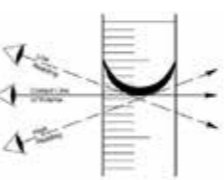


P3 - Particle model of matter

| State | Pattern | Energy and movement | Forces between particles |
|--------|--|--------------------------------|--------------------------------|
| Solid |  Ordered and all touching | Vibrate around fixed positions | Strong forces between particle |
| Liquid |  Random and touching | Move around randomly | Weaker than in a solid |
| Gas |  Random and far apart | Move around randomly | Weak forces of attraction |

| Models | + | - |
|--|---|---|
| Particle diagrams | Easy to see/draw arrangement | <ul style="list-style-type: none"> Can't see the forces between particles Particles look like flat circles rather than 3D spheres Movement isn't shown |
| Kinetic models (e.g. marbles or animations) | Easy to see particle arrangement Can see the movement of particles | Can't see forces between particles |

Measure the volume of small objects by putting them into a measuring cylinder with 100cm³ water in

Zero error  **Read the meniscus!** 

Measure the volume of larger objects by putting them into a full eureka can and catching and measuring the water that is displaced

Required practical continued: Density of liquids

- Find the mass of an empty measuring cylinder using a top pan balance.
- Pour a known volume (100ml) of liquid into the measuring cylinder.
- Use the meniscus to measure the volume of the liquid accurately. This is the volume.
- Now measure the mass of the measuring cylinder + the liquid combined.
- Subtract the mass of the empty measuring cylinder and this is the mass of the liquid.

Density = mass ÷ volume.

Density

Density is mass per cm³
It can be calculated using:

$$\text{Density} = \frac{\text{mass}}{\text{volume}} \quad \rho = \frac{m}{v}$$

Required practical – measuring the density of different materials.

For regular solids:

Mass measured by **top pan balance**

Volume measured by measuring **length x breadth x height**

For irregular solids:

Mass measured by **top pan balance**

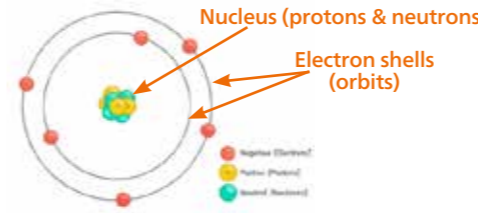
Volume measured by **displacement of water**

This means putting the object into water and measuring the volume of water 'pushed out'

P4 – Atomic Structure

Atoms

- Smallest part of an element that can exist.
- Made up of **protons, electrons** and **neutrons**.

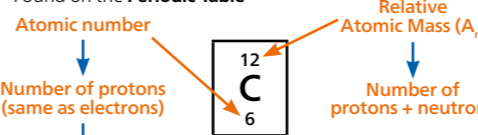


| Subatomic particle | Relative Mass | Charge |
|--------------------|---------------|----------|
| Proton | 1 | Positive |
| Neutron | 1 | Neutral |
| Electron | Very small | Negative |

Atoms have a radius of about 0.1nm (1x10⁻¹⁰m)
Radius of nucleus = about 1x10⁻¹⁴m

Elements

- Made up of **one type** of atom
- Found on the **Periodic Table**



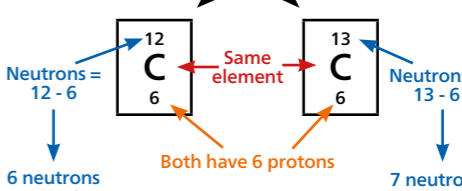
Atoms are neutral as number of protons = number of electrons

Number of neutrons = Atomic Mass - Atomic number (top) (bottom)

Isotopes

Isotope = atoms of the **same element** which have the **same number of protons**, but a **different number of neutrons**.

These are isotopes because..



Radioactive Decay and Nuclear Radiation

- Some nuclei are **unstable** – give out radiation – happens **randomly** and is called **radioactive decay**.
- Activity** = rate at which unstable nuclei decays.
- Activity** is measured in **becquerel (Bq)**.
- Count-rate = number of decays per second recorded by a detector (e.g **Geiger-Muller tube**)

The nuclear radiation emitted may be:

- Alpha**
- Beta**
- Gamma**
- A neutron**

Alpha

Alpha particle = two neutrons and two protons (same as helium nucleus)

- Do not travel far in the air
- Least penetrating** radiation – stopped by skin and paper.
- Highly ionising** because of their size.

Beta

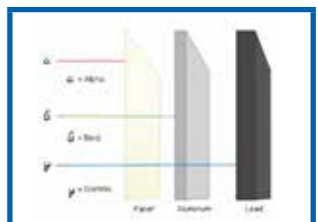
Beta = a fast moving electron.

- Stopped by a piece of aluminium.
- Beta radiation is emitted when a neutron turns into a proton.

Gamma

Gamma = a wave of electromagnetic radiation from the nucleus.

- Most penetrating** – stopped by thick lead and concrete.
- Is the most dangerous when outside the body.

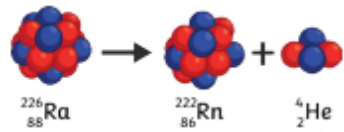


P4 – Atomic Structure

Alpha Decay Equations

Alpha particle = made up of two protons and two neutrons.

Mass number (top) decreases by 4.
Atomic number (bottom) decreases



Alpha particle symbol

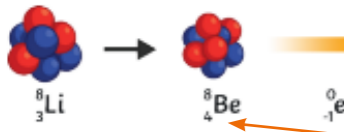


Use the periodic table to find the element once you have worked out the numbers.

Beta Decay Equations

A neutron turns into a proton and releases an electron.

Mass number (top) stays the same.
Atomic number (bottom) increases by 1.



Alpha particle symbol

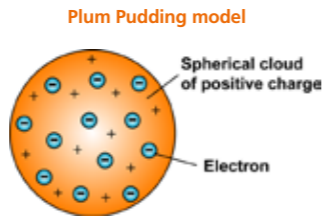


Use the periodic table to find the element once you have worked out the numbers.

Gamma Decay Equations

- No change to the nucleus.
- Nucleus is releasing excess energy.
- Mass number (top) stays the same.
- Atomic number (bottom) stays the same.

History of the atom



Differences to nuclear model

- Electrons scattered inside
- Ball of positive charge (no protons)
- No nucleus
- No neutrons
- Evenly distributed mass

Rutherford tested the plum pudding model

| Scientist | Time | Discovery |
|-------------------|---------------------------|--|
| John Dalton | Start of the 19th century | Atoms were first described as solid spheres. |
| JJ Thomson | 1897 | Plum pudding model – atom is a ball of charge with electrons scattered. |
| Ernest Rutherford | 1909 | Alpha scattering experiment – mass concentrated at the centre; the nucleus is charged. Most of the mass is in the nucleus. Most atoms are empty space. |
| Niels Bohr | Around 1911 | Electrons are in shells orbiting the nucleus. |
| James Chadwick | Around 1940 | Discovered that there are neutrons in the nucleus. |

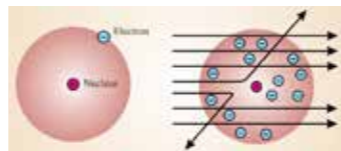
WHAT HAPPENED?

Rutherford's scattering experiment
alpha particles are positively charged

fired at gold foil

some alpha particles are deflected/repelled

most alpha particles pass straight through



CONCLUSION

supported Rutherford's new nuclear model as: those that were reflected – this was due to the small, dense positive centre of the atom

Rutherford named this particle the **proton**

supported Rutherford's new nuclear model as most went straight through (so actually mainly empty space)

refuted the plum pudding model as if it was a ball of positive charge the alpha particles should all be deflected

P4 – Atomic Structure

Contamination

- Contamination** = the unwanted presence of materials containing radioactive atoms on other materials.
- Hazard is due to decay of the contaminating atoms.
- Type of radiation emitted** affects level of hazard (e.g. alpha/beta/gamma).
- Protective clothing** should be worn when handling radioactive material.
- Radioactive sources can be injected into the body to use as **tracers** to make soft tissues show up on x-rays.

Apple injected with radiation = contamination

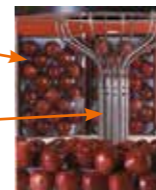


Irradiation

- Irradiation** = exposing an object to nuclear radiation.
- The object **does not** become radioactive.
- Can use irradiation to kill **harmful microorganisms** on food and **increase shelf-life**.

Apples exposed to radiation = irradiation

Radioactive source



Dangers of Radiation

Alpha

- More dangerous** inside the body – **highly ionising** and can cause a lot of damage.
- Less dangerous** outside body as cannot penetrate the skin.

Beta

- Less dangerous** inside body as some is able to escape.
- More dangerous** outside body as it can penetrate the skin.

Gamma

- Least dangerous** inside the body as most will pass out and it is the **least ionising**.
- More dangerous** outside the body as can penetrate the skin.

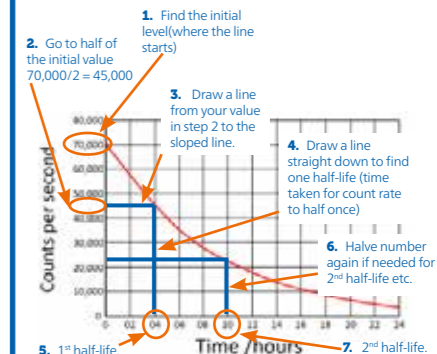
Investigating Radiation

- It is important for findings of studies into effects of radiation on humans to be published and shared with other scientists.
- This means findings can be checked by peer review.

Half-Life

- Radioactive decay is **random**.
- Half-life = time taken** for the **number** of nuclei of the isotope in a sample to halve.
- or
- Time taken** for **count rate** (activity) from a sample containing the isotope to **fall to half its initial level**.

Half-life can be calculated using graphs



Half-life as a percentage (HT only)

Example: The initial activity of a sample is 640 Bq. Calculate the percentage reduction in activity after two half-lives.

$$1 \text{ half-life} = 640/2 = 320 \text{ Bq}$$

$$2 \text{ half-lives} = 320/2 = 160 \text{ Bq}$$

$$\text{So the reduction in activity is } 640 - 160 = 480 \text{ Bq}$$

$$\text{As a percentage: } 480/640 = 0.75 \times 100 = 75\%$$

Grammar & Key Vocabulary

The present tense – regular verbs

Take the ending off the infinitive and replace it with the correct ending for the person you want to talk about:

| | -ar | -er | -ir |
|---------------------|-------|-------|-------|
| I (yo) | -o | -o | -o |
| You (tú) | -as | -es | -es |
| He/She/It (él/ella) | -a | -e | -e |
| We (nosotros) | -amos | -emos | -imos |
| You pl (vosotros) | -áis | -éis | -ís |
| They (ellos/ellas) | -an | -en | -en |

Ejemplo: hablar = **to** speak so hablo = **l** speak (as it is an -ar verb).

Stem Changing Verbs

Some Spanish verbs change a bit at the start of the verb as well as the end **except for the we and you pl forms:**

| | jug <u>u</u> (to play) | quere (to want) | poder (to be able to) |
|---------------------|------------------------|-----------------|-----------------------|
| I (yo) | ju <u>e</u> go | quie <u>o</u> | pu <u>e</u> do |
| You (tú) | ju <u>e</u> gas | quie <u>es</u> | pu <u>e</u> des |
| He/She/It (él/ella) | ju <u>e</u> ga | quie <u>o</u> | pu <u>e</u> de |
| We (nosotros) | jugamos | queremos | podemos |
| You pl (vosotros) | jug <u>áis</u> | quer <u>is</u> | pod <u>éis</u> |
| They (ellos/ellas) | ju <u>e</u> gan | quie <u>en</u> | pu <u>e</u> den |

Preterite tense - Irregular verbs

Some verbs don't follow the regular pattern and you just have to learn these ones. These are some of the most common irregular verbs:

| | tener (to have) | ser (to be) | ir (to go) | hacer (to do/make) |
|---------------------|-----------------|-------------|------------|--------------------|
| I (yo) | tuve | fui | fui | hice |
| You (tú) | tuviste | fuiste | fuiste | hiciste |
| He/She/It (él/ella) | tuvo | fue | fue | hizo |
| We (nosotros) | tuvimos | fuimos | fuimos | hicimos |
| You pl (vosotros) | tuvisteis | fuiteis | fuiteis | hicisteis |
| They (ellos/ellas) | tuvieron | fueron | fueron | hicieron |

The **imperfect tense** is another past tense. One of the ways it is used is for descriptions in the past. These are the key verbs you need to know to describe someone or something in the past:

era – it/he/she was
estaba – it/he/she was (for location or mood)
tenía – it/he/she had

The **near future tense – going to do something.** Use the right form of 'ir' (to go), put 'a' in the middle and add an infinitive.

I'm going - Voy a
You're going - Vas a
He's/she/its is going - Va a
We're going - Vamos a

+ infinitive (jugar, salir, ir, ser, montar, hacer, comer, vivir etc)
E.g. voy a jugar = I'm going to play, vamos a salir = we're going to go out

Other ways of talking about future hopes and plans:

| | | | |
|--------------|--------------------------------------|------------------|-------------------------------|
| I hope | Espero (+ infinitive) | I want | Quiero (+ infinitive) |
| I would like | Me gustaría (+ infinitive) | I want | Tengo ganas de (+ infinitive) |
| I intend | Tengo la intención de (+ infinitive) | I am thinking of | Pienso (+ infinitive) |

The Preterite Tense -regular verbs

This is used to describe a single, completed action in the past (i.e. not a repeated action) Take the ending off the infinitive and replace it with the correct ending for the person you want to talk about:

| | -ar | -er | -ir |
|---------------------|---------|---------|---------|
| I (yo) | -é | -í | -í |
| You (tú) | -aste | -iste | -iste |
| He/She/It (él/ella) | -ó | -ió | -ió |
| We (nosotros) | -amos | -imos | -imos |
| You pl (vosotros) | -astais | -isteis | -isteis |
| They (ellos/ellas) | -aron | -ieron | -ieron |

Ejemplo: hablar = **to** speak so hablo = **l** speak (as it is an -ar verb).

Irregular verbs

Some verbs don't follow the pattern above and you just have to learn these ones. These are some of the most common irregular verbs:

| | tener (to have) | ser (to be) | ir (to go) | hacer (to do/make) |
|---------------------|-----------------|-------------|------------|--------------------|
| I (yo) | tengo | soy | voy | hago |
| You (tú) | tienes | eres | vas | haces |
| He/She/It (él/ella) | tiene | es | va | hace |
| We (nosotros) | temenos | somos | vamos | hacemos |
| You pl (vosotros) | tenéis | sois | vais | hacéis |
| They (ellos/ellas) | tienen | son | van | hacen |

Some verbs in present tense are only irregular in the 'I' Form

hacer (to do) hago (I do)
salir (to go out) salgo (I go out)
ver (to see/watch) veo (I watch/see)

Comparatives – these are phrases that are used to compare things or people. This is how you form them:

| | | |
|--------------------------|--------------------------|---|
| mas (adjective) que... | more (adjective) than... | e.g. más interesante que – more interesting than... |
| menos (adjective) que... | less (adjective) than... | e.g. menos interesante que – less interesting than... |
| tan (adjective) como... | as (adjective) as... | e.g. tan interesante que – as interesting as... |
| mejor que | better than... | |
| peor que | worse than... | |

Superlatives – This is how you say something is the most, the least, the best or the worst. To form these you need the word 'the' in front of the words used for comparatives. Remember you will need to use the right word for 'the' depending on whether the noun you are talking about is masculine (el), feminine (la), masculine plural (los) or feminine plural (las).

| | | |
|-----------------------------------|------------------------|---|
| el/la/los/las más (+ adjective) | the most (+ adjective) | (e.g. el más importante – the most important) |
| el/la/los/las menos (+ adjective) | the least (+adjective) | |
| el/la mejor | the best | |
| los/las mejores | the best (plural) | |
| el/la peor | the worst | |
| los/las peores | the worst (plural) | |

The Future Tense

This is used to say 'will do something' (I will go, we will play etc.) To form the future tense you do not take the ending off the infinitive but you need to add the following endings which are the same for -ar, -er and -ir verbs:

| | Infinitive | Stem change |
|---------------------|------------|------------------------------------|
| I (yo) | -é | dir- (diré – I will say) |
| You (tú) | -ás | to do/make hacer har- |
| He/She/It (él/ella) | -á | to be able to poder podr- |
| We (nosotros) | -emos | to put poner pondr- |
| You pl (vosotros) | -éis | to leave/go out salir saldr- |
| They (ellos/ellas) | -án | to have tener tendr- |
| | | to come venir vendr- |

Some verbs have irregular stems in the future tense (the start of the verb) but the endings are the same as in the table above.

The Conditional tense

This is used to say 'would do something'. It works the same as the future tense but the endings are different. The irregular verbs are the same as the future tense irregulars.

| | |
|---------------------|---------------|
| I (yo) | -ía |
| You (tú) | -ías |
| He/She/It (él/ella) | -ía |
| We (nosotros) | -íamos |
| You pl (vosotros) | -íais |
| They (ellos/ellas) | ían |
| hay | there is/are |
| había | there was |
| habrá | there will be |

Reflexive verbs- These verbs have an extra bit. The infinitives have a 'se' on the end and lots of daily routine verbs are reflexive verbs. (e.g. lavarse = to get washed etc.). They describe actions that you do to yourself.

First you have to **take off the 'se'** and then treat the verb the same as any other – **change the ending for the right person.** Then, for this type of verb, you need to add an **extra bit in front of the verb** depending on the person you are referring to.

| | ducharse (to have a shower) |
|---------------------|-----------------------------|
| I (yo) | me ducho |
| You (tú) | te duchas |
| He/She/It (él/ella) | se ducha |
| We (nosotros) | nos duchamos |
| You pl (vosotros) | os ducháis |
| They (ellos/ellas) | se duchan |

Some reflexive verbs are also stem-changing: acostarse (to go to bed) - me **acuesto**
despertarse (to wake up) - me **despierto**
vestirse (to get dressed) - me **visto**

Talking about what could, should or must be done:

| | |
|--|---|
| Se puede + infinitive | you can (ejemplo: se puede ahorrar energía – you can save energy) |
| Se debe + infinitive | you must/should (e.g. se debe reciclar más – you should recycle more) |
| deberíamos/debemos + infinitive | we should/must |
| tenemos que + infinitive | we have to |
| podemos + infinitive | we can |

Ser and Estar

Both of these verbs mean 'to be'. You need to choose the right one depending on what you want to use it for.

Ser is used for:
Description
Origin: (where someone is from)
Character
Time
Occupation

Estar is used for:
Position
Location
Action
Condition
Emotion

| | Ser | Estar |
|---------------------|-------|---------|
| I (yo) | soy | estoy |
| You (tú) | eres | estás |
| He/She/It (él/ella) | es | está |
| We (nosotros) | somos | estamos |
| You pl (vosotros) | sois | estáis |
| They (ellos/ellas) | son | están |

Desconéctate – Travelling abroad, past and future holidays

| ¿Dónde vives? | Where do you live? |
|--|---|
| Vivo en el... | I live in the... |
| norte/noreste/noroeste... | north/northeast/northwest... |
| sur/sureste/suroeste... | south/southeast/southwest... |
| este/oeste/centro... | east/west/centre... |
| de Inglaterra/Escocia de Gales/Irlanda (del Norte) | of England/Scotland of Wales/(Northern) Ireland |

| ¿Con qué frecuencia? | How often? |
|-------------------------|---------------------------|
| siempre | always |
| a menudo | often |
| todos los días | every day |
| a veces | sometimes |
| de vez en cuando | from time to time |
| una vez a la semana | once a week |
| dos o tres veces al año | two or three times a year |
| (casi) nunca | (almost) never |

| ¿Adónde fuiste de vacaciones? | Where did you go on holiday? |
|--|---|
| hace una semana/un mes/un año | a week/month/year ago |
| hace dos semanas/meses/años | two weeks/months/years ago |
| fui de vacaciones a... | I went on holiday to... |
| Francia/Italia/Turquía | France/Italy/Turkey |
| ¿Con quién fuiste? | Who did you go with? |
| Fui... | I went... |
| con mi familia/instito con mi mejor amigo/a solo/a | with my family/school with my best friend alone |
| ¿Cómo viajaste? | How did you travel? |
| Viajé... | I travelled... |
| en autocar/avión | by coach/plane |
| en barco/coche/tren | by boat/car/train |

| ¿Qué te gusta hacer? | What do you like doing? |
|--|---------------------------------|
| Soy adicto/a a... | I'm addicted to... |
| Soy un(a) fanático/a de... | I'm a ... fan/fanatic. |
| ya que/dado que/puesto que | given that/since |
| Prefiero... | I prefer... |
| Me gusta... | I like... |
| Me encanta/Me mola/Me chifla/ Me flipa/ Me apasiona... | I love... |
| No me gusta (nada)... | I don't like... (at all) |
| Odio... | I hate... |
| A (mi padre) le gusta... | (My dad) likes... |
| Nos encanta... | We love... |
| bucear | diving |
| estar al aire libre | being outdoors |
| estar en contacto con los amigos | being in touch with friends |
| hacer artes marciales | doing martial arts |
| hacer deportes acuáticos | doing water sports |
| ir al cine/a la pista de hielo | going to the cinema/ ice rink |
| ir de compras | going shopping |
| leer (un montón de revistas) | reading (loads of magazines) |
| usar el ordenador | using the computer |
| ver películas | watching films |
| Prefiero veranear... | I prefer to spend the summer... |
| en el extranjero/en España | abroad/in Spain |
| en la costa/en el campo | on the coast/in the country |
| en la montaña/en la ciudad | in the mountains/in the city |

| ¿Qué tal lo pasaste? | How was it? |
|-----------------------------|------------------------------|
| Me gustó/Me encantó. | I liked it/I loved it. |
| Lo pasé bomba/fenomenal. | I had a great time. |
| Lo pasé bien/mal/fatal. | I had a good/bad/awful time. |
| Fue... | It was... |
| inolvidable/increíble | unforgettable/incredible |
| impresionante/flipante | impressive/awesome |
| horroroso | awful |
| un desastre | a disaster |
| ¿Qué tiempo hizo? | What was the weather like? |
| Hizo buen/mal tiempo. | It was good/bad weather. |
| Hizo calor/frío/sol/viento. | It was hot/cold/sunny/windy. |
| Hubo niebla/tormenta. | It was foggy/stormy. |
| Llovió/Nevó. | It rained/snowed. |

| ¿Qué hiciste? | What did you do? |
|-------------------------------|-------------------------------------|
| primero | first |
| luego | then |
| más tarde | later |
| después | after |
| finalmente | finally |
| Lo mejor fue cuando... | The best thing was when... |
| Lo peor fue cuando... | The worst thing was when... |
| aprendí a hacer vela | I learned to sail |
| comí muchos helados | I ate lots of ice creams |
| compré recuerdos | I bought souvenirs |
| descansé | I rested |
| fui al acuario | I went to the aquarium |
| hice turismo | I went sightseeing |
| llegué tarde al aeropuerto | I arrived at the airport late |
| perdí mi móvil | I lost my mobile |
| saqué fotos | I took photos |
| tomé el sol | I sunbathed |
| tuve un accidente en la playa | I had an accident on the beach |
| vi un partido | I saw/watched a match |
| visité el Park Güell | I visited Park Güell |
| vomité en una montaña rusa | I was sick on a rollercoaster |
| Puedes... | You can... |
| descubrir el Museo | Picasso discover the Picasso Museum |
| disfrutar del Barrio Gótico | enjoy the gothic quarter |
| pasear por las Ramblas | walk along Las Ramblas |
| subir al Monumento a Colón | go up the Columbus Monument |
| ver los barcos en el puerto | see the boats in the port |

Desconéctate – Travelling abroad, past and future holidays

| ¿Cómo era el hotel? | What was the hotel like? |
|--------------------------------|-----------------------------|
| Me alojé/Me quedé... | I stayed... |
| Nos alojamos/Nos quedamos... | We stayed... |
| en un albergue juvenil | in a youth hostel |
| en un apartamento | in an apartment |
| en un camping | on a campsite |
| en un hotel de cinco estrellas | in a five-star hotel |
| en un parador | in a state-run luxury hotel |
| en una casa rural | in a house in the country |
| en una pensión | in a guest house |
| Fui de crucero. | I went on a cruise. |
| Estaba... | It was... |
| cerca de la playa | near the beach |
| en el centro de la ciudad | in the city centre |
| en las afueras | on the outskirts |
| Era... | It was... |
| acogedor(a) | welcoming |
| antiguo/a | old |
| barato/a | cheap |
| caro/a | expensive |
| grande | big |
| lujoso/a | luxurious |
| moderno/ | a modern |
| pequeño/a | small |
| ruidoso/a | noisy |
| tranquilo/a | quiet |
| Tenia/Había... | It had/There was/ were... |
| No tenía ni... ni... | I had neither... nor... |
| No había ni... ni... | There was neither... nor... |
| Tampoco tenía... Nor | did it have... |
| (un) aparcamiento | a car park |
| (un) bar | a bar |
| (un) gimnasio | a gym |
| (un) restaurante | a restaurant |
| (una) cafetería | a café |
| (una) lavandería | a launderette |
| (una) piscina cubierta | an indoor pool |
| Mucho espacio para mi tienda | lots of space for my tent |

| ¿Cómo era el pueblo? | What was the town/village like? |
|---------------------------|---------------------------------|
| Lo bueno/Lo malo... | The good thing/The bad thing... |
| del pueblo... | about the town/village... |
| de la ciudad... | about the city... |
| era que era... | was that it was... |
| demasiado/muy/bastante... | too/very/quite... |
| animado/a | lively |
| bonito/a | pretty |
| histórico/a | historic |
| pintoresco/a | picturesque |
| turístico/a | touristic |
| Tenia... | It had... |
| mucho ambiente/tráfico | lots of atmosphere/traffic |
| mucho que hacer | lots to do |
| mucha contaminación/gente | lots of pollution/people |
| muchos espacios verdes | lots of green spaces |
| muchos lugares de interés | lots of places of interest |
| muchas discotecas | lots of discos |

| ¿Qué haces en verano? | What do you do in summer? |
|--|--|
| En verano/invierno... | In summer/winter... |
| chateo en la red | I chat online |
| cocino para mi familia | I cook for my family |
| descargo canciones | I download songs |
| escribo correos | I write emails |
| hago natación/esquí/windsurf | I go swimming/skiing/windsurfing |
| hago una barbacoa | I have a barbecue |
| juego al baloncesto/fútbol | I play basketball/football |
| monto a caballo/en bici | I go horseriding/cycling |
| nado en el mar | I swim in the sea |
| salgo con mis amigos/as | I go out with my friends |
| toco la guitarra | I play the guitar |
| trabajo como voluntario/a | I work as a volunteer |
| veo la tele | I watch TV |
| voy al polideportivo/al parque/a un centro comercial | I go to the sports centre/to the park/to a shopping centre |
| voy de paseo | I go for a walk |

| Quisiera reservar... | I would like to book... |
|-----------------------------------|--------------------------------|
| ¿Hay... | Is/Are there... |
| wifi gratis... | free wifi... |
| aire acondicionado... | air conditioning... |
| en el hotel/las habitaciones? | in the hotel/the rooms? |
| ¿Cuánto cuesta | How much does a... |
| una habitación...? | room cost? |
| ¿A qué hora se sirve el desayuno? | What time is breakfast served? |
| ¿Cuándo está abierto/a el/la...? | When is the... open? |
| ¿Cuánto es el suplemento | How much is the supplement |
| por...? | for...? |
| ¿Se admiten perros? | Are dogs allowed? |
| Quisiera reservar... | I would like to book... |
| una habitación individual/ | a single/ doble double room |
| con/sin balcón | with/without balcony |
| con bañera/ducha | with a bath/shower |
| con cama de matrimonio | with double bed |
| con desayuno incluido | with breakfast included |
| con media pensión | with half board |
| con pensión completa | with full board |
| con vistas al mar | with sea view |
| ¿Para cuántas noches? | For how many nights? |
| Para... noches | For... nights |
| del... al... de... | from the... to the... of... |
| ¿Puede repetir, por favor? | Can you repeat, please? |
| ¿Puede hablar más despacio? | Can you speak more slowly? |

| ¿Qué tiempo hace? | What's the weather like? |
|-------------------------------|----------------------------|
| Hace buen/mal tiempo. | It's good/bad weather. |
| Hace calor/frío/sol/viento. | It's hot/cold/sunny/windy. |
| Llueve/Nieva. | It's raining/snowing. |
| El tiempo es variable. | The weather is changeable. |
| El clima es caluroso/soleado. | The climate is hot/sunny. |
| Hay niebla/tormenta. | It's foggy/stormy. |
| Hay chubascos. | There are showers. |
| Está nublado. | It's cloudy. |

Mi gente – Technology, free time, leisure, family and relationships

| Mis vacaciones desastrosas | My disastrous holiday |
|---------------------------------|--|
| Por desgracia | Unfortunately |
| Por un lado... por otro lado... | On the one hand... on the other hand... |
| El primer/último día | (On) the first/last day |
| Al día siguiente | On the following day |
| Tuve/Tuvimos... | I had/We had... |
| un accidente/un pinchazo | an accident/a puncture |
| un retraso/una avería | a delay/a breakdown |
| Tuve/Tuvimos que... | I had to/We had to... |
| esperar mucho tiempo | wait a long time |
| ir al hospital/a la comisaría | go to the hospital/to the police station |
| llamar a un mecánico | call a mechanic |
| Perdi/Perdimos... | I lost/We lost... |
| el equipaje/la cartera | the luggage/the wallet |
| la maleta/las llaves | the suitcase/the keys |
| Cuando llegamos... | When we arrived... |
| era muy tarde | it was very late |
| estaba cansado/a | I was tired |
| la recepción ya estaba cerrada | the reception was already closed |
| acampar | to camp |
| decidir | to decide (to) |
| alquilar bicicletas | to hire bicycles |
| coger el teleférico | to catch/take the cable car |
| chocar con | to crash into |
| hacer alpinismo | to go mountain climbing |
| volver | to return |
| el paisaje | the landscape |
| la autopista | the motorway |
| precioso/a | beautiful |

| ¿Te llevas bien con tu familia y tus amigos? | Do you get on well with your family and friends? |
|--|--|
| Me llevo bien con... | I get on well with... |
| No me llevo bien con... | I don't get on well with... |
| Me divierto con... | I have a good time with... |
| Me peleo con... | I argue with... |

| ¿Quieres salir conmigo? | Do you want to go out with me? |
|-------------------------|--------------------------------|
| No puedo porque... | I can't because... |
| Está lloviendo | it's raining |
| tengo que... | I have to... |
| visitar a (mi abuela) | visit (my grandmother) |
| cuidar a (mi hermano) | look after (my brother) |
| quiero... | I want... |
| subir mis fotos | to upload my photos |
| quedarme en casa | to stay at home |
| dar una vuelta | to go for a wander |
| ¡Qué pena! | What a shame! |
| ¿A qué hora quedamos? | What time shall we meet? |
| ¿Dónde quedamos? | Where shall we meet? |
| En la plaza Mayor. | In the main square. |
| Vale | Ok |

| Quiero quejarme | I want to complain |
|--------------------------------|---------------------------------|
| Quiero hablar con el director. | I want to speak to the manager. |
| Quiero cambiar de habitación. | I want to change rooms. |
| El aire acondicionado... | The air conditioning... |
| El ascensor... | The lift... |
| La ducha... | The shower... |
| La habitación... | The room... |
| está sucio/a | is dirty |
| La luz... | The light... |
| no funciona | doesn't work |
| Hay ratas en la cama. | There are rats in the bed. |
| No hay... | There is no... |
| Necesito... | I need... |
| papel higiénico | toilet paper |
| jabón/champú | soap/shampoo |
| toallas/(un) secador | towels/a hairdryer |
| ¡Socorro! | Help! |
| Es inaceptable. | It's unacceptable. |
| Lo siento/Perdone. | I'm sorry. |
| El hotel está completo. | The hotel is full. |

| La familia | Family |
|----------------|---------------|
| el padre | father |
| la madre | mother |
| el padrastro | step-father |
| la madrastra | step-mother |
| el hermano | brother |
| la hermana | sister |
| el hermanastro | step-brother |
| el hermanastra | step-sister |
| el abuelo | grandfather |
| la abuela | grandmother |
| el tío | uncle |
| la tía | aunt |
| el primo | male cousin |
| la prima | female cousin |
| el sobrino | nephew |
| la sobrina | niece |
| el marido | husband |
| la mujer | wife |
| el hijo | son |
| la hija | daughter |
| el nieto | grandson |
| la nieta | granddaughter |
| mayor/menor | older/younger |

| ¿Qué estás haciendo? | What are you doing? |
|------------------------------------|---------------------------|
| Estoy... | I am... |
| tocando la guitarra | playing the guitar |
| hablando por teléfono | talking on the phone |
| jugando con mi móvil | playing on my phone |
| comiendo pizza | eating pizza |
| tomando el sol | sunbathing |
| esperando a... | waiting for... |
| viendo una peli | watching a film |
| leyendo | reading |
| durmiendo | sleeping |
| escribiendo | writing |
| pensando en salir | thinking of going out |
| actualizando mi página de Facebook | updating my facebook page |
| editando mis fotos | editing my photos |

Mi gente – Technology, free time, leisure, family and relationships

| ¿Cómo es? | What is he/she like? |
|-----------------------|-----------------------|
| Tiene los ojos... | He/she has...eyes |
| azules | blue |
| verdes | green |
| marrones | brown |
| grises | grey |
| grandes | big |
| pequeños | small |
| Tiene el pelo... | He/She has... hair |
| moreno | dark-brown |
| castaño | mid-brown, chestnut |
| rubio | blond |
| rojo | red |
| corto | short |
| largo | long |
| rizado | curly |
| liso | straight |
| ondulado | wavy |
| Tiene... | He/She has... |
| pecas | freckles |
| Lleva... | He/She wears... |
| gafas | glasses |
| barba | a beard |
| bigote | a moustache |
| Es... | He/She is... |
| alto/ bajo/ delgado/a | a tall/ a short/ slim |
| gordito/a | chubby |
| gordo/a | fat |
| calvo/a | bald |
| moreno/a | dark-haired |
| rubio/a | fair-haired |
| castaño/a | brown-haired |
| pelirrojo/a | red-haired |

| ¿Qué te gusta leer? | What do you like reading? |
|--------------------------------|---------------------------|
| los tebeos / los cómics | comics |
| los periódicos | newspapers |
| las revistas | magazines |
| las novelas de ciencia ficción | science fiction novels |
| las novelas de amor | romantic novels |
| las historias de vampiros | vampire stories |
| las biografías | biographies |

| ¿Cómo es de carácter? | What is he/she like as a person? |
|-----------------------|----------------------------------|
| Como persona, es... | As a person, he/she is... |
| optimista | optimistic |
| pesimista | pessimistic |
| trabajador(a) | hard-working |
| perezoso/a | lazy |
| hablador(a) | chatty |
| tímido/a | shy |
| divertido/a | fun |
| serio/a | serious |
| gracioso/a | funny |
| generoso/a | generous |
| fiel | loyal |

| ¿Qué es mejor, e-books o libros en papel? | What is better, e-books or paperbooks? |
|--|--|
| Los e-books... | E-books... |
| cuestan menos que los libros tradicionales | cost less than traditional books |
| son más... | are more... |
| transportables | portable |
| ecológicos | environmentally-friendly |
| cansan la vista | tire your eyes |
| usan batería | use battery |
| Las páginas... | The pages... |
| no tienen números | don't have numbers |
| una ventaja | an advantage |
| una desventaja | a disadvantage |
| Leer en formato digital... | Reading in digital format... |
| protégel el planeta | Protects the planet |
| es más barato | is cheaper |
| depende de... | depends on... |

| ¿Qué aplicaciones usas? | What apps do you use? |
|--------------------------------------|------------------------------------|
| Uso... para... | I use... (in order) to... |
| subir y ver videos | upload and watch videos |
| compartir fotos | share photos |
| pasar el tiempo | pass the time |
| organizar las salidas con mis amigos | organise to go out with my friends |
| contactar con mi familia | contact my family |
| descargar música | download music |
| chatear | chat |
| aprender idiomas | learn languages |
| controlar mi actividad física | monitor my physical activity |
| publicar mensajes | post messages |
| Es/No es... | It is/It isn't... |
| cómo/da | handy/convenient |
| divertido/a | fun |
| peligroso/a | dangerous |
| práctico/a | practical |
| rápido/a | quick |
| fácil de usar | easy to use |
| popular | popular |
| útil | useful |
| gratis | free |
| adictivo/a | addictive |
| mi red social preferida | my favourite social network |
| una pérdida de tiempo | a waste of time |
| la mejor app | the best app |
| Estoy enganchado/a a... | I am hooked on... |

| ¿Con qué frecuencia lees? | How often do you read? |
|---------------------------|------------------------|
| todos los días | every day |
| a menudo | often |
| de vez en cuando | from time to time |
| una vez a la semana | once a week |
| dos veces al mes | twice a month |
| una vez al año | once a year |
| nunca | never |
| un ratón de biblioteca | a bookworm |
| un(a) fan del manga | a manga fan |

Notes

Notes



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Y10 KNOWLEDGE ORGANISER

SEPTEMBER 2024 TO FEBRUARY 2025