



Year 7 Knowledge Book 2026-2027 CORE SUBJECTS



Saint Benedict
A Catholic Voluntary Academy



Love, Belief, Integrity, Knowledge



OUR VALUES

**BE WHO GOD MEANT YOU TO BE AND YOU
WILL SET THE WORLD ON FIRE.**

LOVE

As we know we are loved by God, we will learn to love ourselves and care for our own body mind and soul.

We will show love to one another by being patient and kind, not by being rude, boastful or proud.

As one body in Christ, we will ensure that no member of our community is left out or left behind

BELIEF

We will encourage one another and build each other up.

We will let our light shine, making the world a better place for all.

KNOWLEDGE

We will value knowledge: intelligent hearts acquire knowledge, the ears of the wise seek knowledge.

INTEGRITY

We will always strive to make the right choice even when this is the harder path to take.

We will live and work sustainably.

**AT SAINT BENEDICT
WE DEVELOP THE
CHARACTER OF OUR
COMMUNITY THROUGH
OUR CURRICULUM AND
CULTURE.**



Your Knowledge Book

Our Values

Equipment List and signatures



Study Skills – Yellow



English – Light Pink



Mathematics - Blue



Science - Bright Green



Independence Templates - Teal

Knowledge Book for Core Subjects costs just over £8 to make.

If you lose, damage or break your KB, you will need to buy a new one for £8.



MY EQUIPMENT PLEDGE

To succeed you must be prepared. Every night before school, you need to check your school bag to ensure that you have all the correct equipment.

Here is the list of equipment you need for every lesson:

- ☐ Black or blue pens
- ☐ Red pens (one or two)
- ☐ A ruler
- ☐ A pencil
- ☐ A scientific calculator (CASIO)
- ☐ A rubber
- ☐ A protractor
- ☐ Colouring pencils
- ☐ A sharpener
- ☐ Glue stick
- ☐ Your KNOWLEDGE BOOK

I pledge that I will always bring the correct equipment to class so that I can effectively learn.

Your signature:

Parent/carer's signature:

Form tutor's signature:

.....

.....

.....

BE WHO GOD MEANT YOU TO BE
AND YOU WILL SET THE WORLD ON FIRE

ST CATHERINE OF SIENA

Respect

What is Respect?

Showing respect is an important part of life, and how you maintain relationships.

Three types of respect:

1. Respect Yourself
2. Respect Others
3. Respect the Planet

Why is respect important?

Receiving respect from others is important because it helps us to feel safe and to express ourselves. Respecting others helps maintain a peaceful world and encourages others to be better people. Showing respect to our planet allows us to maintain it for future generations.

Key words	Definitions
Respect	Due regard for the feelings, wishes and rights of others
Honour	The quality of knowing and doing what is morally right
Dignity	Sense of pride and self respect
Relationships	The way two or more people or groups connect and behave towards each other
Worthiness	The quality of being good enough

Rules and Sanctions

Build up a loving community

Key word	
Conduct	The way in which a person behaves.
Unacceptable	Something that is not suitable or appropriate.
Boundaries	The limits of something.
Sanction	A penalty or action taken when a rule or law has been broken.
Consistent	Acting in the same way overtime to be fair.

Behaviour

Rules and sanctions are things which guide our behaviour. We follow rules and regulations to be fair and consistent. Sanctions occur if we do not follow rules or deliberately break them.

Preparation for life

All aspects of life require us to follow rules. There are rules in school; rules in your family and home; rules to follow when crossing the road and using the bus and so on. Structure and rules allow us all to know what is acceptable and how to conduct ourselves. Rules reassure us

The law

We are all bound by the rules of the law. If we break the law, we face a raft of different sanctions. Ultimately, having rules in schools is about a lifelong understanding about what is right and what is wrong.

Kindness

Key word

Empathy	Understand and share feelings of others
Compassion	Concern for misfortune of others
Compliment	Praise or congratulate others
Considerate	Thoughtfulness and sensitivity to others
Generous	Being liberal with things

Treat others how you would want to be treated yourself.

What is Kindness?

The quality of being friendly, generous and considerate

What does it mean to be kind?

To have empathy/sympathy, be compassionate, looking for good in people.

Why is it important to be kind?

Makes you feel happy, feel good about yourself

Builds strong relationships

Inspires others

How can we show kindness?

Smile

Hold the door open for somebody

Say something nice (compliment)

Invite somebody sat on their own to join you

Manners

Listen to somebody

3

Emotions

Key Words

Feelings	An emotional state or reaction.
Relationships	The state of being connected with someone else.
Instinct	A fixed pattern of behaviour.
Intuitive	Using what you feel to be true even without conscious reasoning.
Reaction	Something done, felt or thought in response to a situation or event.
Identification	The act or process of identifying someone or something.

Work and play in harmony

What are emotions?

Emotions are biological states associated with the nervous system.

Thoughts, feelings, behavioural responses, and relationships all generate emotions.

An instinct or, intuitive reaction or feeling can create emotions

Identifying feelings

Making sense of what and how you feel is not always easy. To do this, we need to regularly check in with ourselves, making time to think about the feelings we are having and naming them. To do this, we need to think about our daily lives which may help us to see patterns of behaviour.

Not all feelings or emotions are bad or negative!

It is important to recognise when you feel happy; relaxed and good about yourself. Knowing what has led to these feelings can help us identify things we do not like which may cause us negative feelings.

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Verbal Communication

Treat each other with dignity and justice

Key Words	
Clarity	Vocal clarity means you do not speak too fast or too slowly. You consider carefully the words you mean and whether your listener can understand you.
Honesty	Honesty is speaking the truth.
Respect	Respect means that you accept somebody for who they are, even when they are different from you or you do not agree with them.
Appropriate	fitting the practical or social requirements of the situation.
Tone	a quality in the voice that expresses your feelings or thoughts, often towards the person being spoken to or the subject being spoken about
Courtesy	politeness, good manners, or consideration for other people.

What is verbal communication?

Verbal communication is the use of words to share information with other people.

What does it mean to communicate effectively?

Every time you verbally interact with someone you are aiming to develop your understanding of the world; you may be wishing to obtain information, respond to a request or offer support or guidance to another. In every one of these exchanges you are representing your tutor, your family and most importantly yourself.

Why is it important to communicate effectively?

All young people need to develop good speech, language and communication skills to reach their full potential.

Speech, language and communication underpin the basic skills of literacy and numeracy and are essential for you to understand and achieve in all subjects.

How can we communicate effectively?

Make eye contact

Speak honestly

Consider your role within the school

Consider the role of the person you are speaking to

Think carefully why you need to speak to the person you are addressing

Where necessary adapt as your conversation develops

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Manners

Key Words	
Manners	A person's words or way of behaving towards others.
Respect	A regard for the feelings, wishes, or rights of others.
Listen	To take in what you hear.
Harmony	A time of behaving in one way to produce a pleasing effect.
Vocabulary	The range of words that we know and use.
Gratitude	The quality of being thankful; readiness to show appreciation for and to return kindness.

Loving...harmony...dignity

Treat your neighbour as yourself

The way in which we behave and speak towards others, reflects in their actions and words towards us.

Show the best side of yourself

When you speak to others, always show respect; be polite and thankful. Use the words 'please, thank you, sorry and pardon' when communicating with others.

Manners are for every situation

Every interaction has space for the use of manners: speech, emails, messages. Often when we get upset or angry we don't use manners.

However it does calm a situation if you do.

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Change

Key Words	Definition
Change	Make or become different
Organised	Make arrangements or preparations for an event or activity
Opportunity	A time set of circumstances that make it possible to do something
Coping	To deal effectively with something difficult
Embrace	Accept (a belief, theory or change) willingly and enthusiastically
Strategies	A plan of action designed to achieve a long term or overall aim

Develop potential to the full

Find the positive

Don't allow yourself to become negative about the changes in your life. Change is good, keep repeating it.

Feeling vulnerable

Facing change can be very overwhelming, leaving you feeling very emotional. Make it your mission to be proactive and respond to it positively.

Talk about it

It's good to talk about change in your life. Focus on problems, solutions and the positives that change will bring. Try to avoid focussing on the negatives and letting emotions take over.

Study Skills – Ways to learn and remember

Self quizzing (look, cover, write)



Read through the information in the knowledge book that you want to learn



Cover the information up



Write down as much as you can remember



Use the knowledge book to;

- a) Correct any mistakes
- b) Add any information that you forgot

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Study Skills – Ways to learn and remember

Spacing



Complete a self quiz of the information you want to learn



Wait for a day or 2 (depending on the deadline)



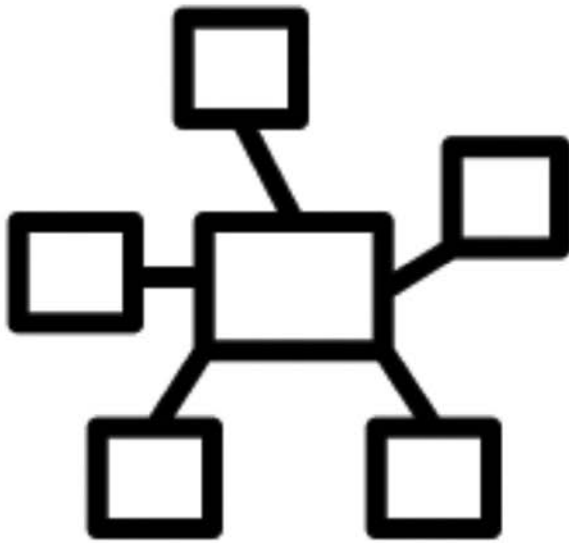
Repeat the self quiz.

The more times you can repeat this process, the more you will be able to remember without the book

2

Study Skills – Ways to learn and remember

Elaboration



Think about the topic that you are studying

Ask questions such as who, what, why, where, when how. Try to find the answers

See how these ideas connect - a mind map will be useful for this

3

Study Skills – Ways to learn and remember

Concrete Examples

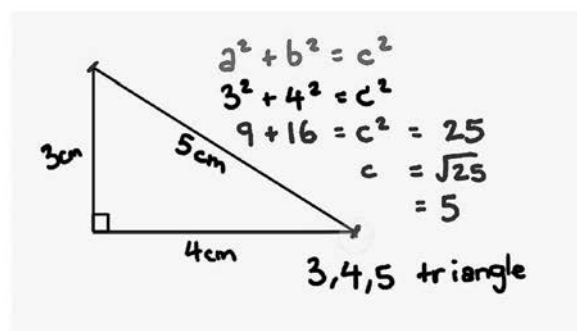


Pythagoras theorem example

If you tried to explain Pythagoras's theorem to someone verbally, it would be quite hard to understand.

By using a concrete example that shows exactly how to use Pythagoras theorem, it is much easier to remember, understand and use

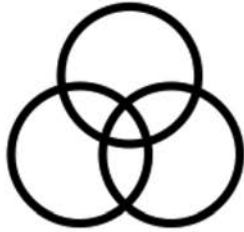
A concrete example is an clear example of an abstract idea



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Study Skills – Ways to learn and remember

Interleaving



Research says we will actually learn more effectively if we mix our study skills up rather than using the same techniques all the time

1. Try to use different study skills rather than just one technique.

2. When revising for exams, prepare a revision timetable and try to revise more than one subject during a session

5

Study Skills – Ways to learn and remember

Dual Coding



As well as **writing** information down, **create an icon/ drawing** too for individual facts. This helps your brain to remember the information

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Year 7 English Knowledge Organiser

Full academic year

1

Vocabulary



Full academic year

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TIER TWO VOCABULARY

The Romantics

WORD	DEFINITION
Childhood	The state of being a child.
Industrial	Relating to or characterized by industry.
Inequality	A lack of equality.
Morality	Principles concerning the distinction between right and wrong or good and bad behaviour.
Poverty	The state of being extremely poor.
Revolution	A forcible overthrow of a government or social order, in favour of a new system.
Romanticism	An artistic and philosophical movement that redefined the ways people think about themselves and the world.
Nature	The Physical world and it's phenomena including landscapes.

Women's Literature

WORD	DEFINITION
Discrimination	The unjust or prejudicial treatment of different categories of people, especially on the grounds of race, age, sex, or disability.
Empowerment	The process of becoming stronger and more confident, especially in controlling one's life and claiming one's rights.
Equality	The state of being equal, especially in status, rights, or opportunities.
Feminism	The belief in women's rights on the ground of the equality of the sexes.
Misogyny	A hatred towards women.
Patriarchy	A society where men have more power than women.
Prejudice	A preconceived opinion that is not based on reason or actual experience.
Society's norms	The informal rules that govern behaviour in groups and societies.
Suffrage	The right to vote.

3

TIER TWO VOCABULARY

Much Ado About Nothing

WORD	DEFINITION
Deception	The act of causing someone to accept as true or valid what is false or invalid.
Expectation	A strong belief that something will happen or be the case.
Gender	Gender is the range of characteristics relating to, and differentiating between, femininity and masculinity.
Hierarchy	A system in which members of an organisation or society are ranked according to relative status or authority.
Independence	The state of wanting or being able to do things for yourself and make your own decisions, without help or influence from other people.
Maid	A female virgin; a girl or unmarried young woman.

WORD	DEFINITION
Misogyny	A hatred towards women.
Patriarchy	A society in which men hold more power than women.
Renaissance	The revival of European art and literature under the influence of classical models in the 14th to 16th centuries.
Slander	A verbal accusation that is damaging to someone's reputation.
Soliloquy	The act of speaking one's thoughts aloud when by oneself, especially by a character in a play.
Stereotype	A widely held but fixed and oversimplified image or idea of a particular type of person or thing.

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TIER TWO VOCABULARY

Trash

WORD	DEFINITION
Curious	Eager to learn or know more about something; inquisitive.
Anxious	Experiencing worry, unease, or nervousness.
Loyal	Showing firm and constant support or allegiance to a person, group, or cause.
Strategic	Carefully planned to achieve a specific goal; tactical.
Quick-witted	Able to think and respond quickly and intelligently, especially in conversation or challenging situations.

WORD	DEFINITION
Solidarity	Mutual support within a group.
Activist	A person who campaigns for some kind of social, political, or environmental change.
Resilient	Able to recover quickly from difficulties or adapt well in the face of adversity.
Voracious	Having an intense hunger or eagerness, especially for food.
Corruption	Dishonest or unethical behaviour by those in power, typically involving bribery or the abuse of entrusted authority.

TIER THREE VOCABULARY

WORD	DEFINITION
Adjective	A word describing or naming an attribute of a noun e.g <i>Tasty cheese</i>
Adverb	A word that describes how a verb is being done e.g <i>Walked quickly</i>
Alliteration	The repetition of the same sound in a sequence of words beginning with the same letter e.g <i>Cautious cat</i>
Allusion	A reference to another literary text, event or person e.g I am the Juliet to your Romeo !
Foreshadowing	A warning or indication of (a future event).
First person narrative	When a narrator recounts events from their own point of view using the first person such as "I", "us", "our" and "ourselves"
Genre	A style or category of art, music, or literature e.g <i>Gothic, Comedy</i>

WORD	DEFINITION
Metaphor	A figure of speech in which a word or phrase is applied to an object or action to which it is not literally applicable e.g <i>Love is a battlefield</i>
Noun	A word used to identify a person, place or thing e.g Table, love
Pathetic fallacy	When the weather reflects the mood or tone of a character. <i>The angry storm clouds growled across the sky as she slammed the door.</i>
Personification	The attribution of human feelings and responses to inanimate things or animals e.g <i>The clouds cried</i>
Simile	A figuring of speech involving the comparison of one thing with another thing of a different kind e.g <i>Love is like a battlefield</i>
Symbolism	The use of symbols to represent ideas or qualities
Third person narrative	The narrator is an external observer.
Verb	A word describing an action or how something is done e.g <i>Walking</i>

TIER THREE VOCABULARY

WORD	DEFINITION
Ellipsis	Intentionally leaving out a word, sentence, or whole section from a text without altering its original meaning
Emotive language	Words which elicit a powerful emotional response
Exaggeration	Representing something as being larger, better, or worse than it really is
Direct address	Referring to the reader directly using the pronouns 'we' or 'you'
Facts	Something which can be proven to be true
Knowledge	Knowing the topic/subject you are writing or speaking about
Repetition	The repetition of a word or phrase across the text

WORD	DEFINITION
Onomatopoeia	The process of creating a word that phonetically imitates, resembles, or suggests the sound that it describes e.g 'Zap' 'sizzle' 'Pow'
Opinion	A belief which cannot be proven to be true
Oxymoron	A figure of speech in which apparently contradictory terms appear in conjunction e.g Happy accident
Pun	A joke using the different possible meanings of a word or the fact that there are words which sound alike but have different meanings e.g Denial is a river in Egypt.
Archaic pronoun	Archaic pronouns are personal pronouns that were commonly used in Shakespeare's writing e.g Thou, thee, thine, thy

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Grammar



Full academic year

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Complex Sentences

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Apostrophes
Paragraphs

Capitalisation in English means using capital (uppercase) letters in the right places.

Start of a sentence: Always capitalise the first word.

The cat is sleeping.

Names and titles: Capitalise names of people, places, days, months, and specific things.

Sarah, London, Monday, August, the Eiffel Tower.

The word "I": Always capitalise "I" when you talk about yourself.

I went to the park.

Titles of books, films, etc.: Capitalise the main words in titles.

Harry Potter and the **Goblet of Fire**.

Holidays and events: Capitalise special days.

Christmas, Halloween, World Book Day.

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TERM 1



A simple sentence is a complete piece of information. It contains a subject, a verb and sometimes an object.

The pen fell on the floor.



A compound sentence contains two main clauses (like two simple sentences). These are joined with a conjunction: *and*, *but*, *so*, *because*.

Miss Kelly was tired, so she bought a large coffee.



A complex sentence contains a main clause and a subordinate clause.

Whilst it was raining, Mr Thornhill enjoyed a cup of tea in his office.



A comma indicates a pause between parts of a sentence or separates items in a list.

I went to Morrisons and bought linguine, king prawns, garlic and chilli flakes.



A semi-colon can be used between two closely related independent clauses, provided they are not already joined by a coordinating conjunction.

Miss Kureczko was busy; she wouldn't even answer the phone.



A colon is used to precede a list of items, a quotation, or an expansion or explanation.

Monday: the worst day of the week.



ISPACE indicates the various ways you can start a sentence. It stands for –ING verbs, Simile, Preposition, Adverb, Connective, -ED verbs.

–ING verb

-ING verb example: Flying proudly in the wind, the flag reigned over the castle

Simile

Simile example: Like a predator, the child caught the escaping balloon.

Preposition

Preposition example: Turning to my right, I saw the corridor I was meant to walk down.

Adverb

Adverb example: Nervously, the cat padded its way across the room.

Connective

Connective example: Finally, she arrived at her front door.

-ED verb

-ED verb example: Withered, the trees stood like ancient guards.



An apostrophe is used to indicate either possession or the omission of letters.

Apostrophes for possession

Using an apostrophe + s ('s) shows that one person/thing owns or is a member of something.

Recce's ballet class
Iqra's bike
Jake's pen
Jess' room

Apostrophes for contractions

When you combine two words to make a contraction, you will always take out some letters. In their place, use an apostrophe.

they + have = they've
are + not = aren't
they + will = they'll



A paragraph is a distinct section of a piece of writing, usually dealing with a single theme and indicated by a new line.

New paragraphs should start with a topic sentence, and information within the paragraph should stay focused on that topic.

A helpful way to remember when to start a new paragraph is to learn TiPToP.



Ti - stands for **Time**, so start a new paragraph for a different time period.



P - stands for **Place**, so start a new paragraph for each new place.



To - stands for **Topic**, so start a new paragraph for each new topic, idea or subject.



P - stands for **Person**, so start a new paragraph for each new person or change of speaker in a dialogue.

English Skills



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Full academic year

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ORACY - RESPONDING VERBALLY

Practicing oracy means getting better at speaking and listening. It helps you talk clearly, share your ideas, and listen to others. This can make you more confident, help you learn better in all subjects, and prepare you for things like teamwork, debates, and job interviews in the future.

Supporting or agreeing

- I strongly believe that...
- It is my opinion that...

Expanding or building on...

- Adding on what X said...
- Building on what X said...
- I have been listening carefully, and I would like to add a new point...

Passing on the dialogue...

- X, what do you think?
- X, what do you think about what I said?
- X, do you agree or disagree?

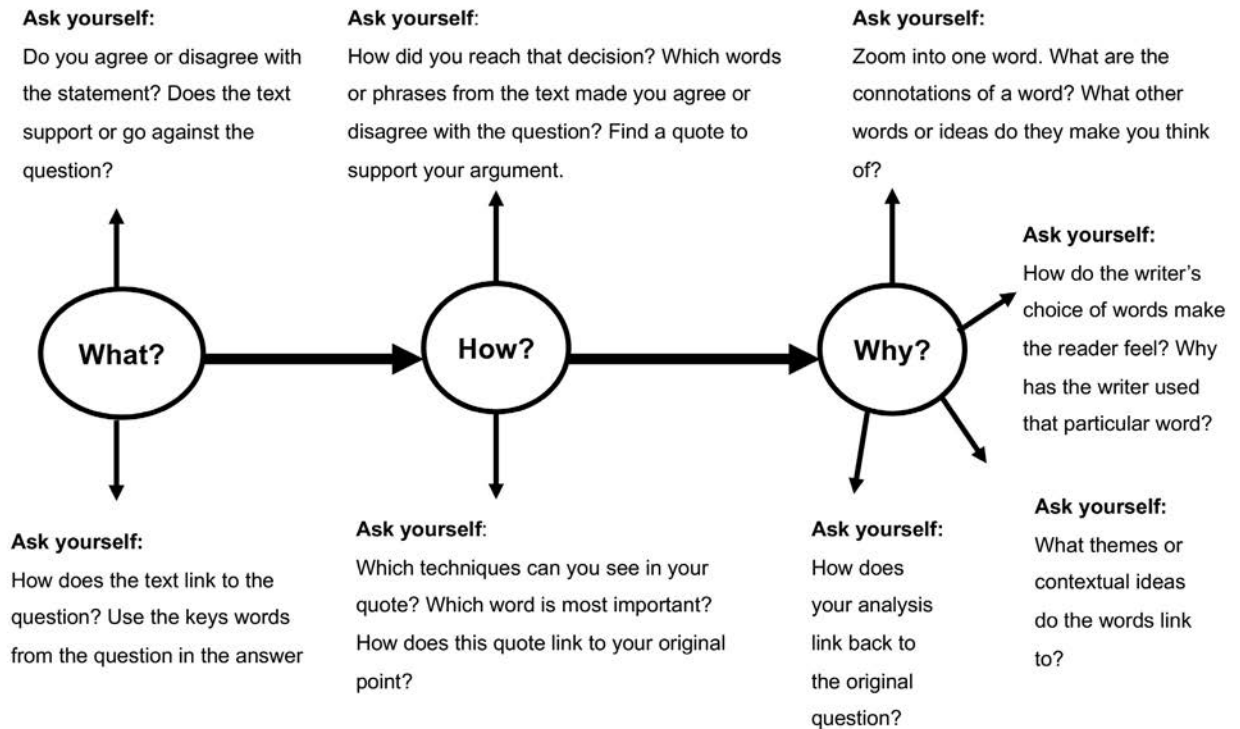
Challenging/ disagreeing

- I have a different idea...
- I disagree...
- I would like to challenge something that X said...
- I would like to respectfully challenge...

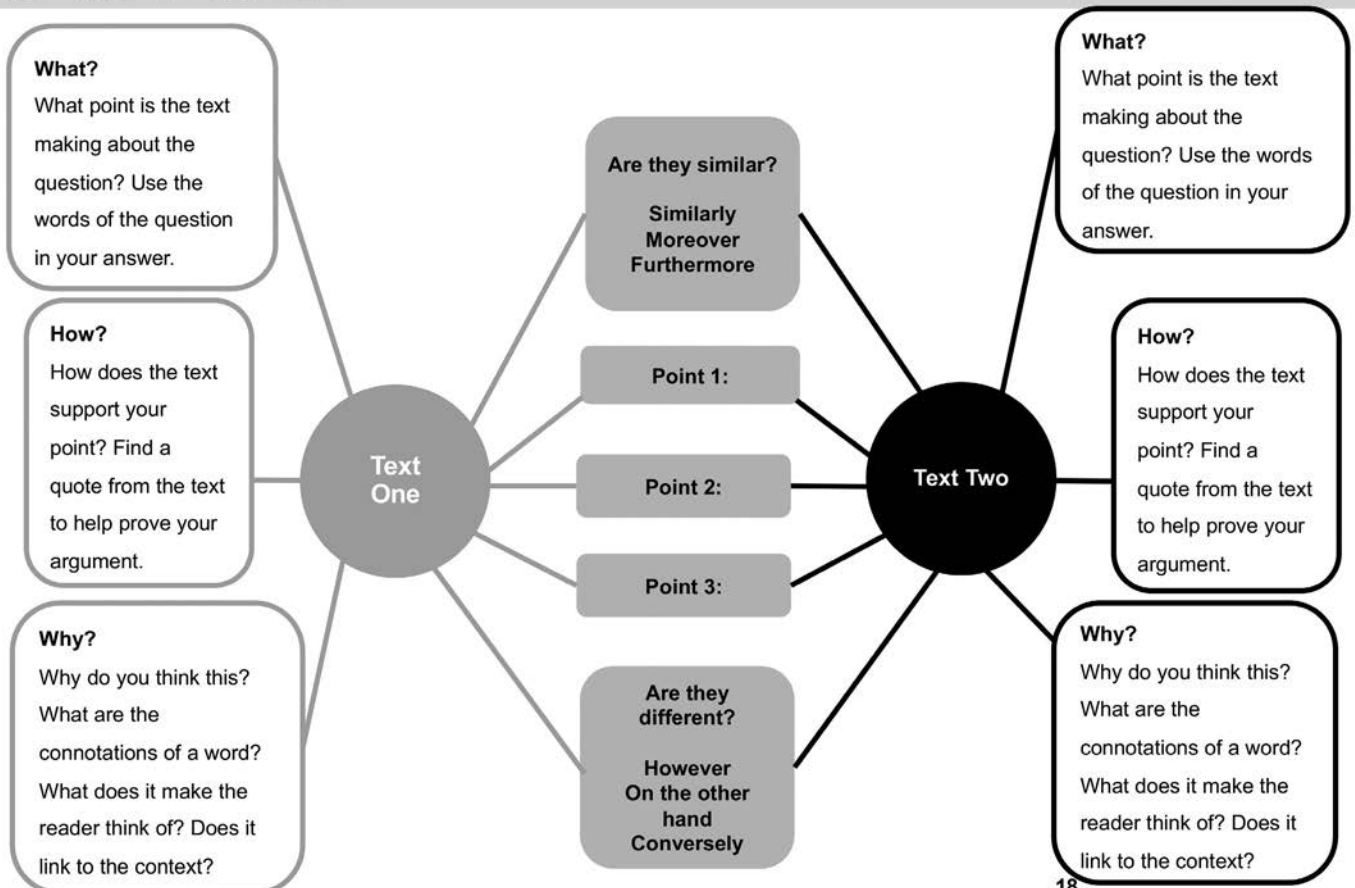
Concluding or end words...

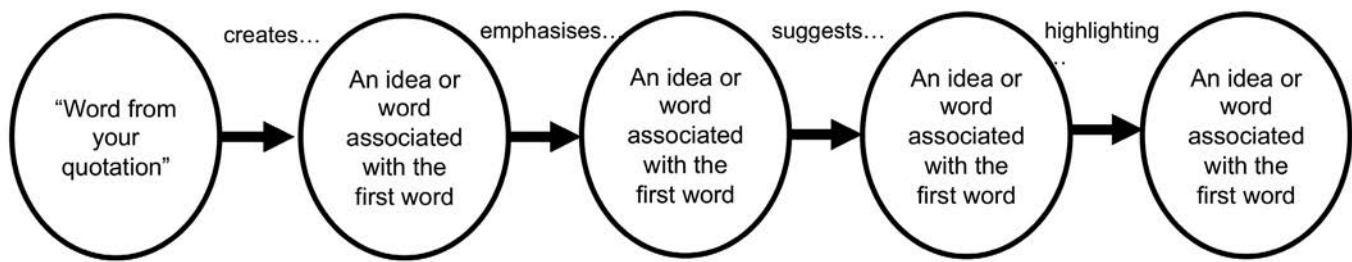
- My final thoughts are...
- There are lots of powerful arguments, but my own opinion is...
- For me, the strongest argument is...

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COMPARING TWO TEXTS





The word "_____" creates an image of _____.

It emphasises _____ because it suggests _____.

This highlights _____ and therefore makes the reader feel _____ about _____.

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Year 7 Texts



Full academic year

Imaginative Writing



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The Five senses

 Sight This is the most used sense in writing because it's how we primarily take in the world. Tips: - Describe colours, shapes, sizes, light, shadows, movement, facial expressions. - Use comparisons (similes/metaphors) for clarity and vividness. Example: <i>The sky burned orange and pink, like a watercolour painting come to life.</i>	 Hearing Sound can create atmosphere, tension, or peace. Tips: - Include tone, pitch, rhythm, and volume. - Think of environmental sounds, dialogue tones, or even silence. Example: <i>The distant wail of a siren cut through the quiet night, a sharp reminder that the city never really sleeps.</i>	 Smell Smell is deeply linked to memory and emotion. Tips: - Be specific—describe smells through associations (e.g., fresh-baked bread, burning rubber). - Use scent to trigger memories or set a mood. Example: <i>The musty scent of old books wrapped around her like a familiar blanket</i>	 Taste Taste can be literal (food) or symbolic (bitterness of betrayal, sweetness of success). Tips: - Describe flavour, texture, temperature. - Don't overuse it—taste is best in moments of focus (e.g., a meal, a kiss, a memory). Example: <i>The lemonade was a perfect mix of sweet and tart, like summer distilled into a glass.</i>	 Touch Touch brings physicality and emotion into scenes. Tips: - Include temperature, texture, pressure, pain, softness. - Can be internal (a chill down the spine) or external (rough bark under fingertips). Example: <i>The rough wool of the blanket scratched her skin, but its weight made her feel safe.</i>
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COMMON GENRES

 Overcoming the Monster The protagonist sets out to defeat an antagonistic force (often evil) which threatens the protagonist and/or protagonist's homeland.	 Rebirth An event forces the main character to change their ways and often become a better individual.	 Quest The protagonist and companions set out to acquire an important object or to get to a location. They face temptations and other obstacles along the way.
 Rags to Riches The poor protagonist acquires power, wealth, and/or a mate, loses it all and gains it back, growing as a person as a result.	 Tragedy The protagonist is a hero with a major character flaw or great mistake which is ultimately their undoing. Their unfortunate end evokes pity at their folly and the fall of a fundamentally good character.	 Comedy Light and humorous character with a happy or cheerful ending; a dramatic work in which the central motif is the triumph over adverse circumstance, resulting in a successful or happy conclusion.

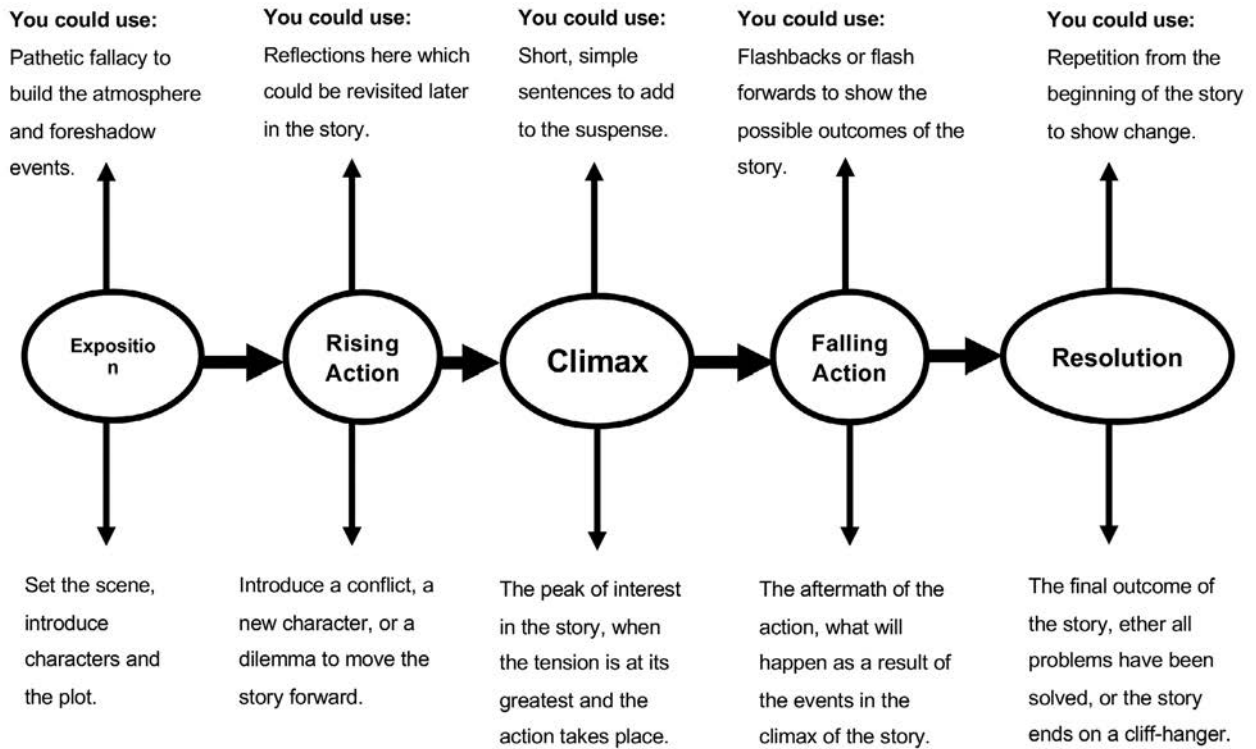
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STRUCTURE GRAPHS

 Freytag's Pyramid Freytag's Pyramid is a paradigm of dramatic structure outlining the seven key steps in successful storytelling: exposition, inciting incident, rising action, climax, falling action, resolution, and denouement.	 Cyclical Narrative Simply enough, a circular plot is a non-linear plot that progresses more or less chronologically and ends with its protagonist returning to a situation similar to the one at the beginning of the story.
 In Medias Res In Medias Res is a Latin term meaning "into the middle of things". Simply put, it's a plot structure that begins in the middle of the story. In Medias Res is best reserved for action-heavy novels like thrillers, mysteries, and horror.	 The Hero's Journey The Hero's Journey operates as a cyclical story structure, meaning that the hero's physical journey will end where it began, though their internal journey as a character will leave them forever changed.

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NARRATIVE STRUCTURE



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STRUCTURAL DEVICES

Foreshadowing	Be a warning or indication of a future event	Climax	The most intense, exciting, or important point of something; the culmination
Repetition	The action of repeating something that has already been said or written	Conclusion	The end or finish of an event, process, or text
Perspectives	A particular attitude towards or way of regarding something; a point of view.	Links	A relationship between two things or situations, especially where one affects the other
Chronological	Following the order in which they occurred	Focus	The centre of interest or activity
Flashback	A scene in a film, novel, etc. set in a time earlier than the main story	Anaphora	The repetition of a word or phrase at the beginning of successive clauses
Echo	A close parallel to an idea, feeling, or even	Changes	An act or process through which something becomes different
Location	The place or type of surroundings where something is positioned or where an event takes place	Introduction	The action of introducing something

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CHARACTER TYPES

 Protagonist (the main character) Every story has this type of character. It appears in the story from the start to end. It is the one who fights with the situations and antagonist characters and takes the story to the happy (or unhappy) ending.	 Static or flat character Flat characters don't have strong characteristics or reveal much about the self, but play an important role in helping the main character in his or her intention. They do not change throughout the story. Such characters often have a very short role to play.	 Changing or dynamic character The dynamic character plays a role that develops and changes during the events in the story. This character may change positively or negatively depending on the need of the story. This type of character often rises from a normal non-important person to an important one and makes a significant impact on the story.
 Antagonist (opposing the main character) The antagonist plays against this heroic character and tries to stop him by posing threats to his and others' lives. An antagonist is usually a negative influence within a story, but doesn't always need to be a person. It can also be a difficult situation or accidental event that works against the protagonist.	 Stock character Unlike other characters, the characters of this type are of no much value in a story. They are usually stereotypical and don't have any impact on the plot. They are generally not recognized by the readers.	 Round character This is the character which contributes the most in making the story interesting and keeps the reader confused about the person's actual nature. This type of character acts subtly and makes it difficult for the readers to fully understand and identify how the person will act in the story until the end of the story. 27

Romantic Poetry

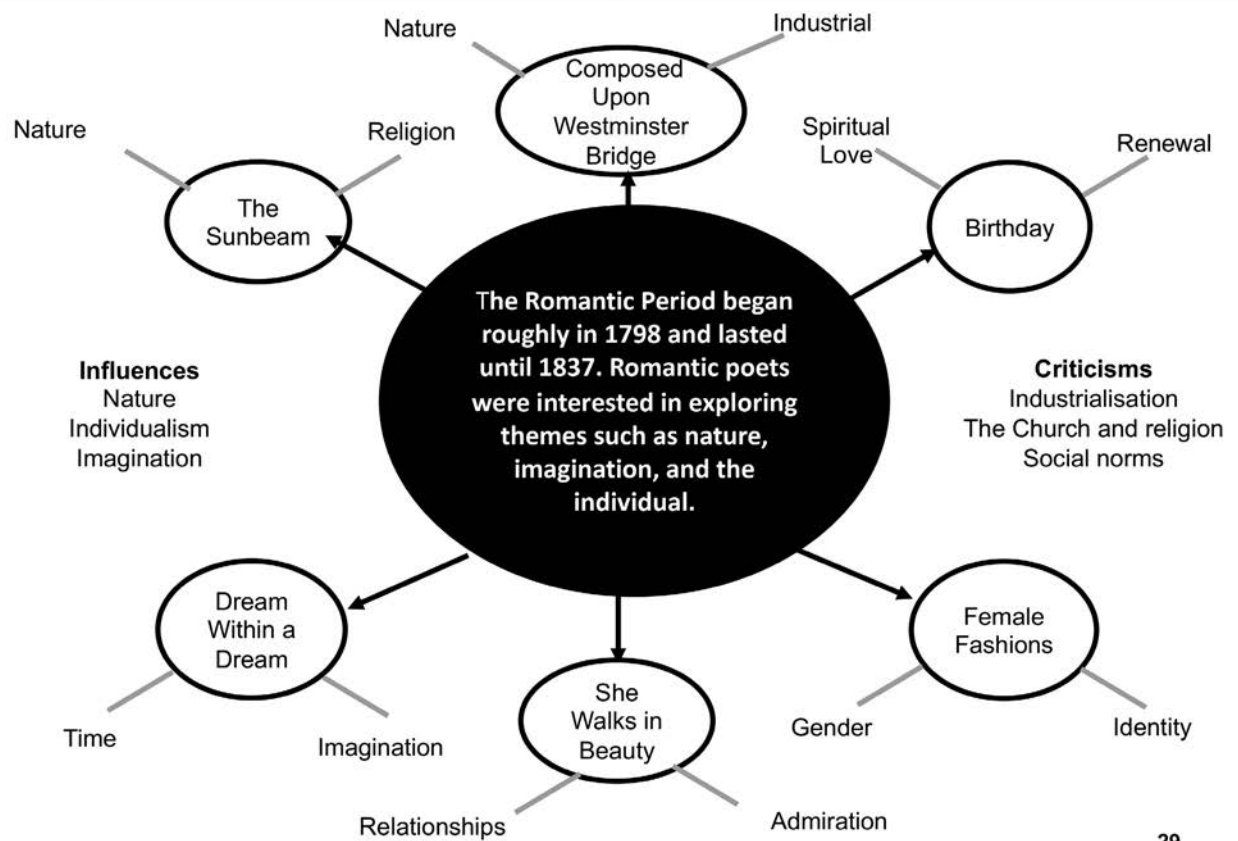


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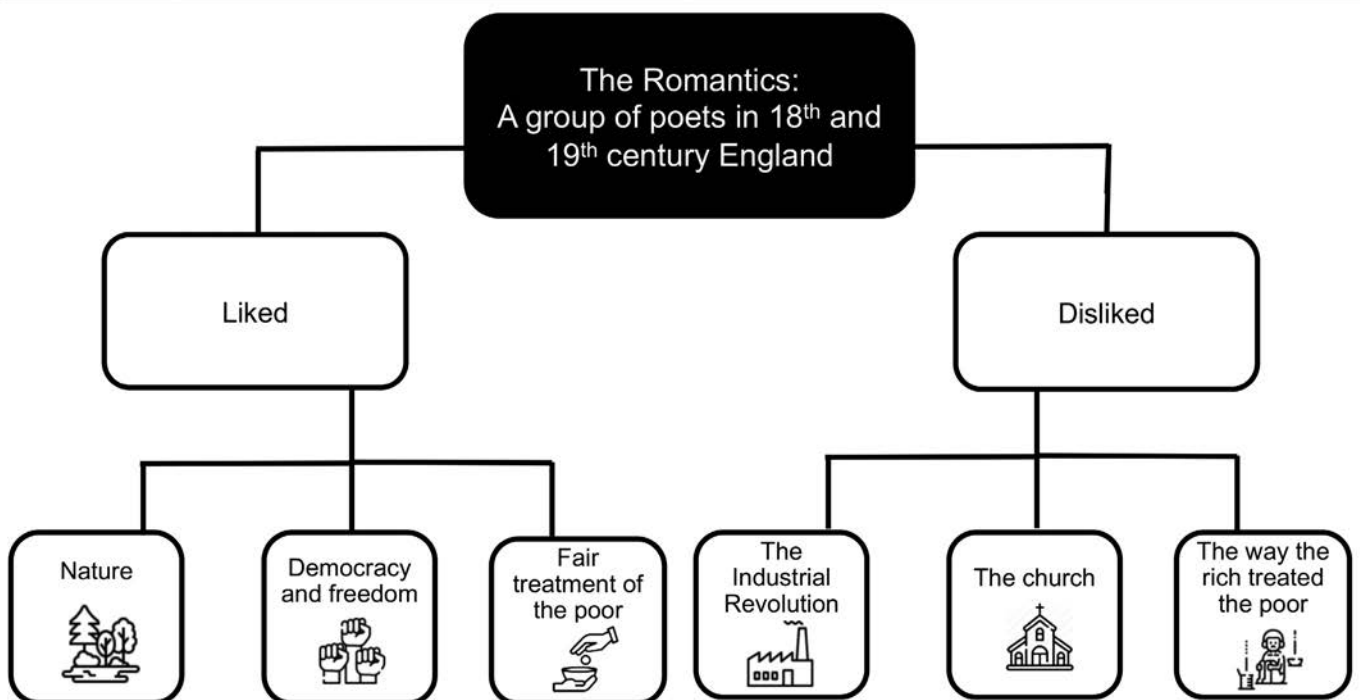
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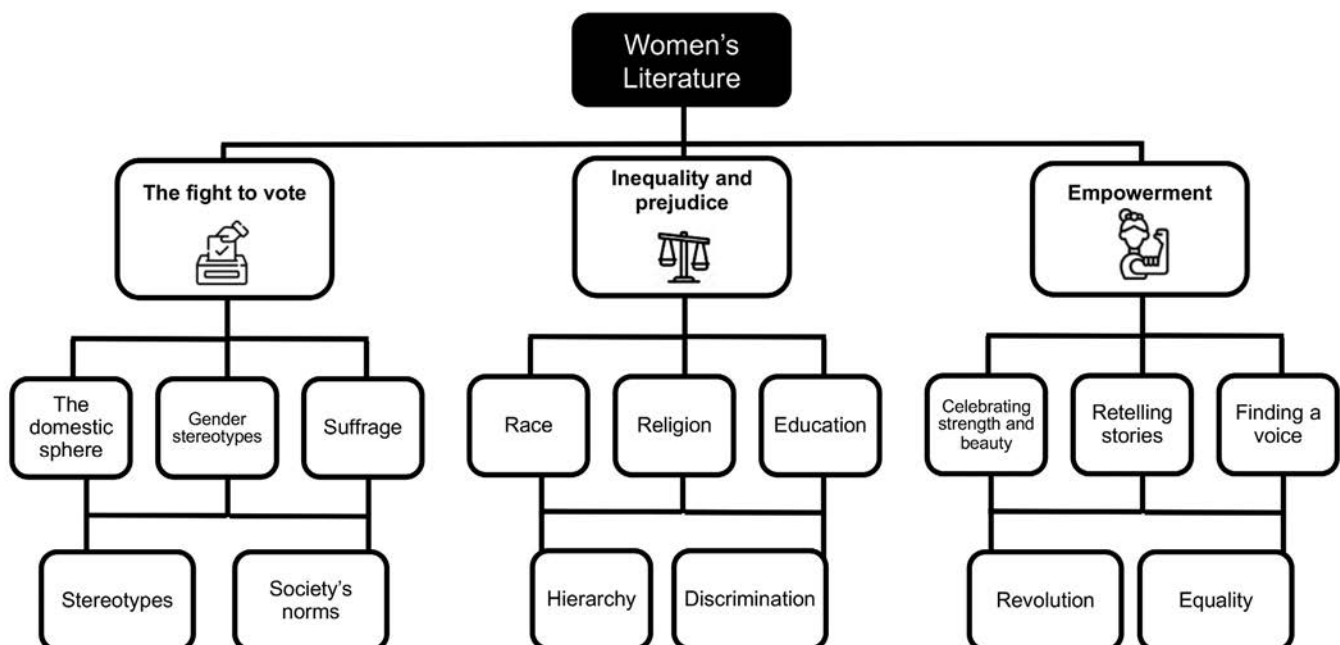
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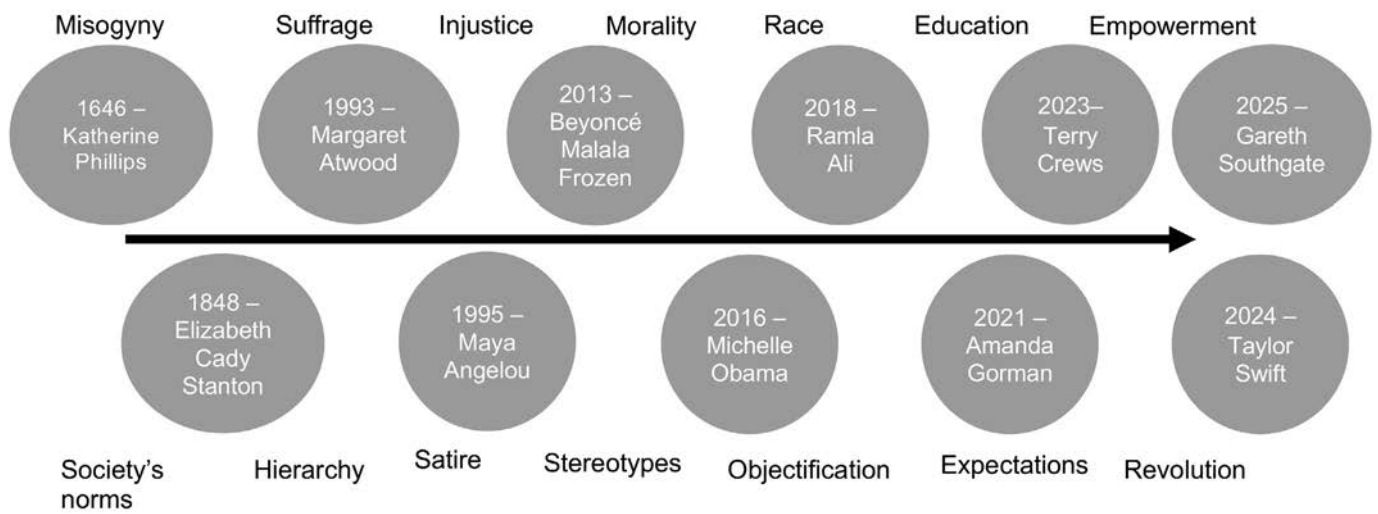
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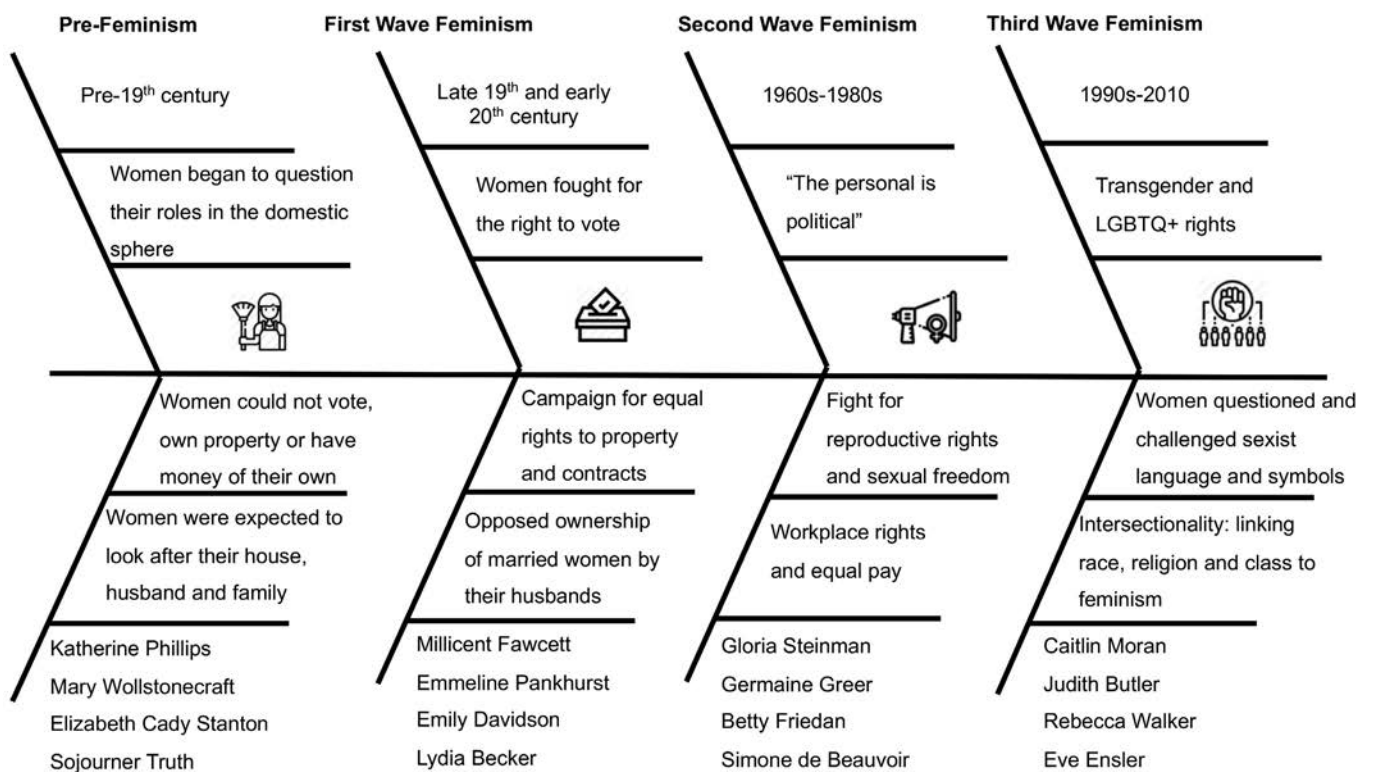
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FEMINISM TIMELINE



Much Ado About Nothing



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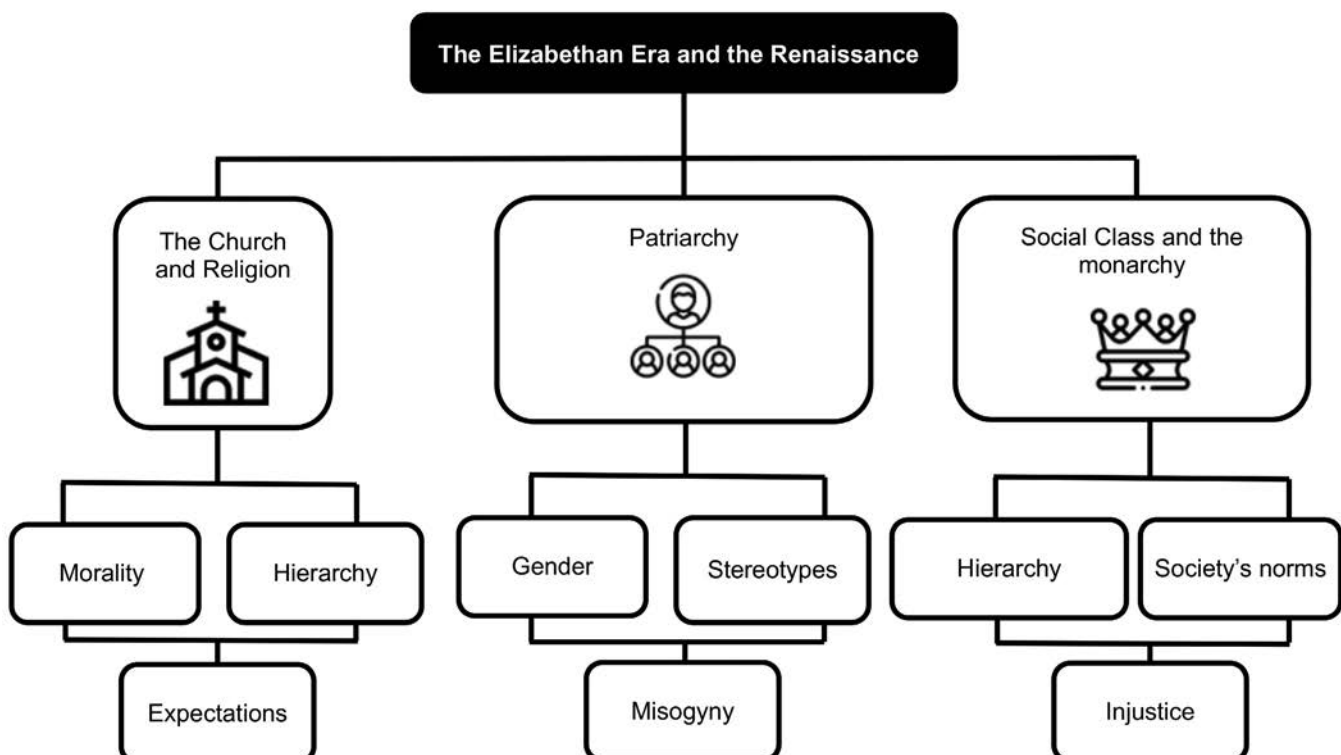
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Deception and disguise



Truth and lies are explored in key scenes in Much Ado About Nothing.

In Act 2, there is a masquerade party, in which all the characters wear masks. Some of them use the opportunity to create mischief: Beatrice pokes fun at Benedick, while Don John (half-brother to Don Pedro) tries to cause trouble between Don Pedro and Claudio. Although the misunderstanding is cleared up quickly, it allows Don John to see that Claudio will easily believe the worst of people, and so Don John begins to plot an even worse deception!

This deception unfolds in Act 4, resulting in a terrible injustice against Hero, whose reputation is ruined by a false accusation. To give her friends time to clear her name, Hero's death is faked. And so the lies continue to pile up until everything is finally resolved in Act 5.

Men and women



The relationships between men and women are presented as ongoing battles in the play.

The Elizabethans lived in a patriarchal society, in which women were expected to obey first their fathers and then their husbands. Another expectation was that women would choose to marry, and that they would be guided by their fathers when choosing (or being chosen by) a husband.

There are two main sets of lovers in the play. Benedick and Beatrice, the main characters, have had a past romance that ended badly. As a result, they have both sworn that they will never marry. Claudio and Hero are younger, and they represent first love, which is very innocent and idealised. But when Hero is accused of unfaithfulness, her accusers are believed over her – because they are men! Even her own father rejects her until another male character steps in to defend her.

Messina



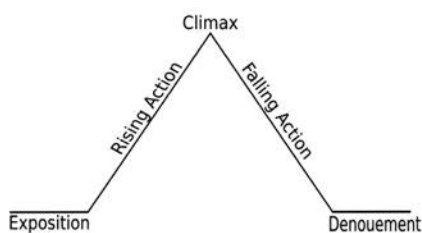
Messina is a port in north-eastern Sicily. At the time Shakespeare wrote Much Ado About Nothing, Messina was a beautiful city with graceful architecture and lush gardens.

Much Ado About Nothing is a romantic comedy centring around two groups of people. First, we are introduced to the citizens of Messina, led by their kindly governor, Leonato. Then a group of soldiers arrive, on leave after successfully fighting a war with the French. They are led by Don Pedro, the Prince of Aragon. Aragon, in Spain, ruled over Sicily from the thirteenth century through to the seventeenth. Don Pedro is therefore the highest-ranking character in the play, with authority over everyone else.

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MUCH ADO ABOUT NOTHING STRUCTURE AND THEMES

Much Ado About Nothing follows a traditional 5 act structure. The storyline follows Freytag's Pyramid.



Exposition: Don Pedro of Aragon arrives in Messina with his company of soldiers for a month of shore leave.

Rising Action: Claudio, Don Pedro's favourite officer, proposes marriage to Hero, daughter of the governor of Messina, and is accepted; Benedick (another officer) and Beatrice (Hero's cousin) are each tricked into believing that the other has declared love for them; Don John (Don Pedro's jealous half-brother) plots to destroy Claudio's happiness.

Climax: Claudio, tricked by Don John, accuses Hero of unfaithfulness in a brutal rejection at their wedding ceremony. Hero's death is faked.

Falling Action: Benedick and Beatrice grow closer as Hero's friends work to clear her name.

Denouement: Don John's deception is uncovered. Claudio and Hero are reunited. Benedick and Beatrice confess their love for one another. Everyone dances!

THEMES



Love

Two types of **love** are explored in the play. Benedick and Beatrice symbolise experienced, mature love. They know it's important to see each other's faults and not expect perfection! Claudio and Hero represent first love, with all its mistakes and too-high expectations. This almost leads them to tragedy!



Patriarchal society

Men hold all the power in the play. It is a man who sets Hero up to be accused of unfaithfulness; and because it is men who accuse her, they are automatically believed! As a woman, Beatrice feels unable to defend her cousin's honour, and she depends on Benedick to do it for her.



Deception

Benedick is tricked by his friends into believing that Beatrice is desperately in love with him; Beatrice is tricked by her friends into believing that Benedick wishes to marry her. Claudio is tricked into believing that Hero has been unfaithful to him.



Marriage

Marriage is a key theme in the play. Benedick and Beatrice are viewed as unusual because they have each sworn never to marry. Their friends work hard to change their minds! Claudio and Hero rush into marriage before getting to know each other, which leads to disaster!

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MUCH ADO ABOUT NOTHING ACT 1

					
PLOT	In Messina, a letter announces the arrival of Don Pedro and his company of soldiers. The people of Messina are excited, particularly Hero, who caught the eye of Claudio, a young soldier, the last time the company visited. Beatrice is less happy because her romance with Benedick, another soldier, ended badly.	Don Pedro and his company arrive and are greeted warmly. Benedick and Beatrice immediately start arguing. Claudio tells Benedick and Don Pedro that he wishes to marry Hero. Don Pedro tells Claudio that he will disguise himself and court Hero in Claudio's name.	Leonato is informed by his brother Antonio that Claudio has been overheard talking to Don Pedro about how he intends to propose marriage to Hero, Leonato's daughter. Leonato declares that he will tell Hero so that she can prepare herself.	Don John, Don Pedro's half-brother, is talking to Conrade. Don John resents his brother and recently spoke out against him. Don Pedro has taken him back into his company, but Don John is still bitter about having to keep quiet and pretend to get along with everyone.	Borachio, another of Don Pedro's henchmen, arrives and tells him about Claudio's intention to marry Hero. Don John decides to use this information to try to create trouble for Claudio, whom he resents for being his brother's favourite.
KEY QUOTES	"There is a kind of merry war betwixt Signior Benedick and her" Leonato Act 1 i	"I had rather hear my dog bark at a crow than a man swear he loves me." Beatrice Act 1 i	"Can the world buy such a jewel?" Claudio Act 1 i	"I had rather be a canker in a hedge than a rose in his grace" Don John Act 1 iii	"If I can cross him any way, I bless myself every way." Don John Act 1 iii

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MUCH ADO ABOUT NOTHING ACT 2

					
PLOT	Leonato holds a celebration, in which the guests are all masked. Don Pedro takes Hero aside to propose to her on Claudio's behalf. Beatrice and Benedick, pretending that they don't know who they're talking to, insult one another.	Don John approaches Claudio, and tells him that Don Pedro is courting Hero for himself. Beatrice brings Claudio to Don Pedro, who assures him that he wooed Hero on his behalf. Don Pedro proposes marriage to Beatrice but she gently refuses. Don Pedro decides to try to get Beatrice and Benedick together.	Don John is infuriated that Claudio is still set to marry Hero. Borachio, one of Don John's henchmen, reveals that he is involved with Margaret, Hero's waiting gentlewoman. He has a plan to arrange for Claudio to see Borachio and a partly-concealed Margaret in Hero's bedchamber window. It will look as if Hero is being unfaithful to Claudio.	Benedick, walking alone, complains about how love turns men into fools. Don Pedro, Claudio and Leonato arrive and have a loud conversation (for Benedick's benefit) about how Beatrice is secretly in love with Benedick.	After the others have gone, Benedick joyfully declares his intention to return Beatrice's love. When Beatrice appears, sent to call Benedick in to dinner, Benedick decides that he can tell she is in love with him.
KEY QUOTES	"[Benedick] is the Prince's jester, a very dull fool" Beatrice Act 2 i	"If we can do this, Cupid is no longer an archer; his glory shall be ours, for we are the only love-gods." Don Pedro Act 2 i	"What life is in that, to be the death of this marriage?" Don John Act 2 ii	"Bait the hook well, this fish will bite." Claudio Act 2 iii	"I will be horribly in love with her" Benedick Act 2 iii

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PLOT	Hero and Ursula lie in wait for Beatrice, then have a loud conversation (for Beatrice's benefit) about how Benedick is secretly in love with Beatrice. After they have gone, Beatrice joyfully declares her intention to return Benedick's love.	Benedick's friends tease him about the changes they have noticed in him because he is in love. Don John approaches Don Pedro and Claudio, and tells them he knows Hero is being unfaithful to Claudio. He asks them to follow him so that he can show them proof.	Members of the Watch encounter Borachio telling Conrade about how he has manipulated Margaret to make Claudio and Don Pedro believe that they were seeing Hero being courted by Borachio. An enraged Claudio has declared his intention to shame Hero at the wedding. The Watch arrest the two henchmen.	The following morning, Beatrice, Margaret and Ursula keep Hero company as she prepares for her wedding to Claudio. They are all unaware of what has taken place the night before. Margaret teases Beatrice about the changes she has noticed in her because she is in love.	The constable, Dogberry, arrives to inform Leonato about the two men the Watch has arrested. He asks Leonato to interrogate the men. Unfortunately, his stupidity means that he fails to get the importance of his message across. As Leonato leaves for the wedding, Dogberry returns to the jail to interrogate Borachio and Conrade.
	KEY QUOTES "Some Cupid kills with arrows, some with traps." Hero Act 3 i	"Leonato's Hero, your Hero, every man's Hero" Don John Act 3 ii	"...away went Claudio enraged" Borachio Act 3 iii	"...methinks you look with your eyes as other women do" Margaret Act 3 iv	"...our watch, sir, have indeed comprehended two auspicious persons" Dogberry Act 3 v

					
PLOT	The characters assemble for the wedding of Claudio and Hero. In front of everyone, Claudio savagely rejects Hero, accusing her of being unfaithful to him.	Despite Hero's protests that she is innocent, Claudio and Don Pedro continue to abuse her in front of her friends. Leonato declares that he wants to die of shame. Hero collapses into a faint. Don John, Don Pedro and Claudio leave.	As Beatrice tries to comfort Hero, Leonato declares that Hero would be better off dead. The friar who was to conduct the wedding has been watching Hero closely and declares that he believes her to be innocent. He has a plan: they will tell everyone that Hero has died, and hide her away until the truth can be uncovered.	Benedick and Beatrice are left alone. Benedick tries to comfort a weeping Beatrice, who is angry that, as a woman, she cannot challenge Claudio in defence of Hero. Benedick declares his love for Beatrice and reluctantly agrees to challenge Claudio to a duel.	The Sexton, Dogberry, and his constable Verges, interrogate Borachio and Conrade. Members of the Watch recount what they heard on the night before the wedding – that Borachio and Don John had schemed to disgrace Hero. The Sexton tells them that Hero has died of grief, and he orders the henchmen to be brought before Leonato.
	KEY QUOTES "Give not this rotten orange to your friend" Claudio Act 4 i	"...fare thee well, most foul, most fair! Farewell, thou pure impiety and impious purity!" Claudio Act 4 i	"Would the two princes lie, and Claudio lie, who loved her so, that, speaking of her foulness, wash'd it with tears?" Leonato Act 4 i	"O God that I were a man! I would eat his heart in the marketplace." Beatrice Act 4 i	"Thou wilt be condemned into everlasting redemption for this." Dogberry Act 4 ii

					
PLOT	Leonato and his brother, Antonio, angrily confront Claudio and Don Pedro, who both refuse to listen to them about Hero, whom they now believe to be dead. Benedick arrives and issues his challenge to Claudio.	The constables and the Watch arrive with Borachio and Conrade. Borachio admits what he has done. A devastated Claudio throws himself on Leonato's mercy. Leonato tells Claudio that he must visit Hero's tomb and also agree to marry a niece of Leonato's. Claudio agrees.	Benedick is trying to compose a love song for Beatrice when she enters. They playfully but lovingly tease one another. Ursula arrives and tells them that Hero has been proven to be innocent.	A grieving Claudio visits what he believes to be Hero's tomb. He hangs an epitaph upon it and swears that he will visit the tomb every year in penance.	The characters gather again for the wedding. Hero is veiled until Claudio promises to marry her, and then she reveals herself. The two lovers are reunited. Benedick makes peace with Claudio. Beatrice and Benedick admit their love for each other publicly. Benedick declares that they will all dance before a double wedding.
	KEY QUOTES "You have killed a sweet lady, and her death shall fall heavy on you." Benedick Act 5 i	"Give her the right you should have giv'n her cousin, and so dies my revenge." Leonato Act 5 i	"Thou and I are too wise to woo peaceably." Benedick Act 5 ii	"Done to death by slanderous tongues was the Hero that here lies" Claudio Act 5 iii	"One Hero died defil'd, but I do live" Hero Act 5 iv "...for man is a giddy thing" Benedick Act 5 iv

Much Ado About Nothing CHARACTERS

 Benedick A lord who has recently returned from fighting in a war and vows he will never marry. He engages with Beatrice in a competition to outwit, outsmart, and out-insult the other, possibly to mask his love for her. Funny Intelligent Dramatic Machiavellian Guileful Resentful Resentful of his brother and jealous of Claudio Don Pedro's half-brother and the antagonist of the play.	 Beatrice The funny and feisty niece of a wealthy governor. She defies patriarchal expectations by refusing to be submissive to men. Witty Feisty Independent Hierarchy Noble Status His friendship with Claudio makes him the target of his scheming brother. Don John's half-brother and the main authority figure.	 Claudio A young lord in Don Pedro's company of soldiers. He is a good person but gullible and easily influenced. Serious Noble Gullible Hierarchy Authority Patriarchy A loving father who nevertheless expects his daughter to submit to patriarchal expectations. Hero's father and the governor of Messina.	 Hero The daughter of Leonato. She is the patriarchal ideal of a quiet and submissive daughter. Pure Meek Submissive Authority Morality Religion Has the idea to hide Hero away and tell everyone that she has died, to save her from disgrace. A holy man and the representative of religion in the play.
 Don John	 Don Pedro	 Leonato	 Friar Francis



Trash



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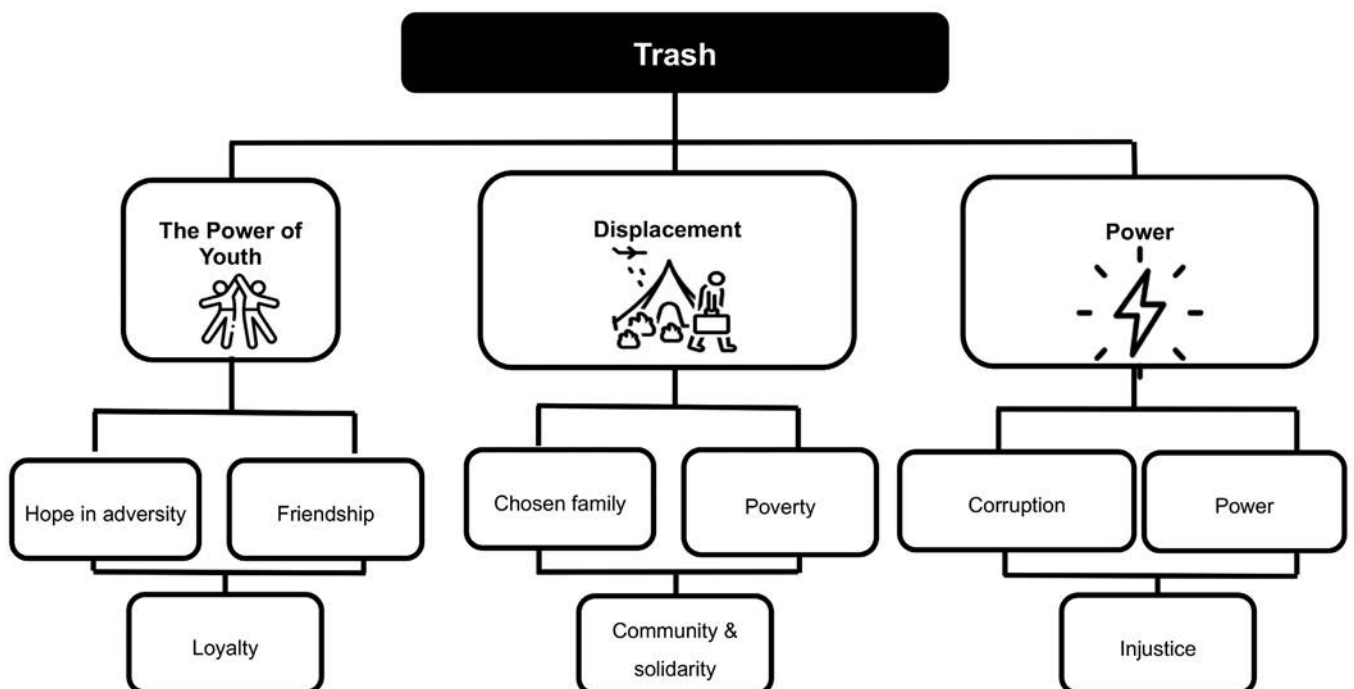
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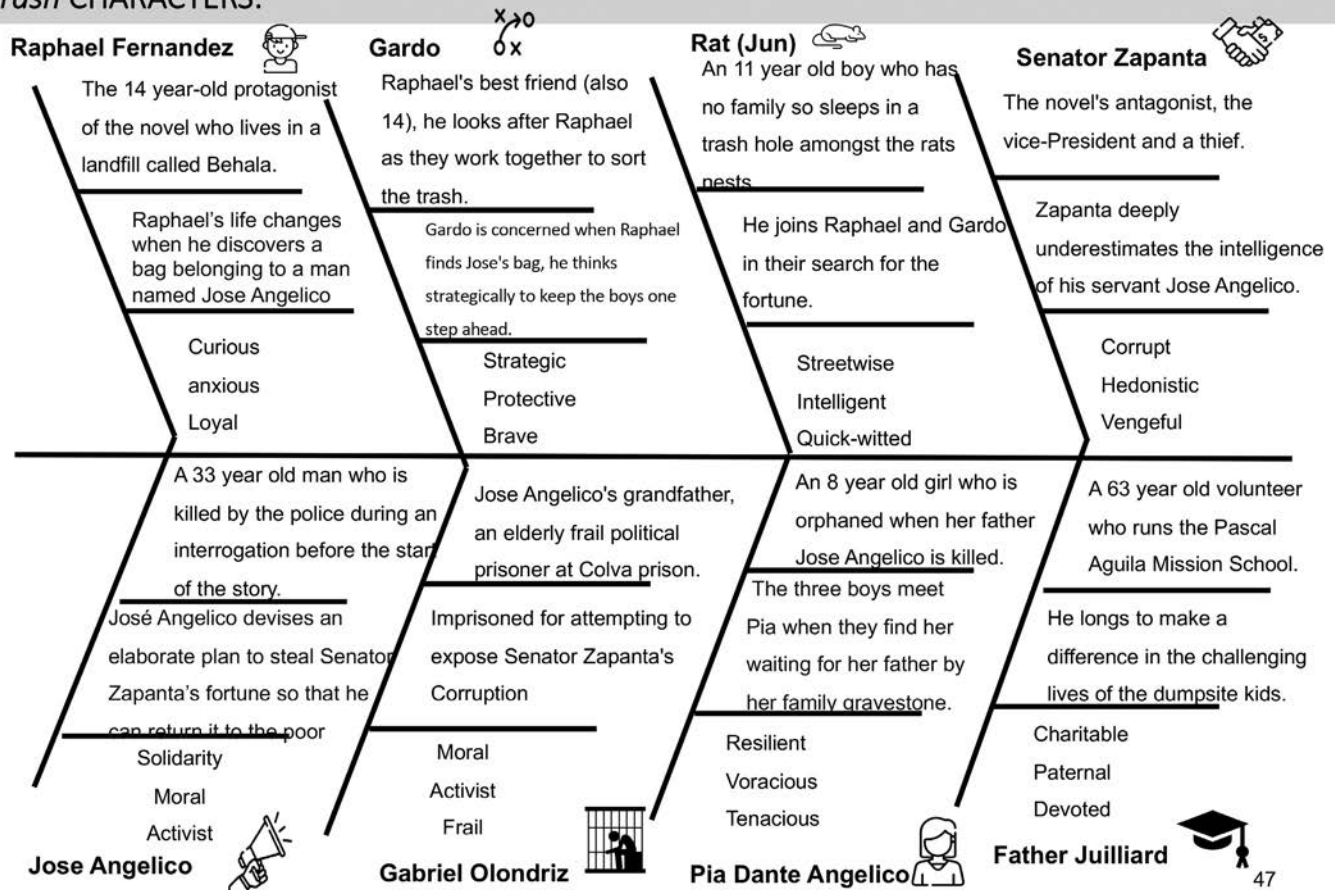
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TRASH THEMES AND INFLUENCES



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Trash CHARACTERS:



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Trash: historical context.



Smokey Mountain

Trash is inspired by 'Smokey mountain'; A slum/ dumpsite in Manila (Philippines). There were many people and children living in extreme poverty around the outskirts of the dumpsite.

The site was originally named 'The Promised Land' as the government promised housing for those in poverty.

In July 2000, the dumpsite collapsed and killed hundreds of families.



Slums

Slums usually arise due to rapid urbanisation and migration. In slums, there is inadequate housing, poor sanitation, and no access to clean water.

To survive, people would search the dumpsite amongst the trash for things they could sell or keep. These people were often called 'slumdweller'.



Corruption

Senator Zapanta is at the center of the novel's main mystery involving the theft of a large sum of money. He stole millions of pesos, which were originally intended for public aid, and kept the money hidden instead of using it for the people.

Zapanta uses his political influence to control the police and the legal system. When a man named José Angelico, who worked for him, tries to expose the theft by smuggling evidence out, Zapanta has him arrested and beaten, ultimately leading to his death.



Chosen family

Raphael and Gardo do not have traditional families. Raphael and Gardo represent characters who are not related by blood but choose each other to be their family. They show loyalty and solidarity as they protect each other.

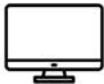
Their bond highlights the importance of love beyond blood relations. Their resilience despite harrowing living conditions in extreme poverty insight empathy and perspective.

Trash: Exposition (part 1)

					
PLOT	The dumpsite of 'Behala' is introduced by the novel's first narrator, Raphael. The city has no running water or toilets so there is 'stupp' (human waste) all over. Raphael and his best friend Gardo search the dumpsite every day.	Raphael and Gardo find a small leather bag containing a wallet, ID, a key and a photo of a small girl. The wallet belongs to José Angelico. In the wallet is 1100 pesos which they split between them.	Raphael begins to panic when the police show up offering a reward in search of a missing bag. Skeptical of the police, he is reluctant to hand over the bag he found.	Knowing that they could get in trouble for lying, Raphael and Gardo decide to hide the bag with Rat. Rat agrees to hide the bag. He wonders who the man in the photo is and he recognises the key: it's for a locker in Central Station.	The next day, the three boys go to the station and they retrieve an envelope from the locker: it contains a cryptic letter addressed to a Gabriel Olondriz at Colva Prison and a slip of paper with numbers, dots, and slashes on it.
KEY QUOTES	"Well, you can smell Behala before you see it." (CH 1)	"There were eleven hundred pesos inside, and that – let me tell you – is good money." (CH 2)	"I'd never had any trouble with the police before then...but everyone knows not to trust them too far." (CH 3)	"What if he's been murdered?...Maybe they're looking for his body – for the murderers too." (CH 4)	"One page, and a little slip stuck to it, with just a line of numbers, making no sense" (CH 6)

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Trash: Rising Action (Part 2)

					
PLOT	One Thursday, Jun offers to pay if he, Raphael, and Gardo can use the school's computer to research some information. The boys lie and say it's for a newspaper quiz.	As Gardo predicted, four vans of police come to Behala that night; the officers search everyone's homes and they arrest Raphael. The police interrogate Raphael using violence.	He realises that the police had nothing if he was their only clue, and he feels pretty proud of himself, a "garbage boy", for outsmarting the "garbage police."	Raphael tells the reader about Jose Angelico: it turns out the man was killed in a police station during an interrogation. He had been arrested on suspicion of robbing \$6,000,000 from the vice-President.	Previously the boys learned that José Angelico was an orphan who'd been adopted by the son of Gabriel Olondriz. Grace begins narrating so she can share Angelico's nature as a man.
KEY QUOTES	"They're taking part in a quiz, said Jun." (CH 1)	"They had flashlights and batons..." (CH 2)	"I'm going to kill you liar!" (CH 2)	"He had died whilst police were interrogating him." (CH 3)	"Jose Angelico was the most trustworthy man" (CH 4)

Trash: Climax (Part 3)



Jun explains to Olivia that Gardo has no family; he will lose his home unless he gets papers to his grandfather in prison; Olivia agrees to take the boys. It's a scam.



As Olivia and Gardo enter the prison they're both scared. Olivia is shocked to see a maze of small cages stacked on top of one another like a towering, "oven-hot" warehouse holding emaciated people.



A frail Gabriel Olondriz greets Olivia happy for the company. Olondriz is shocked that Olivia has no idea who she's visiting. He explains that he brought corruption charges against Senator Zapanta.



Gabriel Olondriz discovered that Zapanta had siphoned money off and stockpiled it in a vault in his home. Olondriz worked meticulously to gather a mass of evidence.



but Zapanta's house and all the evidence was burned down, killing two of his servants. Zapanta charged Olondriz with murder. Rat decides they should go to Zapanta's house; it's a challenging journey.

"My grandfather's in prison mam and I want to go and see him" (CH 1)

"What if something goes wrong and they won't let me out?" (CH 3)

"The man was not simply weak, he was dying" (CH 4)

"It seemed he had many more friends than me and infinitely more powerful." (CH 5)

"The same night there was a terrible fire at the house." (CH 7)

PLOT

KEY QUOTES

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Trash: Falling Action (Section 4)



Right after Gardo returns to Behala, the police arrive. The boys grab Rat's money and flee. The boys know they need Olondriz's Bible so Gardo returns to the prison.



Rat feels awful about stealing money over the years from the mission school; the boys agree to return it if they can decode the Bible and find the stolen money. They are pursued by the police.



Re-united, the boys know the code's numbers match the text; Midnight strikes, it's the Day of the Dead. They realise that the slashes mean to turn a page. They decode the message, it reads...



Rat remembers from school that "map ref" meant they had to find coordinates on the map. Then Gardo remembers that Olondriz's prisoner number on José Angelico's letter is wrong. It works: the coordinates point to a graveyard.



Rat's quick thinking leads them to a shack where a hundred or so street boys sleep; they escape. Newspaper reports show the Zapanta investigation continues. They reach the graveyard.

"We made off, no time to say goodbye." (CH 1)

"We knew most of all that everything depended on that dam Bible" (CH 1)

"Go to the map ref where we lay look for the brightest light my child." (CH 4)

"the trash boys were ahead of the trash police." (CH 5)

"Then just like birds, we were all gone, spreading out and ducking..." (CH 6)

PLOT

KEY QUOTES

52

					
PLOT	Raphael knows that the police wouldn't have buried Jose Angelico, so they look for a family grave instead. Then the boys see "the brightest light": thousands of poor people's candles from the other side of a wall.	People live in shacks on the other side of the graveyard among the poor people's graves. Finally, Gardo finds the Angelico grave. Pia Dante's grave is stacked on top. A tiny girl appears.	Rat asks who the girl is, and she responds, "Pia Dante." Raphael goes cold. He thinks they're looking at Pia Dante's ghost. Pia was brought to the area by her host family, who left her there when her father didn't show up.	They go into the graveyard, feeling ghosts all around, and pry open Pia Dante's grave with a broken knife and a spike. They return to Behala. The group stuffs four backpacks with money for themselves.	Wearing donated school uniform, they unfurl the rest into the typhoon wind, which scatters money like a storm all over Behala. They board a train to Sampalo looking identical to the other schoolchildren; starting a new life.
KEY QUOTES	"The whole cemetery is glittering with the candles CH 1)	"It was a small voice calling down to us." CH 2)	"I went stone-cold all over and nearly fell down." (CH 3)	"I tell you, six million dollars in a box is heavy" (CH 4)	"It was a hurricane and a hurricane of money" (CH 5)

Knowledge Book Maths

Year 7

1

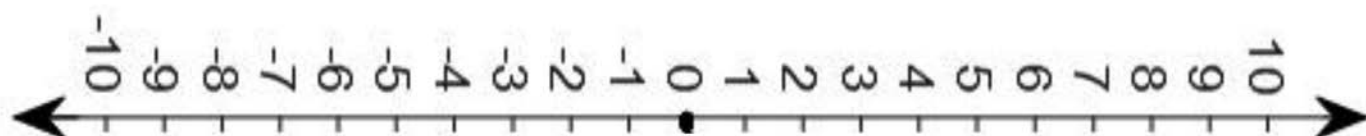
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11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

2

Multiplication

X	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

3



4

Ten Thousandths	
Thousandths	
Hundredths	
Tenths	
Decimal Point	•
Units	
Tens	
Hundreds	
Thousands	

Two signs together		Replace with
+	+	+
-	-	+
+	-	-
-	+	-

Multiplication and Division Rule	
Signs of Two Numbers	Sign of the Answer (Product or Quotient)
the same	positive (+)
different	negative (—)

7

Brackets

Indices

Divide

Multiply

Add

Subtract

B
I
D
M
A
S



8

Factors and Multiples

Factor: An integer that a number can be divided by to leave no remainder.

It will be the same size or lower than the given number.

Multiple: An integer that a number will multiply into.

It will be found in the number's times table.

It will be the same size or greater than the given number.

9

Prime Numbers

Prime

A number with exactly 2 factors

Primes:

2, 3, 5, 7,
11, 13, 17,
19, 23, 29,
31, 37, 41,
43, 47, 53,
59, 61, 67,
71, 73, 79,
83, 89, 97

	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

10

Notation: Signs

$=$

Equal to

$\neq$

Not equal to

$\approx$

Approximately
equal to

$\equiv$

Equivalent to

$<$

Smaller than

$>$

Greater than

$\leq$

Smaller than or equal to

$\geq$

Greater than or equal to

11

Notation

$a + b$

a plus b

$3 + b$

3 plus b

$a - b$

a minus b

$a - 3$

a minus 3

ab

a times b

$3b$

3 times b

$\frac{a}{b}$

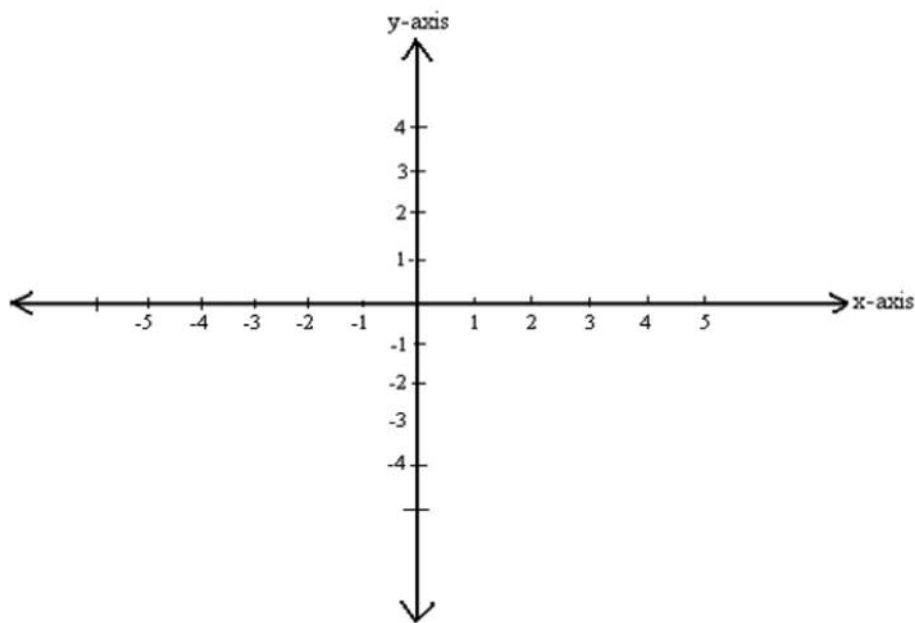
a divide by b

$\frac{3}{b}$

3 divide by b

12

Coordinates and Axes



Coordinate

(x, y)

13

Square Numbers

The result when a number is multiplied by itself.

Square Numbers



- $1 \times 1 = 1$
- $2 \times 2 = 4$
- $3 \times 3 = 9$
- $4 \times 4 = 16$
- $5 \times 5 = 25$
- $6 \times 6 = 36$
- $7 \times 7 = 49$
- $8 \times 8 = 64$
- $9 \times 9 = 81$
- $10 \times 10 = 100$
- $11 \times 11 = 121$
- $12 \times 12 = 144$
- etc

Cube Numbers

The result when a number is multiplied by itself and then by itself again

Cube Numbers



- $1 \times 1 \times 1 = 1$
- $2 \times 2 \times 2 = 8$
- $3 \times 3 \times 3 = 27$
- $4 \times 4 \times 4 = 64$
- $5 \times 5 \times 5 = 125$

14

Square Roots

Inverse of calculating a square

$$\begin{aligned}\sqrt{1} &= 1 \\ \sqrt{4} &= 2 \\ \sqrt{9} &= 3 \\ \sqrt{16} &= 4 \\ \sqrt{25} &= 5 \\ \sqrt{36} &= 6 \\ \sqrt{49} &= 7 \\ \sqrt{64} &= 8 \\ \sqrt{81} &= 9 \\ \sqrt{100} &= 10\end{aligned}$$

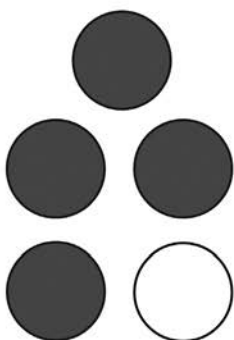
Other Roots

Inverse other powers

e.g. $\sqrt[3]{64} = 4$

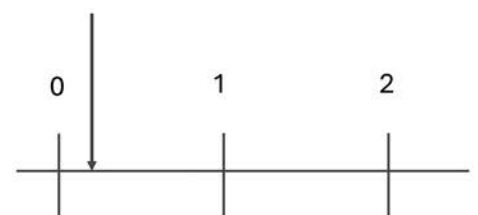
15

Fractions are



Part of a whole

$$\begin{array}{r} 1 \\ \hline 5 \end{array}$$



Numbers on a number line

$$\begin{array}{r} 5 \overline{) 1} \end{array}$$

Division

16

Fractions

4

← Numerator

5

← Denominator

7

2

3

2

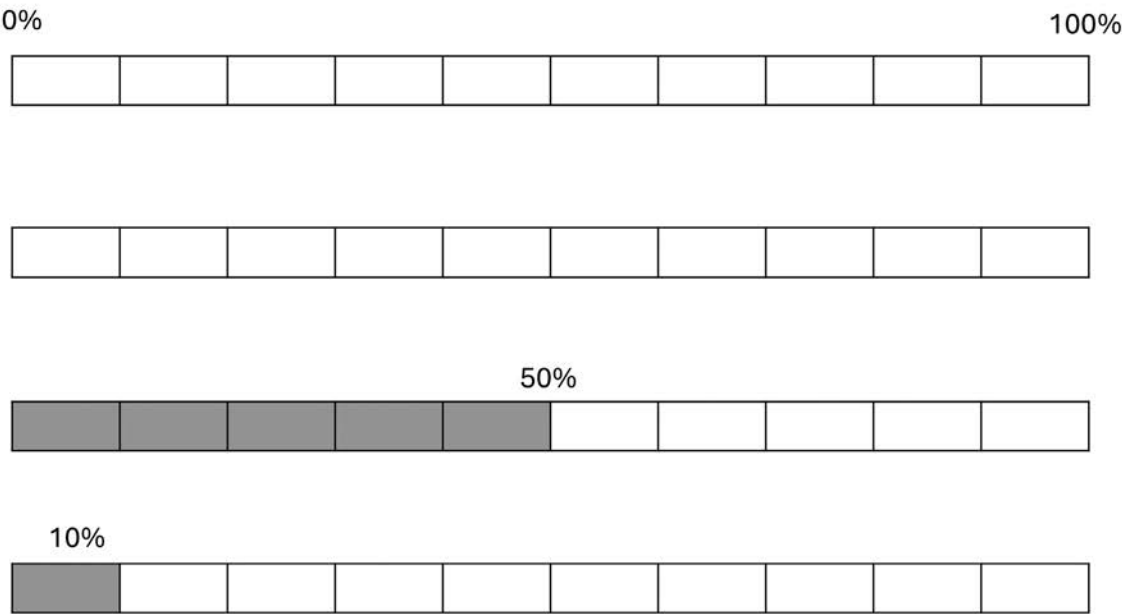
9

Proper Fraction
Numerator < Denominator

Improper Fraction
Numerator > Denominator

Mixed Number

Percentage



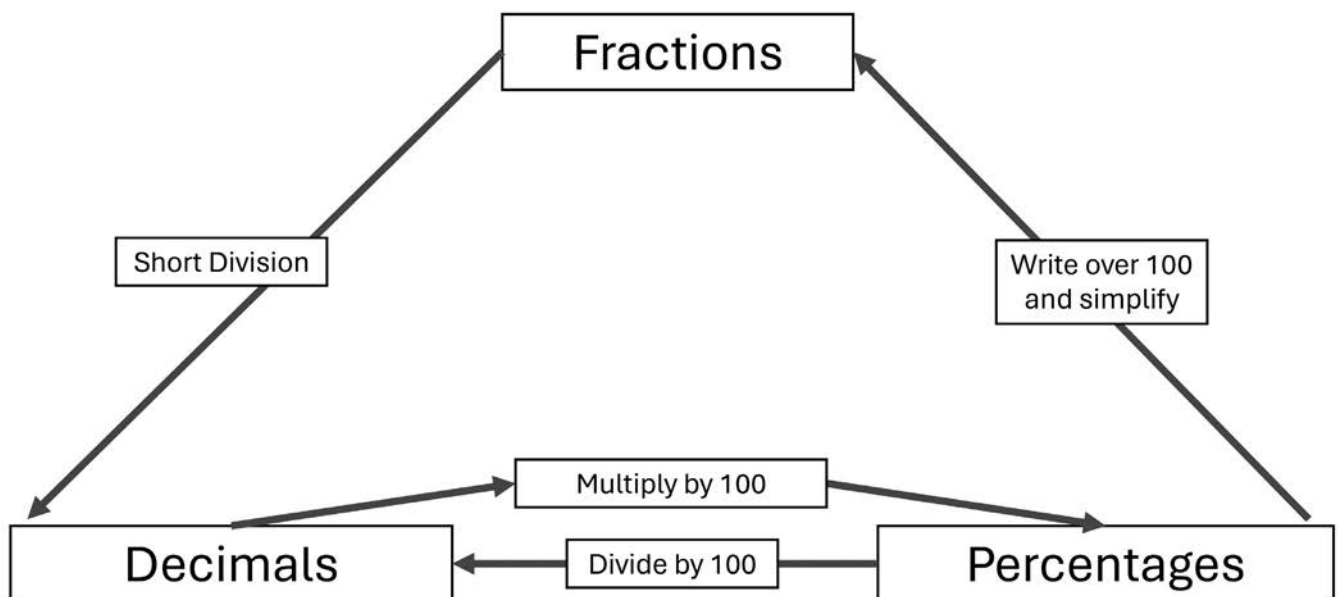
Fractions Decimals and Percentages

Need to know

Fraction	Decimal
$\frac{1}{2}$	0.5
$\frac{1}{4}$	0.25
$\frac{1}{5}$	0.2
$\frac{1}{10}$	0.1
$\frac{1}{3}$	$0.\dot{3}$

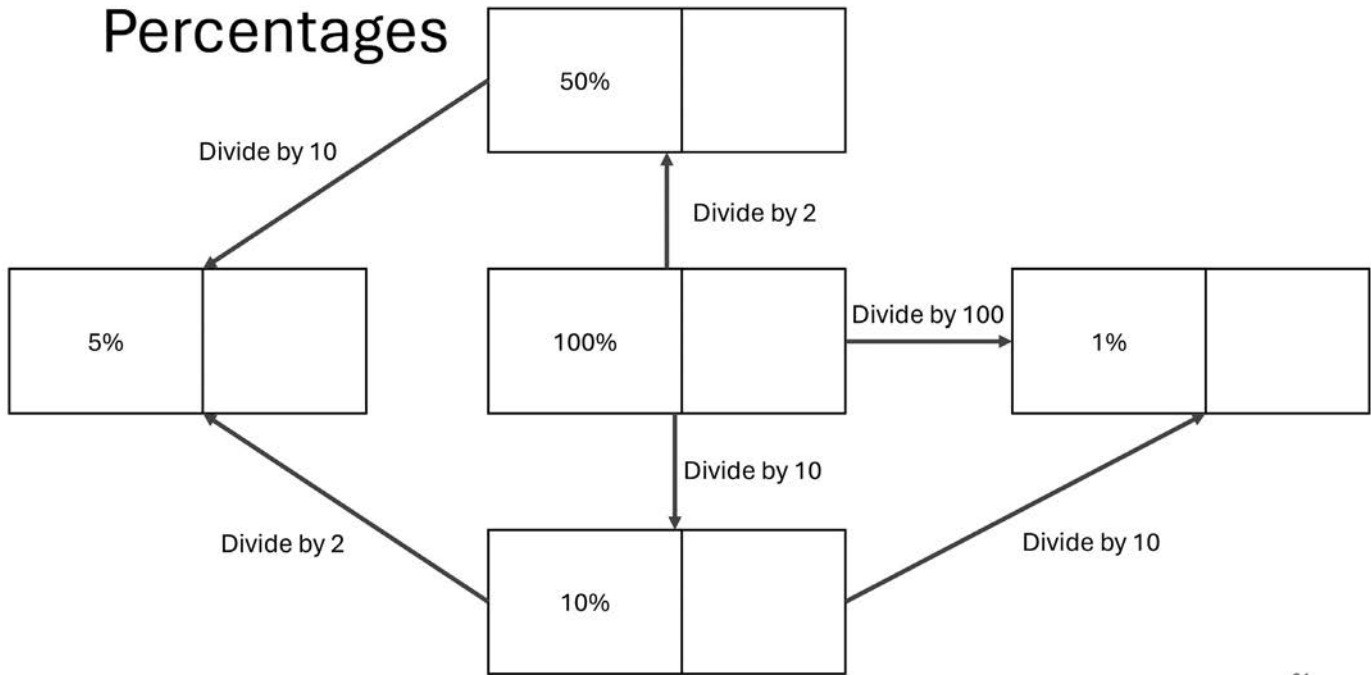
19

Fractions, Decimals and Percentages



20

Percentages



21

Percentages on a Calculator

$$\frac{\text{Percentage}}{100} \times \text{Amount}$$

$$\text{Percentage multiplier} \times \text{amount}$$

22

Percentage Change

$$\text{New Amount} = \text{Percentage Multiplier} \times \text{Original Amount}$$

Repeated Percentage Change

$$\text{Final Amount} = \text{Percentage Multiplier} \times \text{Original Amount}^{\text{Time}}$$

23

Reverse a percentage change

Rearrange the original calculation

$$\text{New Amount} = \text{Percentage Multiplier} \times \text{Original Amount}$$

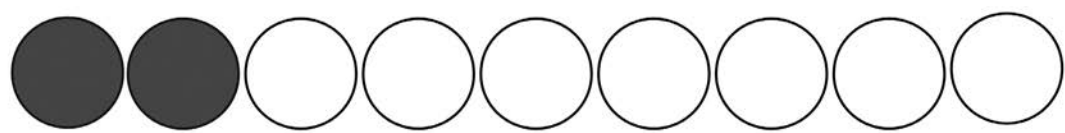
To

$$\text{Original Amount} = \frac{\text{New Amount}}{\text{Percentage Multiplier}}$$

24

Ratio

2:7



25

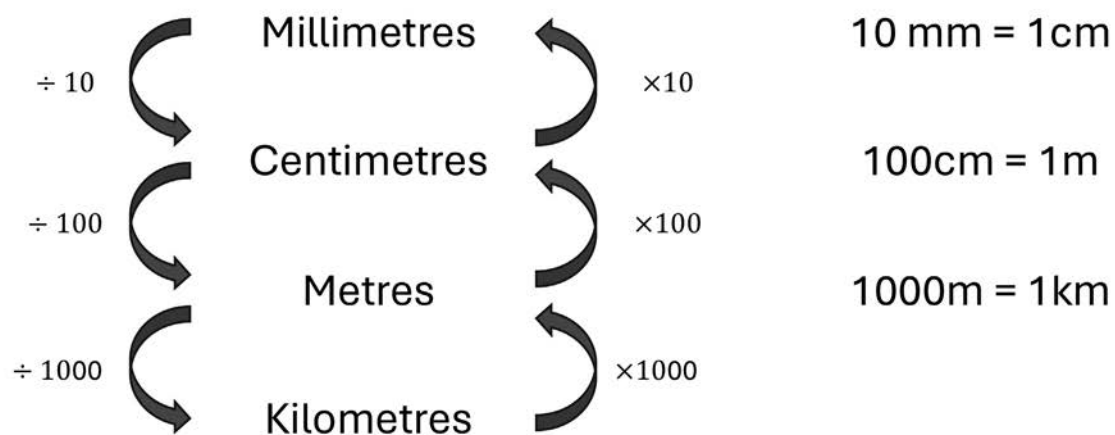
Best Buy

Pay the least amount for the same quantity

Choice A Has a Cost of A Has a Quantity of A	Choice B Has a Cost of B Has aQuantity of b
Cost for 1 of A Cost of A ÷ Quantity of A	Cost for 1 of B Cost of B ÷ Quantity of B
Choose the least cost for 1	

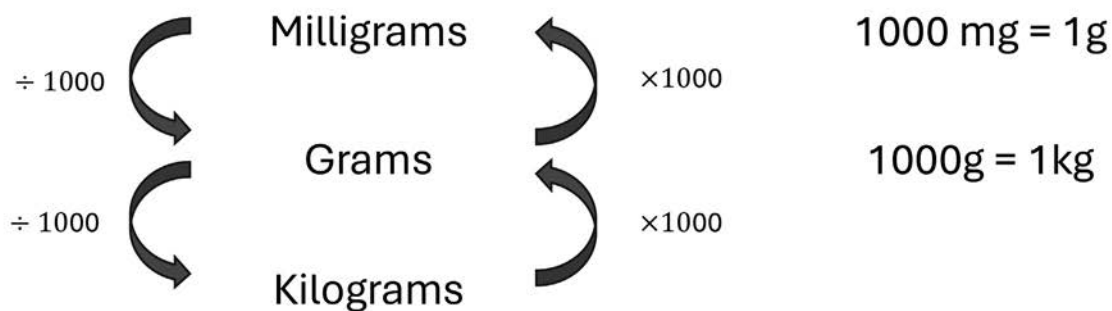
26

Converting Metric Units of Length



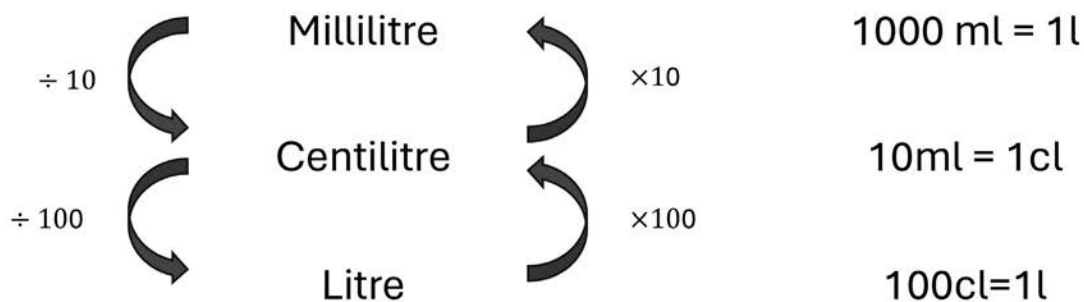
27

Converting Metric Units of Mass



28

Converting Metric Units of Mass

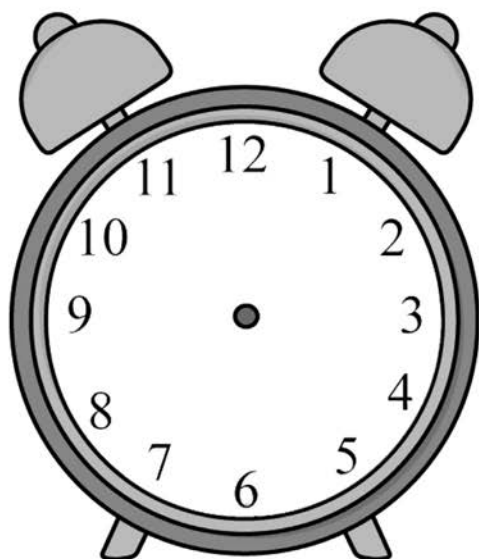


$$1 \text{ Litre} = 1000\text{cm}^3$$

$$1 \text{ Mililitre} = 1\text{cm}^3$$

29

Time



$$1 \text{ Year} = 365 \text{ days (except leap years)}$$

$$= 56 \text{ weeks}$$

1 Week	= 7 days
1 Day	= 24 hours
1 Hour	= 60 minutes
1 minute	= 60 seconds

$$\frac{1}{2} \text{ hour} = 30 \text{ minutes}$$

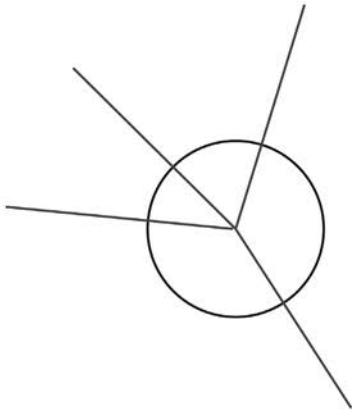
$$\frac{1}{4} \text{ hour} = 15 \text{ minutes}$$

$$0.5 \text{ hour} = 30 \text{ minutes}$$

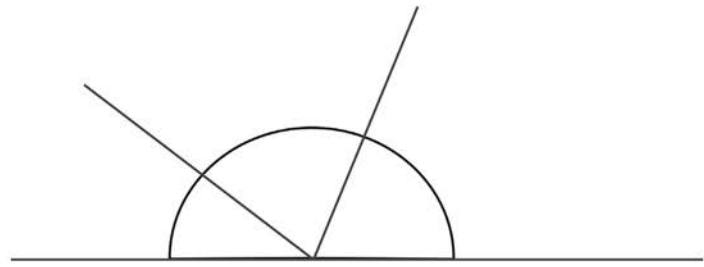
$$0.25 \text{ hours} = 15 \text{ minutes}$$

30

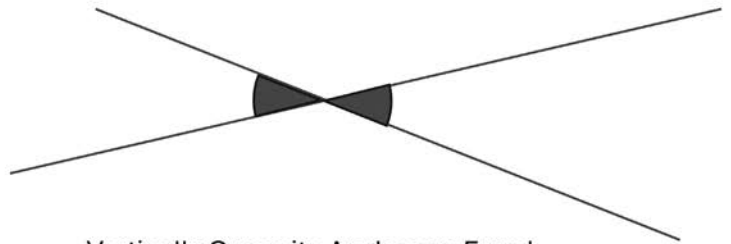
Angle Facts



Angles around a point add up to 360°



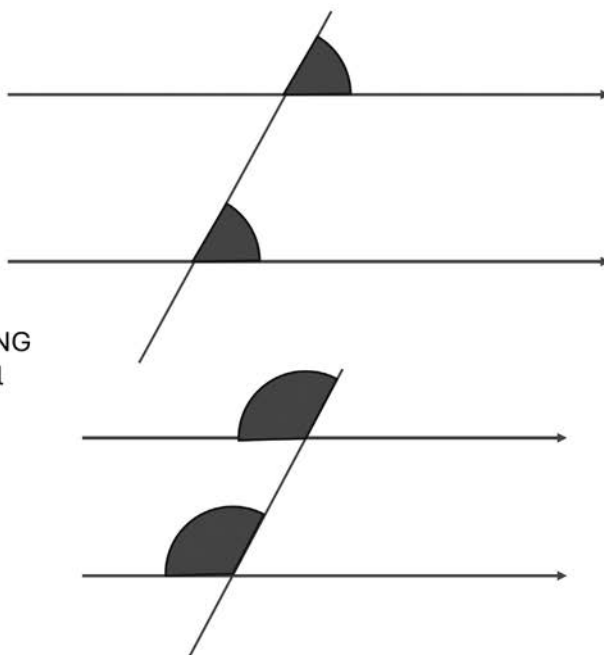
Angles on a straight line add up to 180°



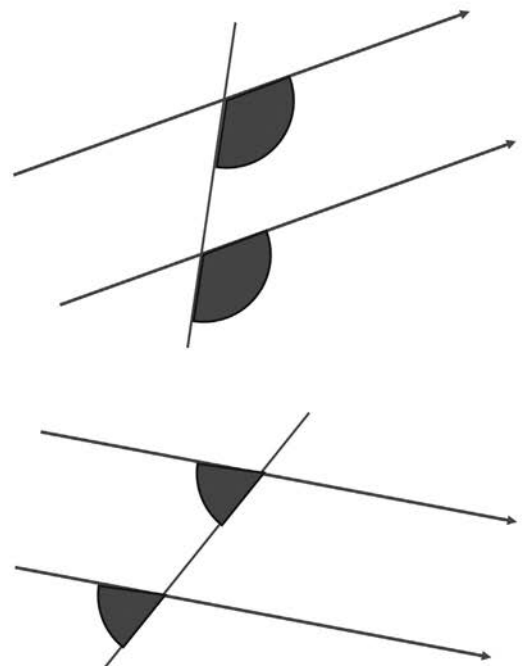
Vertically Opposite Angles are Equal

31

Angles on Parallel Lines



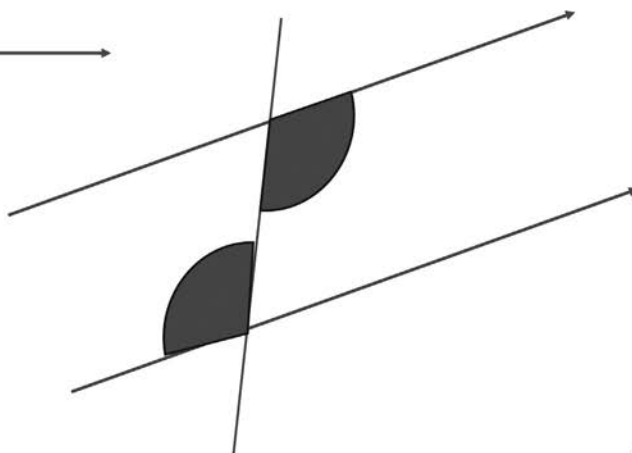
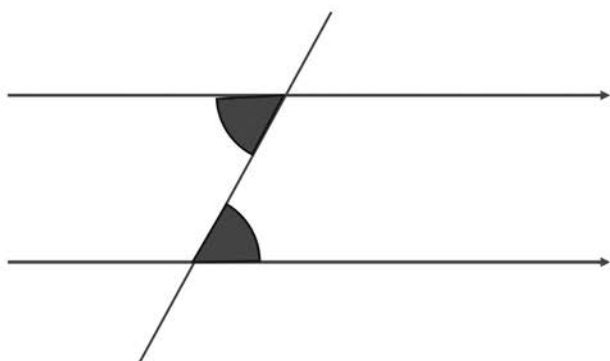
CORRESPONDING
Angles are Equal



32

Angles on Parallel Lines

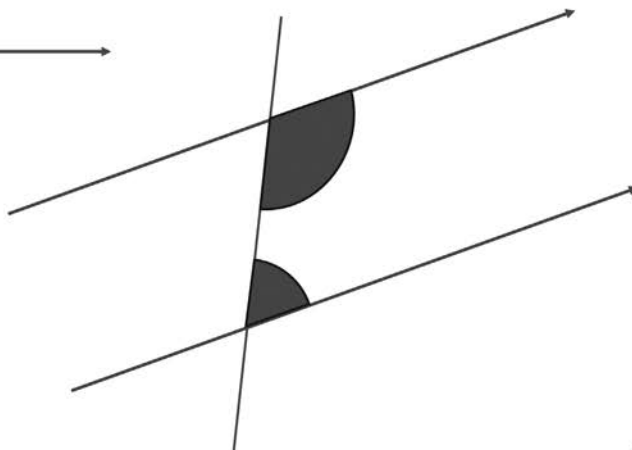
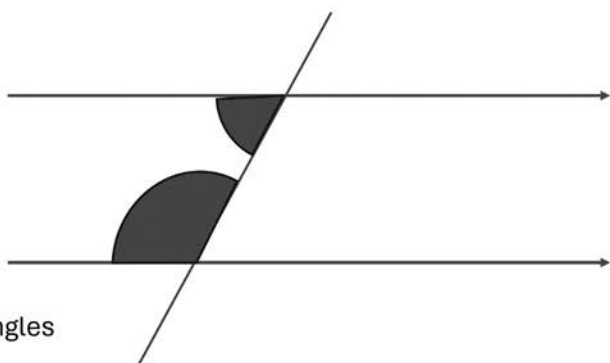
ALTERNATE
Angles are Equal



33

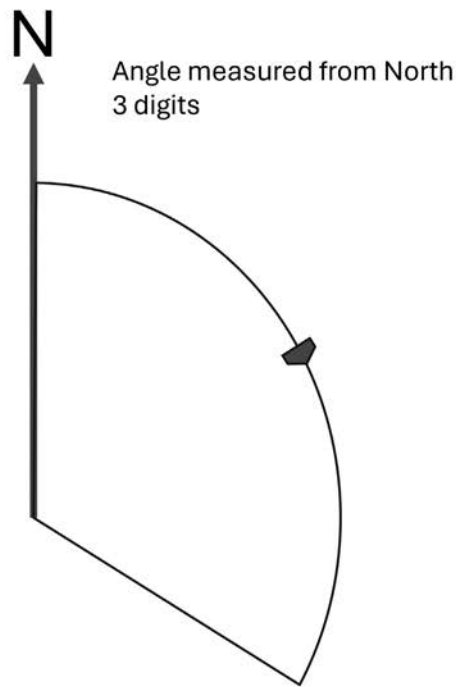
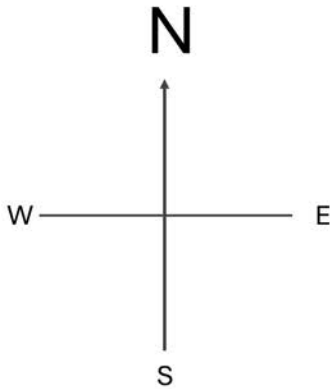
Angles on Parallel Lines

CO-INTERIOR Angles
add up to 180°



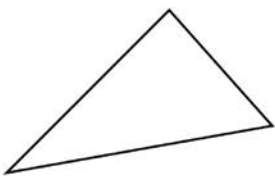
34

Bearings

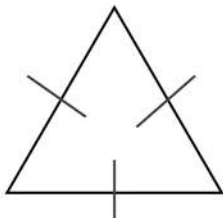


35

Triangles



Scalene: No sides the same, no angles the same



Equilateral: All sides are equal. All interior angles are equal



Isosceles: Two sides are equal. Base angles are equal

36

Quadrilaterals

 Square	Two pairs of parallel sides. All sides are equal. Four 90° angles. Diagonals are equal and bisect each other.	 Trapezium	One pair of parallel sides
 Rectangle	Two pairs of parallel sides. Opposite sides are equal. Four 90° angles. Diagonals bisect each other.	 Kite	Two pairs of equal sides. A pair of equal angles
 Rhombus	Two pairs of parallel sides. All sides are equal. No right angles. Diagonally opposite angles are equal.	 Arrowhead	Two pairs of equal sides. One reflex interior angle.
 Parallelogram	Two pairs of parallel sides. Opposite sides are equal. No right angles. Diagonally opposite angles are equal	 Irregular	No equal sides. No equal angles.

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Other Polygons

Polygon – a straight sided shape with any number of sides.

Regular – all sides equal, all angles equal.

Pentagon: 5 sides

Hexagon: 6 sides (a regular hexagon is made up of 6 equilateral triangles)

Heptagon: 7 sides

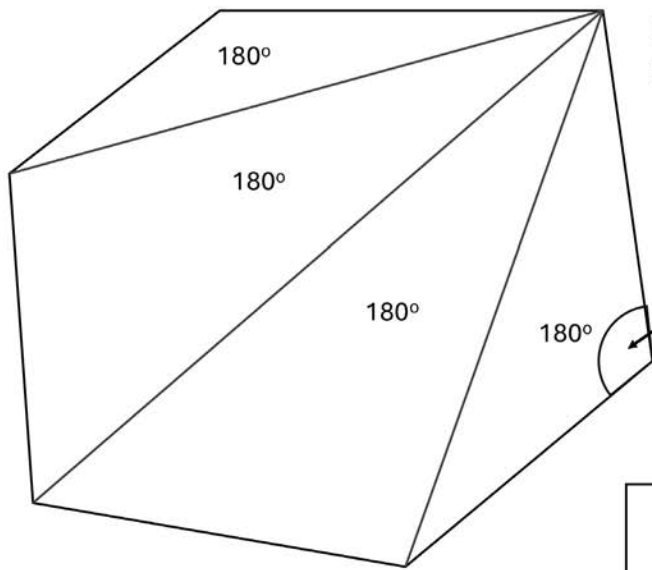
Octagon: 8 sides

Nonagon: 9 sides

Decagon: 10 sides

Dodecagon: 12 sides

Interior Angles of Polygons



Draw straight lines from one point to all other points

Number of triangles = Number of sides - 2

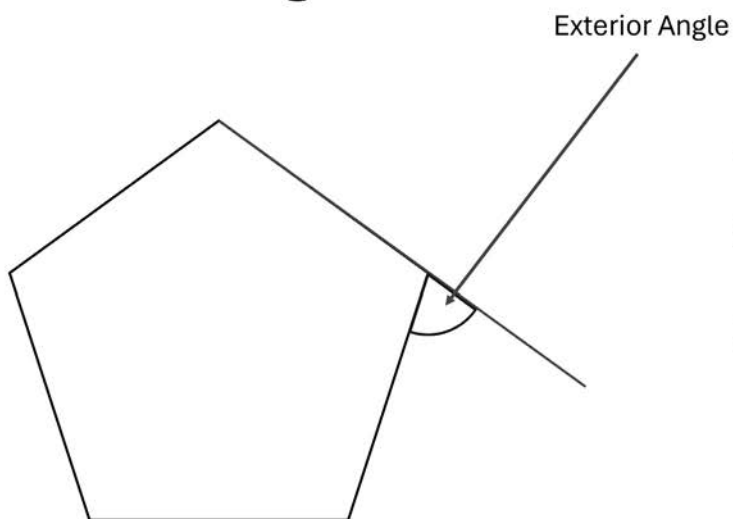
Interior Angle

180°

*Total of Interior Angles = $(n - 2) \times 180$
where n is the number of sides*

39

Exterior Angles



Exterior Angle

*For **any** polygon*

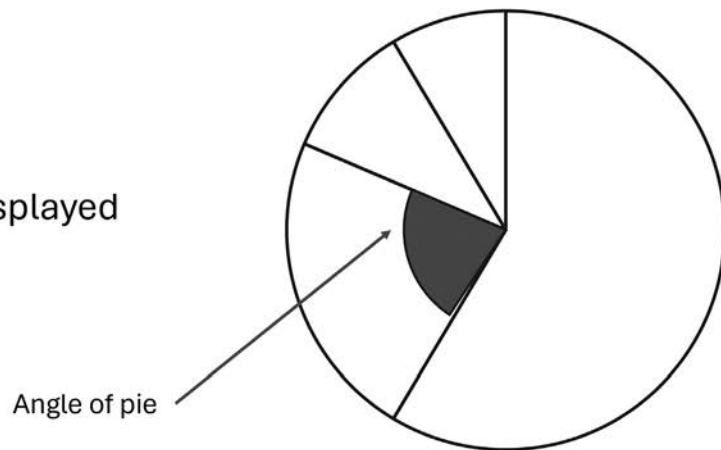
Total of Exterior Angles = 360°

Interior + Exterior = 180°

40

Pie Charts

Frequency not displayed
Proportion of Total Frequency Displayed
Displayed as a sector of circle



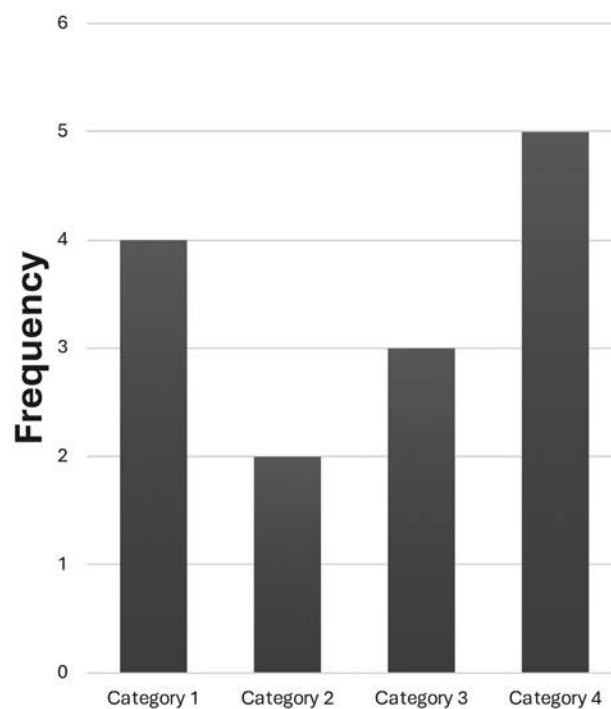
$$Proportion = \frac{Frequency}{Total\ Frequency} = \frac{angle\ of\ pie}{360}$$

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Bar Chart

Frequency displayed as
Bar Height

Bars of same width
Gap between bars



42

Pictogram

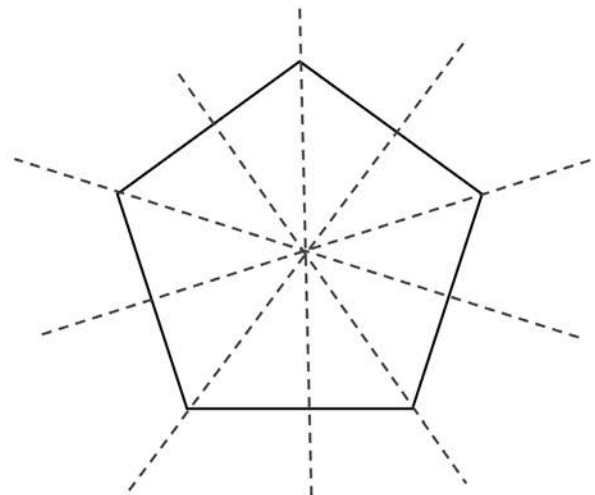
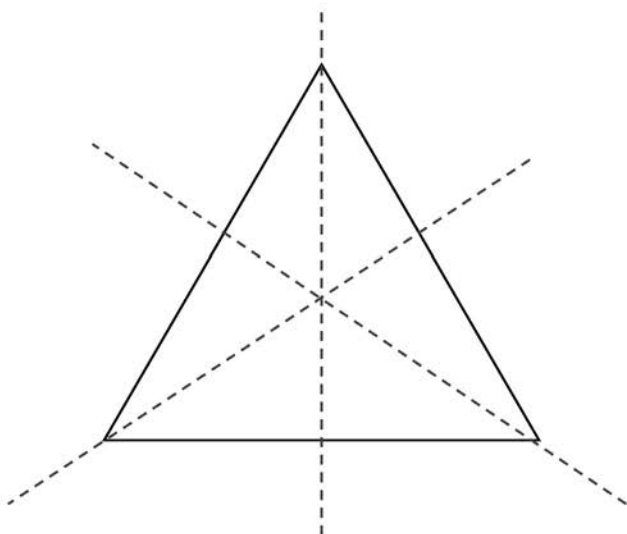
Frequency displayed by pictures or icons

Category 1	  
Category 2	 
Category 3	 

KEY
 8 items

43

Symmetry

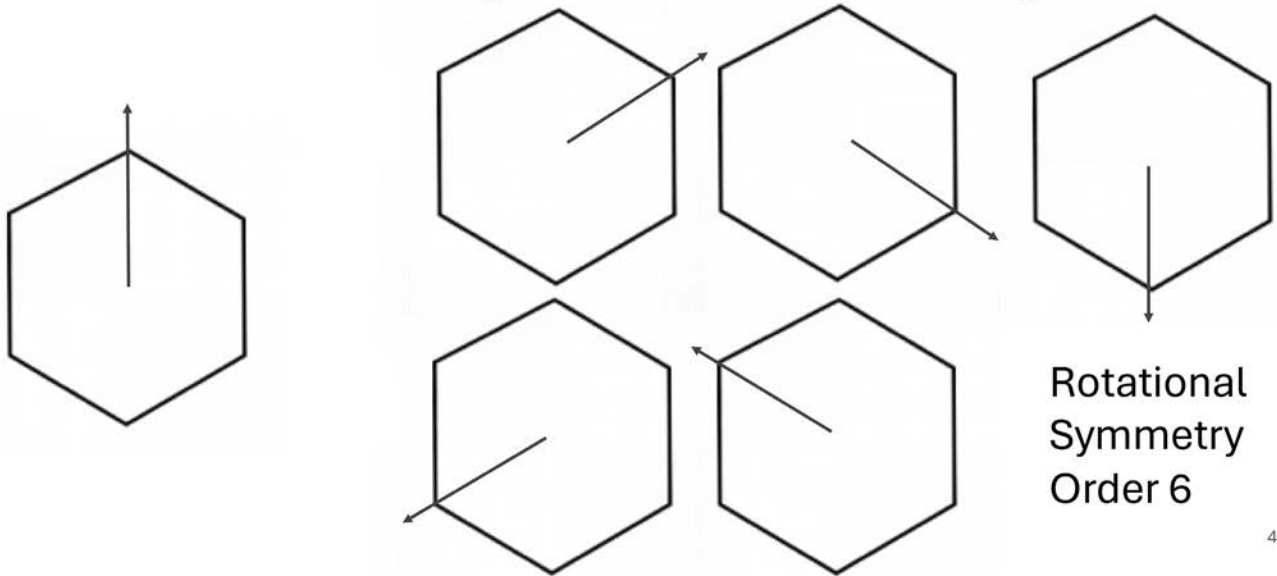


Line of Symmetry
Cuts a shape into two equal halves

44

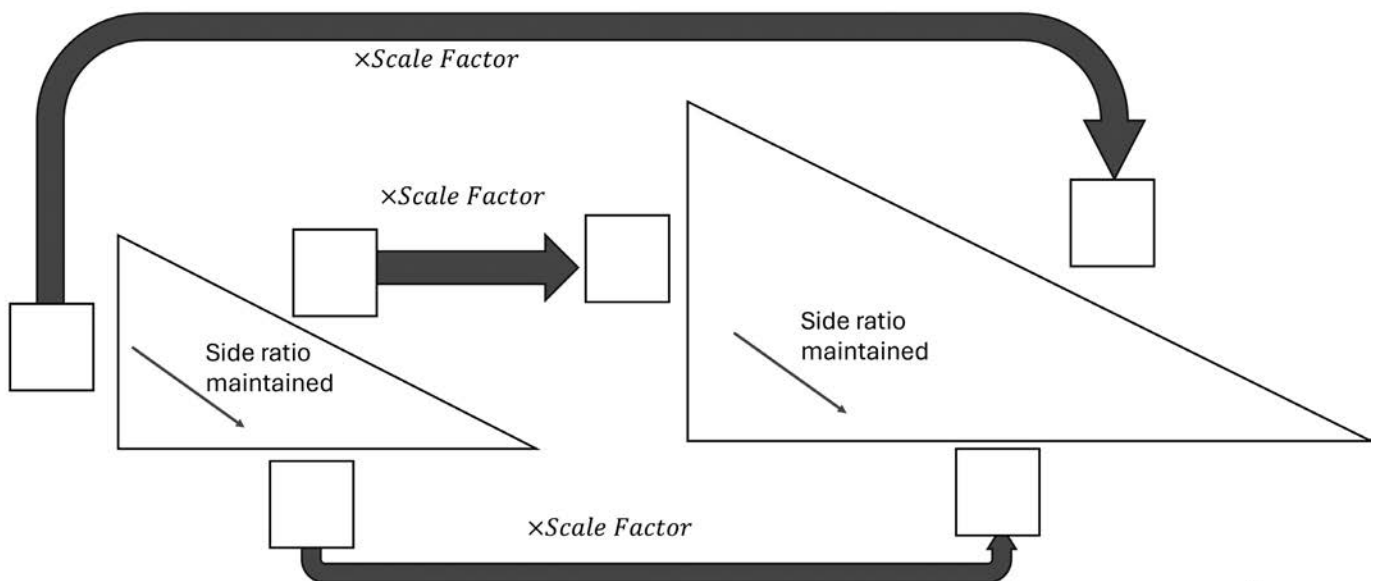
Rotational Symmetry

Order: Number of times a shape fits back onto itself during a 360° turn.



45

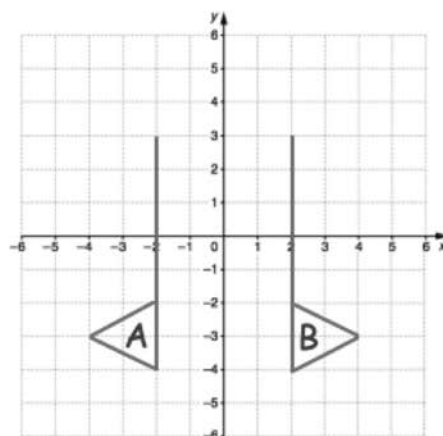
Similar Triangles



46

Transformations: Reflection

Reflection plus line of reflection.

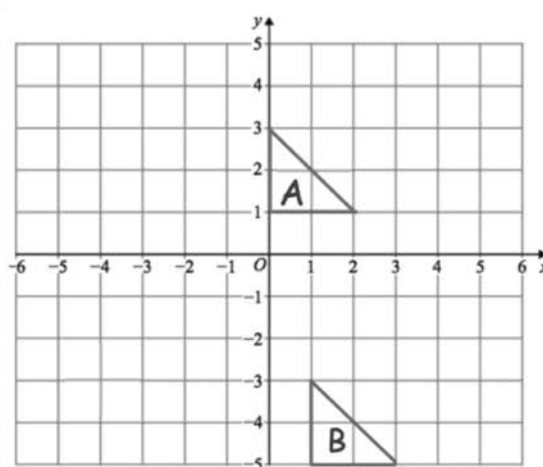


Reflection in y - axis

47

Transformations: Translation

Translation plus vector

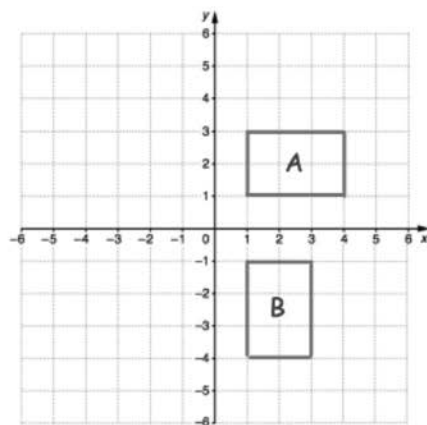


Translation $\begin{pmatrix} 1 \\ -6 \end{pmatrix}$

48

Transformations: Rotation

Rotation plus angle, direction and centre of rotation



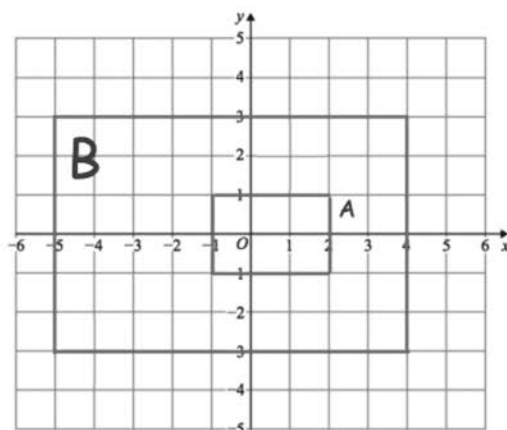
*Rotation
90° Clockwise
about (0,0)*

49

Transformations: Enlargement

Enlargement plus scale factor and centre of enlargement.

(scale factor can be positive, negative and a fraction)



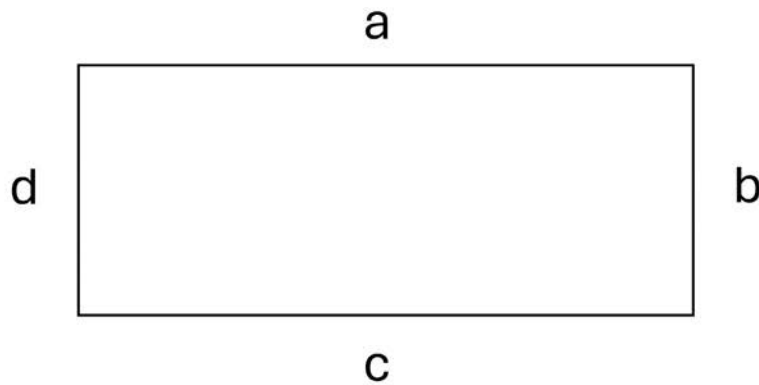
*Enlargement
Scale Factor 2
Centre (0,0)*

50

Perimeter

The distance around a shape.

Add up all the sides

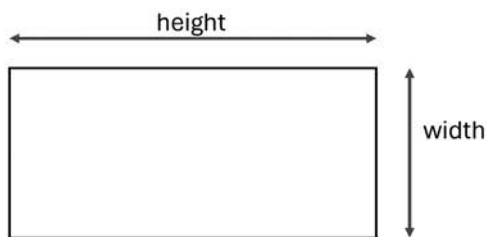


$$\text{Perimeter} = a + b + c + d$$

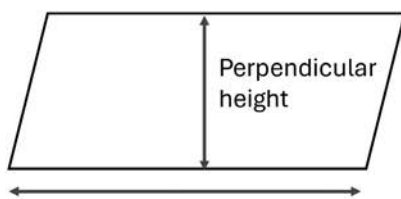
51

Area

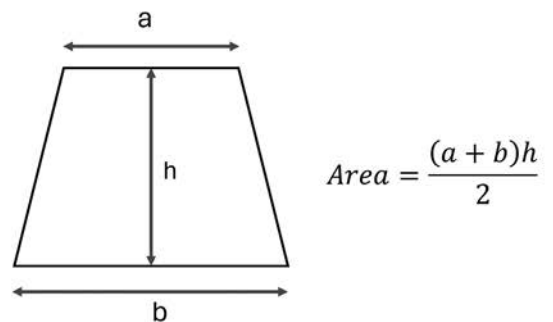
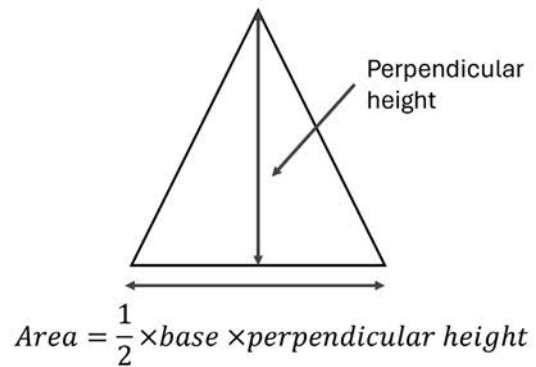
The space inside a shape



$$\text{Area} = \text{length} \times \text{width}$$

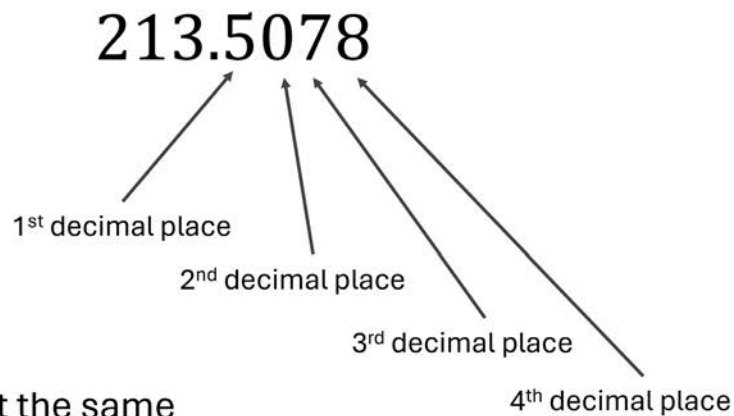


$$\text{Area} = \text{width} \times \text{perpendicular height}$$



52

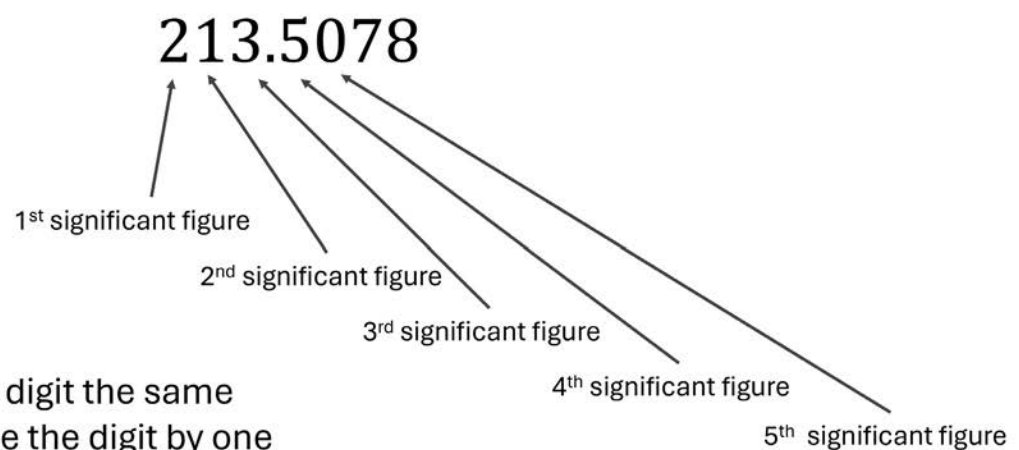
Rounding to decimal places



0,1,2,3,4 then keep digit the same
5,6,7,8,9 then increase the digit by one

53

Rounding to significant figures



0,1,2,3,4 then keep digit the same
5,6,7,8,9 then increase the digit by one

54

Rounding to significant figures

0.0035678

1st significant figure

2nd significant figure

3rd significant figure

4th significant figure

5th significant figure

0,1,2,3,4 then keep digit the same
5,6,7,8,9 then increase the digit by one

Year 7 Science

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9. Circulatory system
10. Different blood vessels
11. Breathing system
12. Gas exchange processes in our lungs
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14. Changing state
15. Predicting the state of matter
16. Solutions
17. Separating techniques
18. Diffusion, pressure and density
19. Skills: Bunsen burner
20. Reflection of light
21. Sound waves
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25. Skeleton
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38. Resistance and electrostatics
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40. The menstrual cycle and pregnancy
41. Plant reproduction
42. Plant fertilisation and pollination
43. Maths in science
44. Maths in science

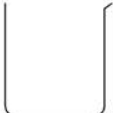
1. Practical Skills Key Terms

Keyword	Definition
Bar chart	Used for categorical (discontinuous) data.
Categoric data	Has values that are words or discrete numbers.
Continuous data	Has values that can be any number.
Line graph	Used when the data is continuous.
Line of best fit	A straight or curved line drawn to show the pattern of data points
Pie chart	Diagram to show the proportions or percentages that make up a whole.

Keyword	Definition
Anomalous result	A piece of data that does not fit the pattern.
Correlation	A relationship between data where one increases or decreases as the other increases.
Experimental error	Variations in measurements due to the scientist, equipment or readings.
Mean	An average of a set of data, calculated by adding all the values and dividing by the number of values.
Random error	Error when the same thing is measured but different numbers are taken.
Range	The maximum and minimum values of your data.
Repeatable	When repeat readings, carried out by the same person and using the same method are close together.
Systematic error	Error due to a fault with the equipment or experimental set-up used.

2. Hazard Symbols and Equipment

	FLAMMABLE
	OXIDISING
	GAS UNDER PRESSURE
	CORROSIVE
	TOXIC
	MODERATE HAZARD (eg, harmful if inhaled or in contact with skin, causes eye irritation)
	HEALTH HAZARD (eg, sensitisers, carcinogens)
	ENVIRONMENTAL HAZARD

Item	Diagram	Purpose
Beaker		Used for holding solids or liquids.
Conical flask		Used for holding liquids.
Test tube and boiling tube		Test tube – holding liquids and solids. Boiling tube – heating them.
Measuring cylinder		Used to measure volumes of liquids.
Bunsen burner, tripod and gauze		Used to heat up items.

2

3. Presenting Data

Variables

Independent variable	The variable being changed
Dependent variable	The variable that is measured
Control variable	A variable that must be kept the same.

Presenting data in a table

Mass (g)	Extension 1 (mm)	Extension 2 (mm)	Average Extension (mm)
0	0	1	0.5
100	5	6	5.5
200	9	9	9
300	15	15	15
400	20	21	20.5
500	24	25	24.5
600	30	31	30.5

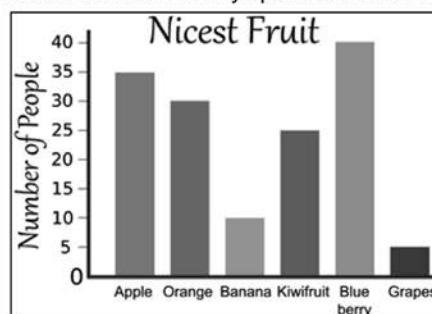
The independent variable is always in column 1.

Units should only be in the column heading.

Presenting data as a graph

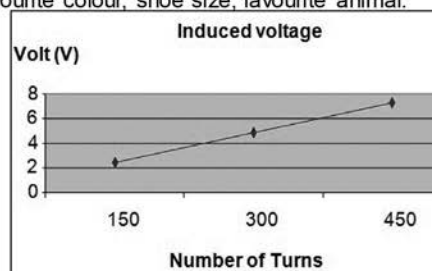
The independent variable is always plotted on the X axis.

The dependent variable is always plotted on the Y axis.



We use **bar graphs/charts** if our experiment has categories

e.g. favourite colour, shoe size, favourite animal.



We use **line graphs/charts** if the data from our experiment could be any value, height, weight etc.

3

4. Diet

Keyword	Definition
Balanced diet	A diet which contains the right amounts of carbohydrates, lipids, proteins, vitamins, minerals, dietary fibre and water.
Malnutrition	Eating too much or too little of any nutrient.
Obesity	Taking in too many calories, increasing the risk of health problems such as heart disease, stroke and diabetes.

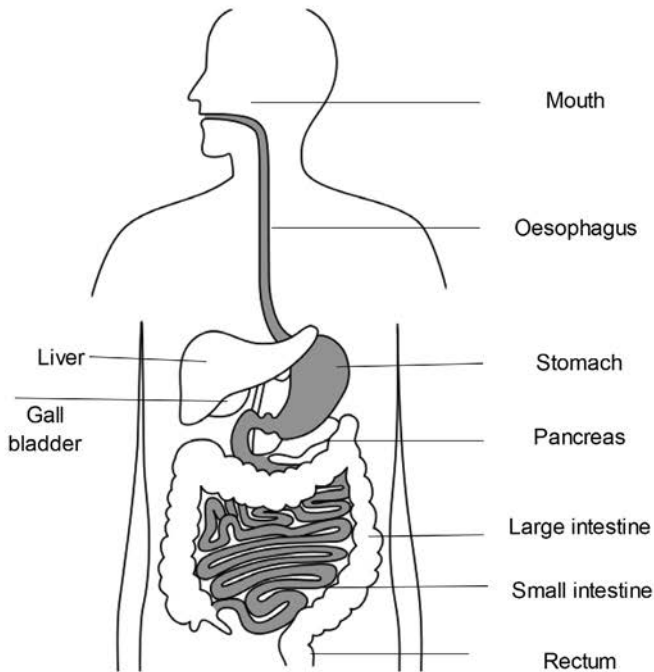
Food group	Why our body needs this food group	Source of this food group
Dietary fibre	Helps to keep food moving along the digestive system at the right speed. Helps to prevent constipation	Vegetables and bran
Carbohydrates	The body's main source of energy. Two types: simple (sugars) and complex (starch).	Bread, fruit, vegetables, pasta
Lipids (fats and oils)	A source of energy.	in butter, milk, eggs, and nuts.
Protein	Used to build new tissue for growth and repair	Found in meat, fish, eggs, dairy products, beans, nuts and seeds.
Minerals	Minerals help to keep us healthy. iron is needed to make new blood cells; calcium is needed to keep our bones and teeth strong	Salt, milk (for calcium) and liver (for iron)
Vitamins	Vitamins help to protect us against disease Example: vitamin C prevents a disease called scurvy	Fruit, vegetables, dairy foods

4

5. Food tests

Food sample	Reagent	Method	Initial colour	Colour of positive result
Glucose	Benedict's	Add Benedict's solution to the food and heat in a water bath.	Blue	Brick red precipitate
Starch	Iodine	Add iodine solution to the food.	Yellow-brown	Blue-black
Protein	Biuret (a mixture of sodium hydroxide and copper sulfate).	Add Biuret solution to the food.	Blue	Lilac/purple
Fat	Ethanol	Add ethanol to the food to dissolve the fat then add water.	Colourless	White emulsion

6. Digestive System



Digestion The breakdown of large insoluble food molecules (e.g. carbohydrates) into small soluble food molecules (e.g. sugars). These small molecules can move into the blood and be taken to cells around the body.

Stomach A sac containing acid which kills microorganisms and where digestion takes place.

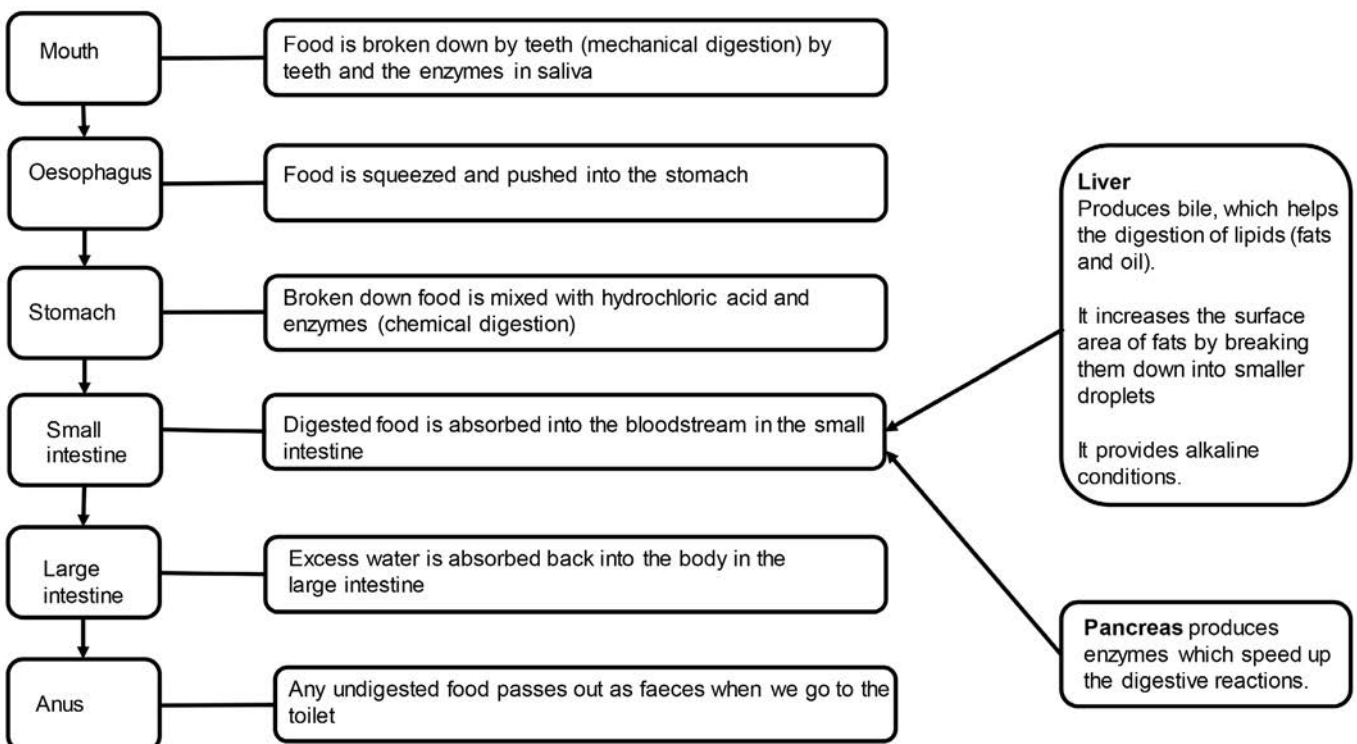
Small intestine Upper part of the intestine where nutrients are absorbed by the blood.

Large intestine Lower part of the intestine from which water is absorbed and where faeces are formed.

Gut bacteria Microorganisms that naturally live in the intestine and help food break down.

6

7. How food is digested



7

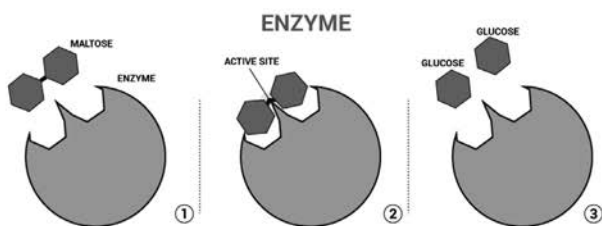
8. Digestive Enzymes

Enzymes are substances that speed up the rate of chemical reactions in the body.

Enzymes are specific.
They only work on one type of molecule.

Different enzymes work in different parts of the body.

Enzyme	Produced by	Converts...	Into...
Amylase	Mouth, small intestine, pancreas	Starch	Sugars: glucose.
Lipase	Small intestine, pancreas	Lipid (fat)	Glycerol and fatty acids.
Protease	Stomach, small intestine, pancreas	Protein	Amino acids.



8

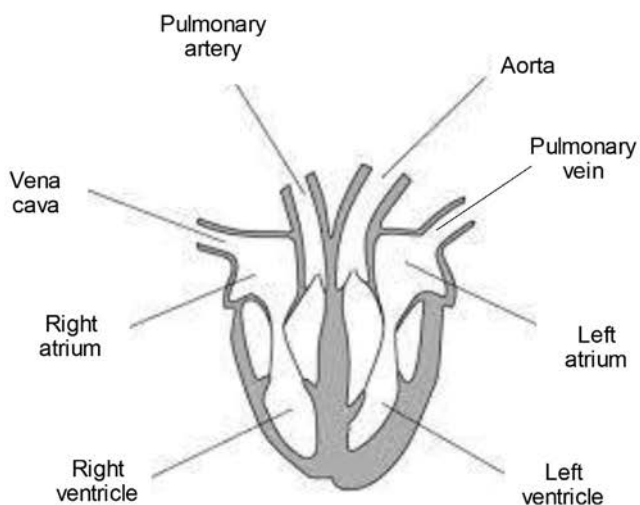
9. The Circulatory System

The heart is an organ

The heart is made of muscle.

It pumps the blood around the body.

It is connected to arteries and veins.



Part	Role
Artery	Carry blood away from the heart
Atrium	Smaller chambers at the top of the heart. Entrance to the heart
Capillary	Connects arteries to veins Allows materials to move in and out of their thin walls
Valve	Prevents the backflow of blood
Vein	Carry blood towards the heart
Ventricle	Larger chambers at the bottom of the heart. Push blood out of the heart.

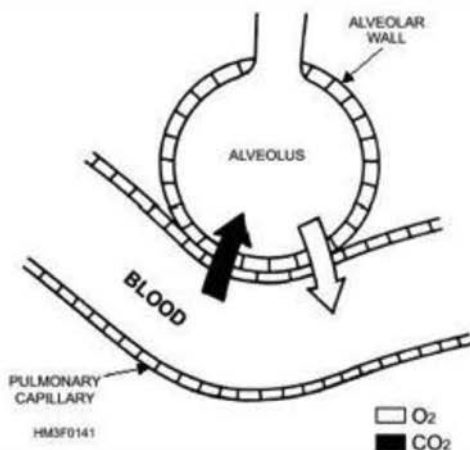
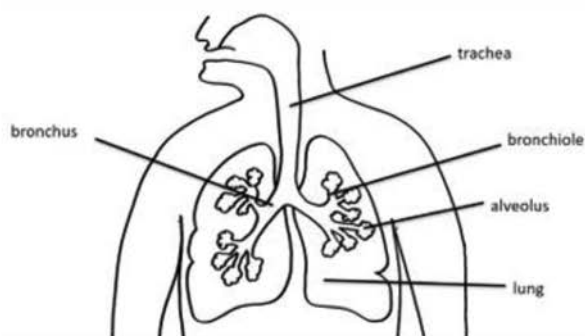
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10. Different Blood Vessels

Type	Arteries	Veins	Capillaries
Function	Carry blood away from the heart (always oxygenated apart from the pulmonary artery which goes from the heart to the lungs).	Carry blood to the heart (always deoxygenated apart from the pulmonary vein which goes from the lungs to the heart).	Found in the muscles and lungs. Where gas exchange takes place - oxygen passes through the capillary wall and into the tissues, while carbon dioxide passes from the tissues into the blood.
Structure	Have thick muscular walls. Have small passageways for blood	Have thin walls. Have larger passageways for blood. Have valves to prevent blood flowing backwards.	Microscopic – one cell thick
Blood pressure	Contain blood under high pressure	Contain blood under low pressure.	Very low blood pressure.

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11. Breathing System



Keyword	Definition
Alveoli (singular: alveolus)	Small air sacs found at the end of each bronchiole that are the site of gas exchange.
Breathing	The movement of air in and out of the lungs.
Bronchi (singular: bronchus)	Tubes which carry air from the trachea to the lungs.
Bronchiole	Small tubes in the lung connecting the bronchi to the alveoli.
Diaphragm	A sheet of muscle found underneath the lungs
Lung volume	Measure of the volume of air breathed in or out.
Trachea (windpipe)	Tube which carries air from the mouth and nose to the lungs.

Features of alveoli

- thin walls
- a large surface area to increase diffusion speed
- a good blood supply

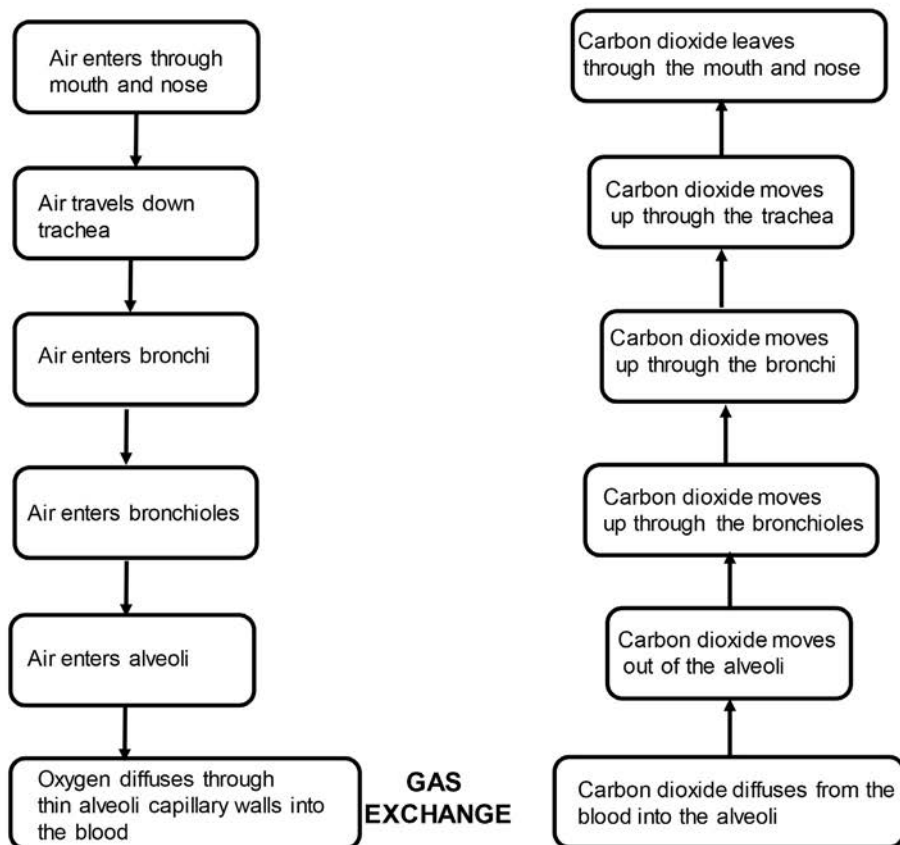
Oxygen is used in cells for aerobic respiration

glucose + oxygen → carbon dioxide + water.

GO → COW

11

12. Gas exchange processes in our lungs



To breathe in:

- 1) Intercostal muscles contract to pull rib cage upwards and outwards
- 2) Diaphragm contracts and flattens to increase the space inside the chest
- 3) Pressure in the chest decreases and air rushes in from outside.

The reverse is true for breathing out.

The effect of exercise on breathing

Respiration provides energy to move the muscles.

During exercise our breathing increases because our cells need more oxygen and glucose to respire faster.

More carbon dioxide is produced in respiration and we need to get rid of this by breathing it out.

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13. Particles and State

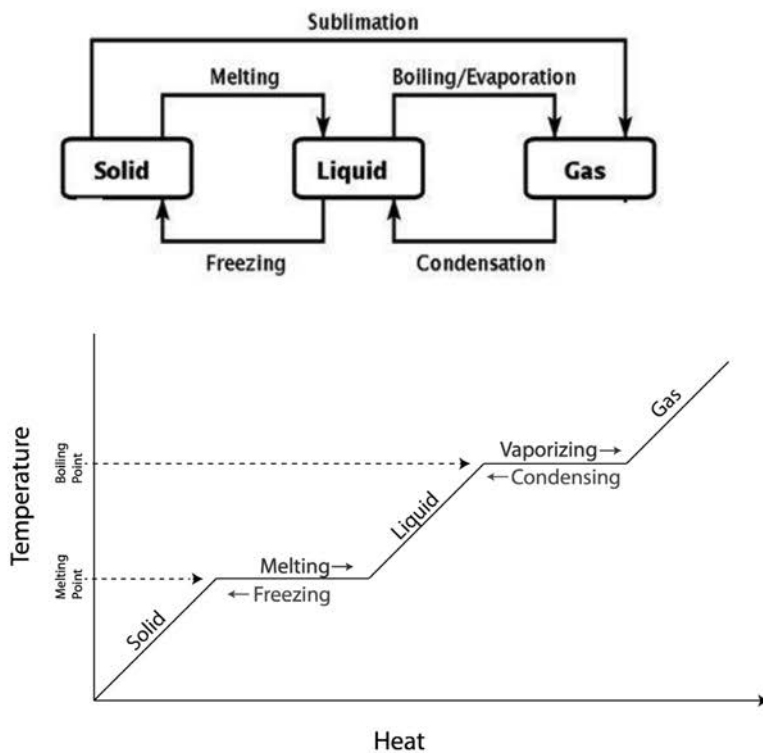
Keyword	Definition
Particle	A tiny object such as an atom or molecule, too small to be seen with a microscope.
Particle model	A way to think about how substances behave in terms of small, moving particles.
Pure substance	Single type of material with nothing mixed in.

States of matter	Solid, liquid and gases
Changes of state	Melting, evaporation, condensing, freezing and sublimation

	Solid	Liquid	Gas
Arrangement of particles	Close together Regular pattern	Close together Random arrangement	Very far apart Random arrangement
Movement of particles	Vibrate on the spot	Move around each other	Move quickly in all directions
Diagram			

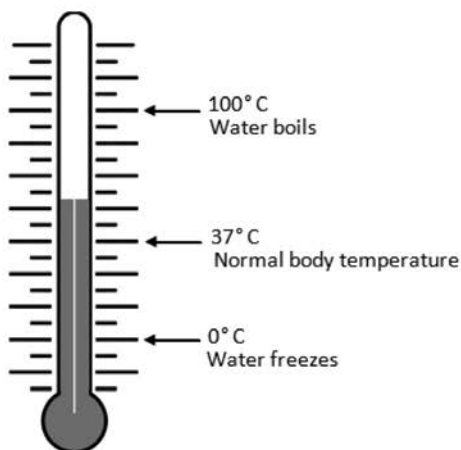
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14. Changing State



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15. Predicting the state



Melting point	The temperature at which a solid turns into a liquid
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Boiling point	The temperature at which a liquid turns into a gas
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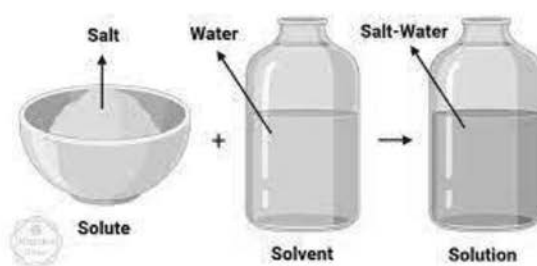
Temperature	Predicted state
Given temperature < melting point	Solid
Given temperature is between melting and boiling points	Liquid
Given temperature > boiling point	Gas

15

16. Solutions

Keyword	Definition
Mixture	The parts can be separated due to differences in the physical properties of each element.
Dissolve	When a solute mixes completely with a solvent e.g. salt dissolves in water
Solvent	A substance, normally a liquid, which dissolves another substance e.g. water
Solute	A substance that can dissolve in a liquid e.g. salt

Keyword	Definition
Solution	Mixture formed when a solvent dissolves a solute e.g. salty water
Soluble	A substance that will dissolve in a liquid e.g. salt is soluble in water
Insoluble	A substance that will not dissolve in a liquid e.g. sand is insoluble in water
Solubility	Maximum amount of solute that dissolves in a certain volume of solvent.



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17. Separating Techniques

Process	Filtration	Distillation	Fractional distillation	Chromatography	Crystallisation
Diagram					
Physical property	Difference in solubility. An insoluble solid from a liquid.	Difference in boiling points	Difference in boiling points	Difference in solubility	Solubility
Example	Sand and salt	Ink and water	Ink, water and oil	Different colours in inks	A solid from a saturated solution: salt from water

17

18. Diffusion, Pressure and Density

Keyword	Definition
Compound	Made up of two or more elements chemically combined e.g. H ₂ O
Density	Density is the mass per unit volume of any object Density = mass ÷ volume
Diffusion	The movement of a substance from an area of high concentration to an area of low concentration
Element	Made up of only one type of atom e.g. C
Mass	Amount of matter in an object. Measured in g or kg
Mixture	More than one element, atom, compound or molecule that is not chemically joined together e.g. air, sea water, milk
Pressure	The force acting on the container due to the collisions between gas particles
Volume	The amount of space that an object/substance occupies. Measured in cm ³ or m ³ .

Density calculations. Use the EVERY model to layout the calculation:

Example: What is the density of a metal if 4 cubic metres (m³) of it has a mass of 2,200 kg?

E=equation	density = mass ÷ volume
V = values	mass = 2 200 kg and v= 4 m ³
E = enter results	2 200 ÷ 4
R = result	550
Y = units	kg/m ³

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19. Skills: Using a Bunsen burner

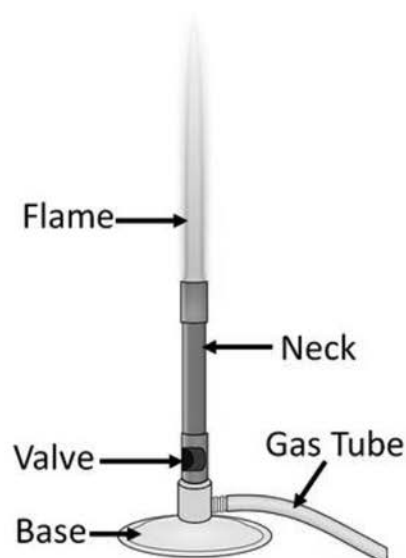
Safety Rules

1. Long hair should be tied back
2. Wear eye protection.
3. Do not leave the gas on for prolonged periods of time.
4. Use a heatproof mat
5. The Bunsen flame should be on the safety flame when not in use.

Turning the collar around the air hole changes the flame from roaring to safety flame.

Safety flame – orange

Roaring flame - blue



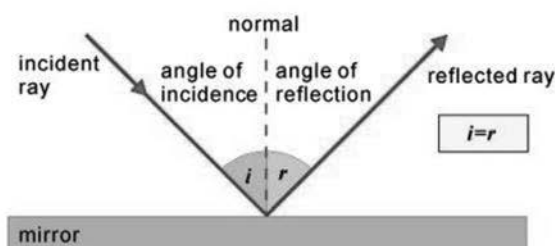
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20. Reflection of Light

Keyword	Definition
Absorption	When energy is transferred from being light into a material.
Angle of incidence	Between the normal and incident ray.
Angle of reflection	The angle between the normal and reflected ray.
Incident ray	The ray of light coming from the source (e.g. ray box).
Normal line	Always at right angles to the surface of the object the light ray is hitting.
Opaque	A material that allows no light to pass through it.
Translucent	A material that allows some light to pass through it
Transparent	A material that allows all light to pass through it.
Scattering	When light bounces off an object in all directions.

Law of Reflection

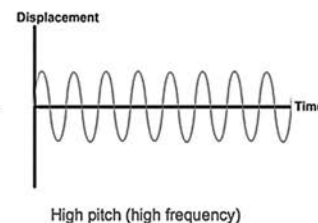
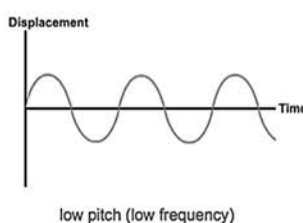
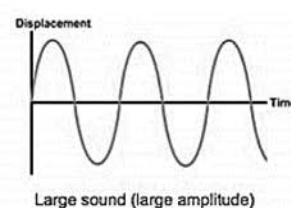
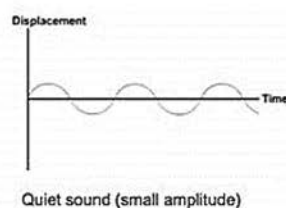
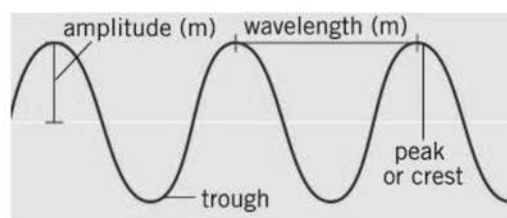
Angle of incidence = Angle of reflection



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21. Sound Waves

Keyword	Definition
Amplitude	The maximum amount of vibration, measured from the middle position of the wave, in metres.
Frequency	The number of waves produced in one second, in hertz (Hz)
Medium	A material for waves to travel through e.g. water, light
Pitch	How low or high a sound is. A high pitch sound has a high frequency.
Retina	The back of the eye where an image is formed. It contains light detecting cells.
Speed of light	300 million m/s
Speed of sound	330 m/s
Vacuum	A space with no particles of matter in it
Vibration	A back and forth motion that repeats.
Volume	How loud or quiet a sound is, in decibels (dB).
Waves	Vibrations that transport energy from place to place through particles.
Wavelength	Distance between two corresponding points on a wave, in metres.



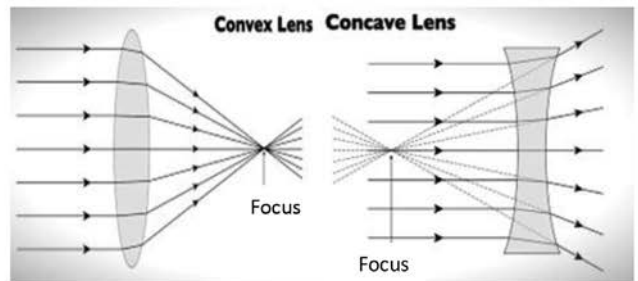
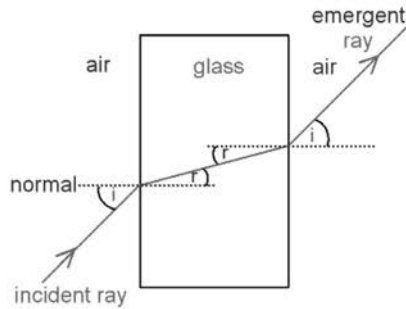
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22. Refraction and Lenses

Refraction: Light waves change speed when they pass across the boundary between two substances with a different density, such as air and glass.

Light **slows** down going into a denser substance, and the ray bends **towards** the normal.

Light **speeds up** going into a less dense substance, and the ray bends **away** from the normal.

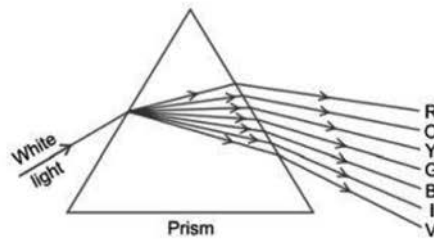


Convex lens

A lens that is thicker in the middle which bends light rays towards each other.

Concave lens

A lens that is thinner in the middle which spreads out light rays.

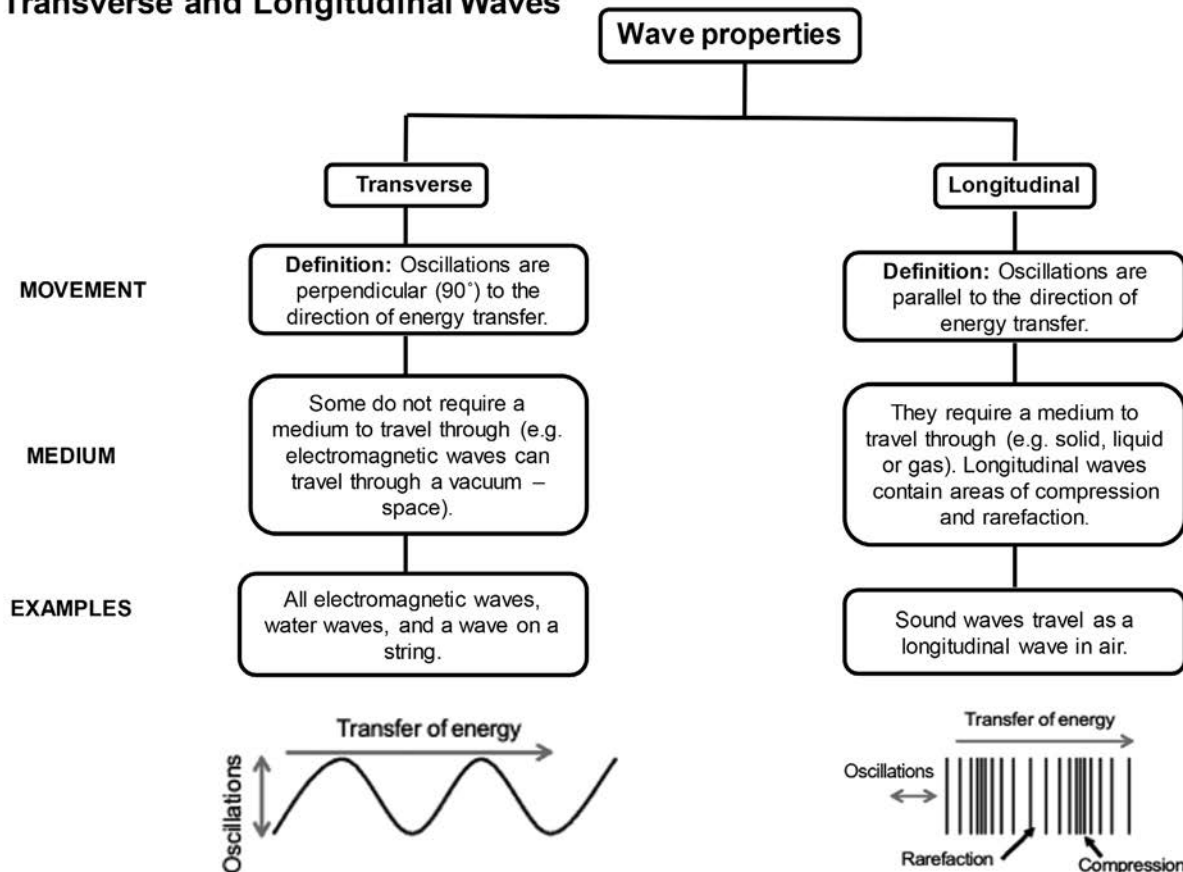


Different colours of light have different frequencies,

A prism can be used to separate light into the 7 colours of the rainbow: red, orange, yellow, green, blue, indigo, violet

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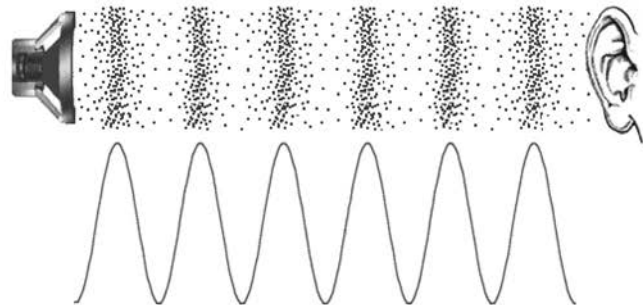
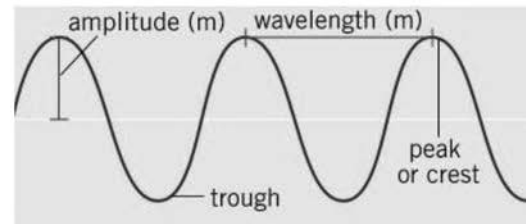
23. Transverse and Longitudinal Waves



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24. Wave Effects

Keyword	Definition
Absorption	When energy is transferred from sound to a material.
Auditory range	The lowest and highest frequencies that a type of animal can hear
Echo	Reflection of sound waves from a surface back to the listener.
Loudspeaker	Turns an electrical signal into a pressure wave of sound.
Microphone	Turns the pressure wave of sound hitting it into an electrical signal.
Oscilloscope	Device able to view patterns of sound waves that have been turned into electrical signals.
Pressure wave	An example is sound, which has repeating patterns of high-pressure and low-pressure regions.
Ultrasound	Sound waves with frequencies higher than the human auditory range.
Ultraviolet (UV)	Waves with frequencies higher than light, which human eyes cannot detect.



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25. Skeleton

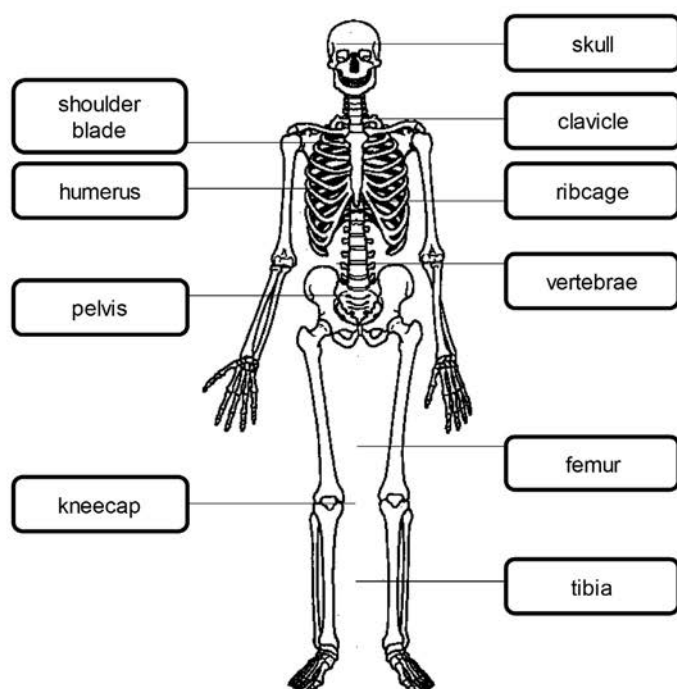
Bones are hollow which makes them light and strong.

Bones need calcium to grow and stay strong.

The human skeleton has 4 roles:

1. Support
2. Protection
3. Movement
4. Making new blood cells.

Keyword	Definition
Bone marrow	Tissue found inside some bones where new blood cells are made.
Cartilage	Tissue at the end of bones, which reduces wear.
Joints	Places where bones meet.
Ligaments	Connect bones to bones in joints and provides structural support.



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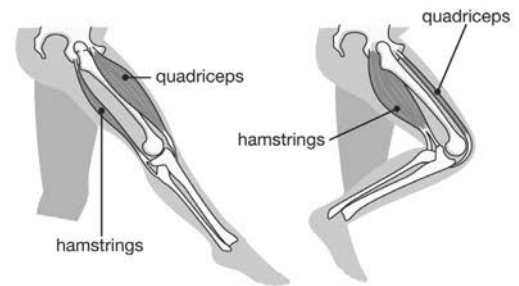
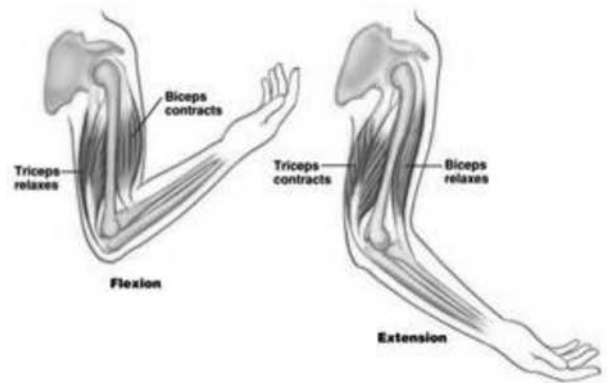
26. Movement

Antagonistic pairs of muscles cause movement.

When one contracts and the other relaxes.

The biceps and triceps work antagonistically to move the arm.

The quadriceps and hamstrings work antagonistically to move the leg.

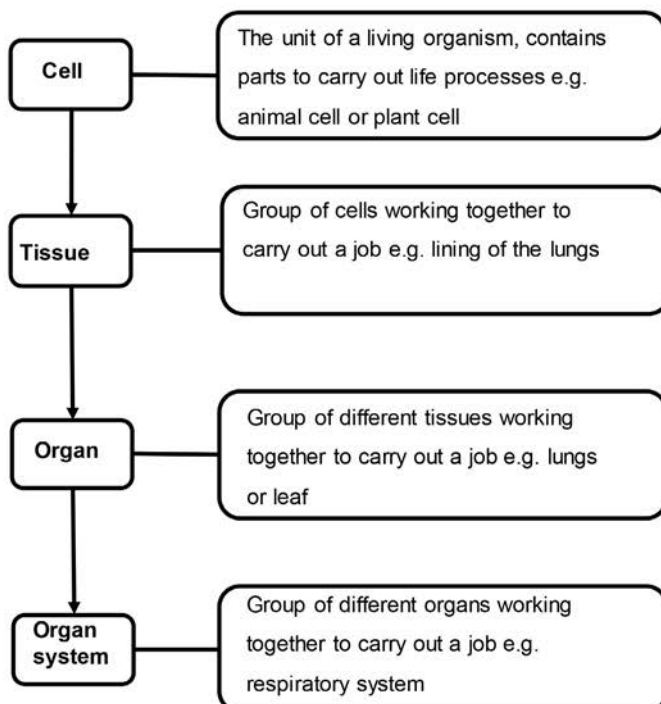


Tendons are fibres that connect muscles to bones to allow the movement to happen.

Ligaments are tough, fibrous and slightly elastic connective tissue that connect bone to bone and help keep the joint together.

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27. How is our body organised?



Organ system	Role
Digestive	Breaks down and then absorbs food molecules.
Muscular skeletal	Muscles and bones working together to cause movement and support the body
Circulatory	Transports substances around the body.
Reproductive	Produces sperm and eggs and is where the foetus develops.
Immune	Protects the body against infections.
Respiratory	Replaces oxygen and removes carbon dioxide from blood.

Unicellular	Living things made up of one cell e.g. a euglena.
Multicellular	Living things made up of many types of cell e.g. human, rabbit, tree
Diffusion	One way for substances to move into and out of cells. Substances move from high concentration to low concentration.

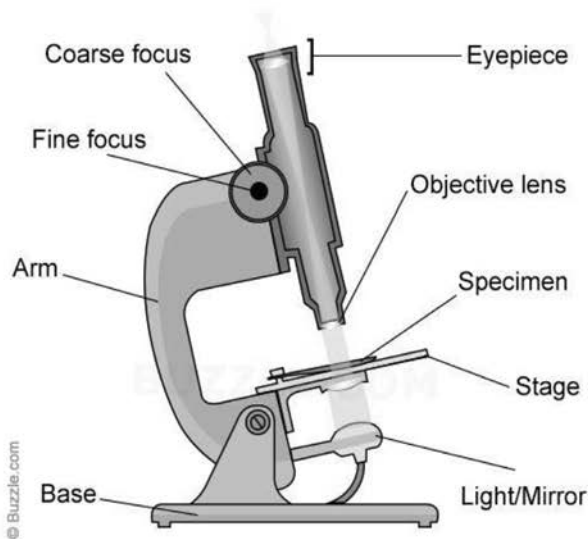
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28. Using a Microscope

Microscopes are used to see objects in detail or to see objects we can't see with our eyes alone.

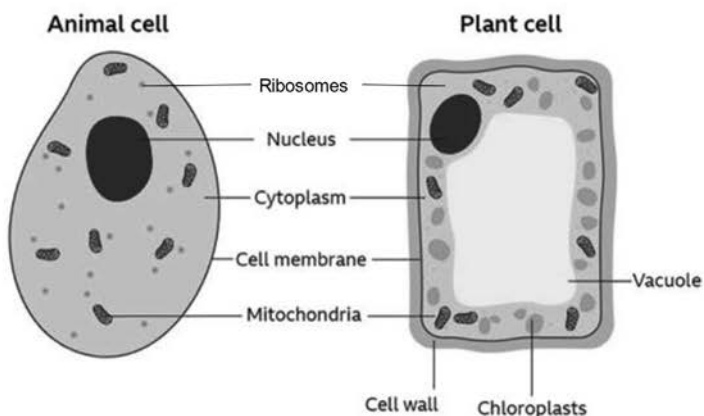
How to observe the best image:

1. Use the lowest magnification first (select the smallest objective lens)
2. Place the slide in the centre of the stage
3. Use the larger focusing wheel to move the stage upwards, as far as it will go (but don't force it beyond the brake mechanism)
4. Look down the eyepiece lens
5. Use the larger focusing wheel to focus on the slide
6. Use the smaller focusing wheel to finely focus the slide.
7. Increase the magnification by turning the objective lenses, then repeat stages 2 and 3.



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29. Plant and animal cells



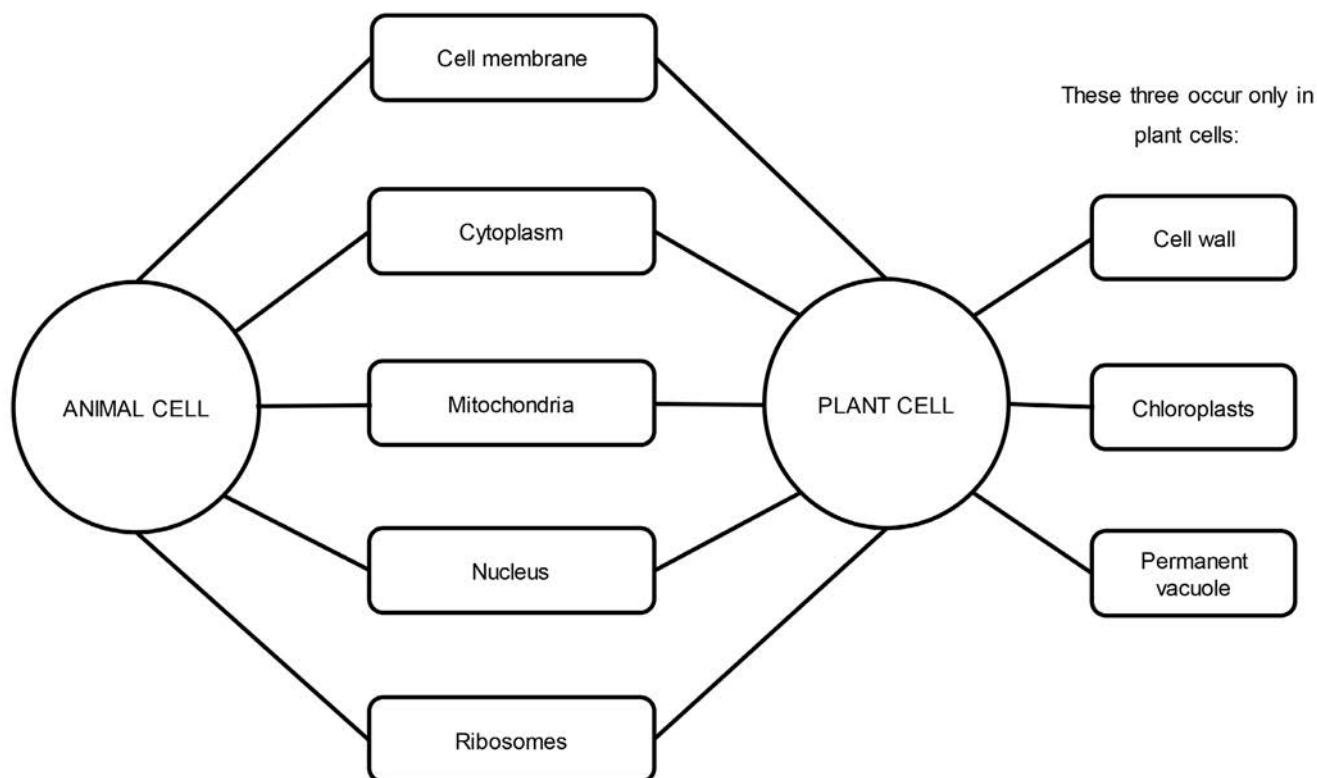
There are many types of cell e.g. egg cell, sperm cell, red blood cell, muscle cell.

Each has a different structure or feature so it can do a specific job.

Cell organelle	Description
Cell membrane	Controls the movement of substances in and out of the cell.
Cell wall	Made of cellulose, to strengthen the cell.
Chloroplast	The site of photosynthesis. Contains chlorophyll to absorb light
Cytoplasm	The site of chemical reactions.
Mitochondria	To release energy during respiration.
Nucleus	Contains genetic material (DNA) which controls the cell's activities.
Permanent vacuole	Contains cell sap to make the cell rigid and store substances
Ribosomes	The site of protein synthesis (where proteins are made).

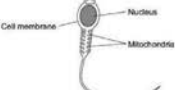
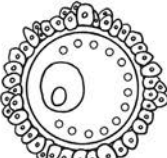
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30. Comparing plant and animal cells



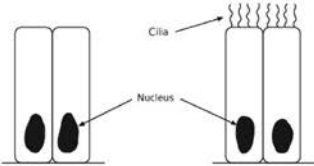
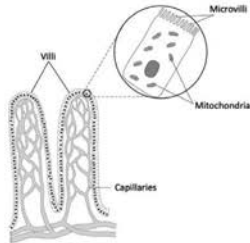
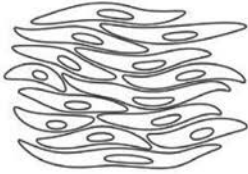
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31. Specialised cells 1

Specialised cell	Function	Adaptation
	Red blood cells carry oxygen around the body, which is needed for respiration.	- They don't have a nucleus, allowing more space to carry oxygen. - They are a flat disc shape with dips on both sides (biconcave). This gives them a large surface area, and the best chance of absorbing as much oxygen as they can in the lungs.
	Sperm are the male sex cell.	- A tail moves them towards an egg cell. - Many mitochondria release energy for movement.
	Eggs are the female sex cell	- The egg cell's cytoplasm contains nutrients for the growth of the early embryo. - The cell membrane changes after fertilisation by a single sperm so that no more sperm can enter.
	Nerve cells transmit electrical signals in the nervous system.	- They are thin, and can be more than one metre long in your spinal cord. This means they can carry messages up and down the body over large distances very quickly. - Nerve cells have branched connections at each end. These join to other nerve cells, allowing them to pass messages around the body.

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32. Specialised cells 2

Specialised cell	Function	Adaptation
	Ciliated cells are found in the airways and in the oviduct	- They have tiny hairs on their tops called cilia which beat in a rhythm. - These hairs move mucus containing dust and other particles upwards and out of the airways.
	Villi are structures about one millimetre long in the small and large intestines. Millions of them poke out to absorb digested food and water into the blood.	- They have a large surface area. - They have thin walls which are only one cell thick. - The cells of the lining have tiny hairs to absorb more food and water.
	Muscle cells are found in bundles which make up our muscles. These cells are able to contract (get shorter) and relax (return to original length).	- Cardiac (heart) muscle cells contract and relax to pump blood around our bodies for our entire lives. They never get tired. - Smooth muscle cells make up thin sheets of muscle, such as the stomach lining. They can also be arranged in bundles, or rings, like that in the anus. - Skeletal muscle is joined to bones. Its cells contract to make bones move and joints bend.

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33. Metals and Non-metals

Keyword	Definition
Displacement reaction	Reaction where a more reactive metal takes the place of a less reactive metal in a compound.
Metals	shiny good conductors of electricity and heat malleable and ductile usually solid at room temperature
Non-metals	dull poor conductors of electricity and heat brittle usually solid or gases at room temperature.
Oxidation	Reaction in which a substance combines with oxygen
Reactivity	The tendency of a substance to undergo a chemical reaction.
Thermal decomposition	The breakdown of a compound using heat

Oxidation

Metals and non-metals react with oxygen to form oxides.

Metal oxides (e.g. magnesium oxide) are alkali.

Non-metal oxides (e.g. carbon dioxide) are acids.

Reactivity

Metals can be arranged in order of how readily they react with other substances. Those metals at the top will **displace** those at the bottom.

potassium	most reactive	K
sodium		Na
calcium		Ca
magnesium		Mg
aluminium		Al
carbon		C
zinc		Zn
iron		Fe
tin		Sn
lead		Pb
hydrogen		H
copper		Cu
silver		Ag
gold		Au
platinum	least reactive	Pt

Iron, nickel and cobalt are magnetic.

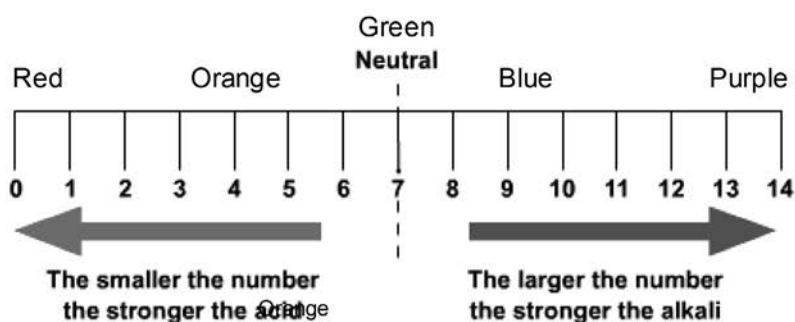
Mercury is a metal that is liquid at room temperature.

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34. Acids and Alkalis

Keyword	Definition
Alkali	A base that has dissolved in water
Base	A substance that neutralises an acid
Concentration	A measure of the number of particles in a given volume.
Indicators	Substances used to identify whether unknown solutions are acidic or alkaline e.g.6 universal indicator, litmus paper
pH scale	Scale of acidity and alkalinity from 0 to 14.

Acid	Alkali
Hydrochloric acid	Sodium hydroxide
Nitric acid	Potassium hydroxide
Sulfuric acid	
Citric acid	
Ethanoic acid	



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35. Reactions with Acids

Metal oxides	Compounds of metal that contain oxygen atoms. They are usually alkali e.g. magnesium oxide
Neutralisation	The reaction between an acid and a base. It forms a salt and water. Acid + alkali → salt + water
Salt	A substance produced from a neutralisation reaction between an acid and a base. The salt is named after the acid.

Reactions with acids

Metal + Acid → Salt + Hydrogen

Test for hydrogen: Lit splint

Observation: squeaky pop

Test for carbon dioxide: Bubble through limewater

Observation: Limewater turns milky/cloudy

Acid used to make the salt	Ending of salt name	Example
Hydrochloric acid	- Chloride	Zinc + hydrochloric acid → zinc chloride + hydrogen
Sulfuric acid	- Sulfate	Zinc + sulfuric acid → zinc sulfate + hydrogen
Nitric acid	- Nitrate	Zinc + nitric acid → zinc nitrate + hydrogen

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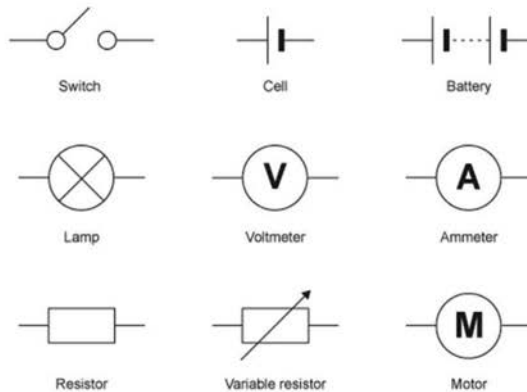
36. Electrical Circuits

Keyword	Definition
Ammeter	Device used to measure current in Amps. It is connected in series.
Electrical conductor	A material that allows current to flow through it easily.
Electrical insulator	A material that does not allow current to flow easily.
Electrons	Tiny particles which are part of atoms and have a negative charge.
Series circuit	Components in a circuit are on the same loop.
Parallel circuit	Some components are on separate loops.
Voltmeter	Device used to measure potential difference (voltage) in Volts. It is connected in parallel.

Drawing electrical circuits

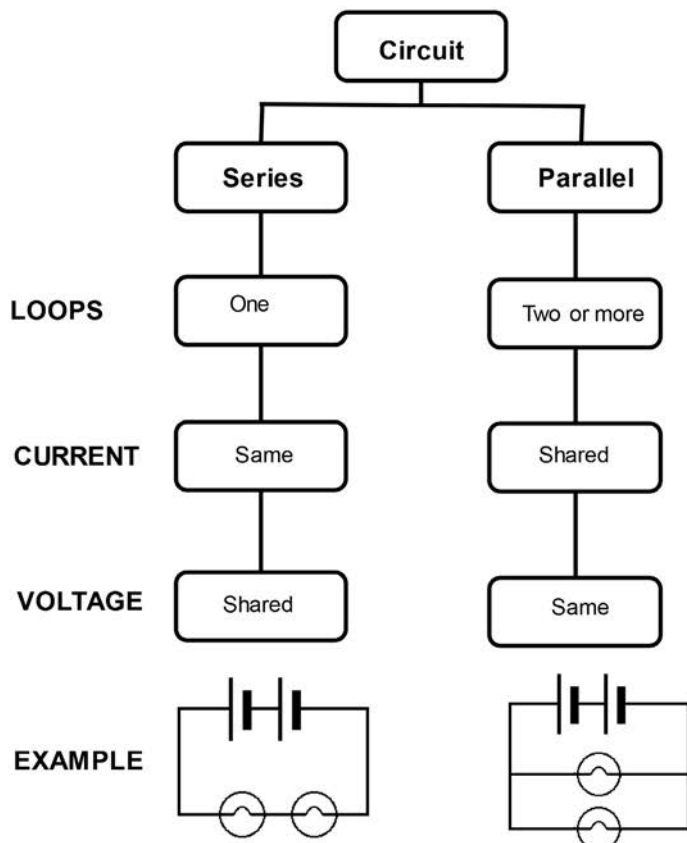
We use special symbols to represent different components, so that all circuit diagram symbols will look the same.

Always use a ruler and pencil to draw the wire in an electrical circuit.



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37. Series and Parallel circuits



	Potential difference	Current
What is it?	The amount of energy passed from the energy source to the moving electrical charge; or transferred from the charge to other parts of the circuit. Like an electrical push from the cell. It provides energy to the electrons.	Flow of electric charge.
Component	Voltmeter	Ammeter
Measured in	Volts (V)	Amps (A)
Component within a circuit	In parallel (in an extra loop)	In series (within the loop)

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38. Resistance and Electrostatics

Resistance operates against the flow of electrical charge and makes it hard for charge to pass through.

Measured in ohms (Ω).

Components with resistance reduce the current flowing and shift energy to the surroundings.

resistance (Ω) = potential difference (V) $\div$ current (A).

Electrostatics

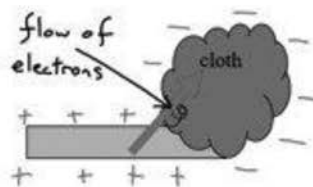
Keyword	Definition
Electrostatic force	A non-contact force between two charged objects.
Negatively charged (-)	An object that has gained electrons.
Positively charged (+)	An object that has lost electrons.

Around a charged object, the electric field affects other charged objects, causing them to be attracted or repelled.

Like charges repel.

Opposite charges attract.

The field strength decreases with distance.



Static electricity is caused when electrons are rubbed from a material (an insulator) and moved onto another material.

One surface gains electrons and becomes negatively charged.

One loses electrons and becomes positively charged.

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39. Human Reproduction

Keyword	Definition
Fertilisation	Joining of a nucleus from a male and female sex cell..
Gamete	A sex cell. In human males it is a sperm. In females it is an egg.
Menstruation	Loss of the lining of the uterus during the menstrual cycle.
Ovary	Female organ which contains eggs.
Oviduct, or fallopian tube	Carries an egg from the ovary to the uterus Where fertilisation occurs.
Ovulation	Release of an egg cell during the menstrual cycle
Penis	Male organ which transports sperm out of the male's body.
Sperm duct	Transport sperm from testes to penis
Testis (plural testes)	Male organ where sperm are produced.
Uterus or womb	Where an embryo develops in a pregnant woman.
Vagina	Where the penis enters the female's body and sperm is received.

A **sperm** cell is specialised for its job.

It has a pointed head and a tail for swimming.

An **egg** cell is specialised.

It is large and has a protective layer that only allows 1 sperm to get through.

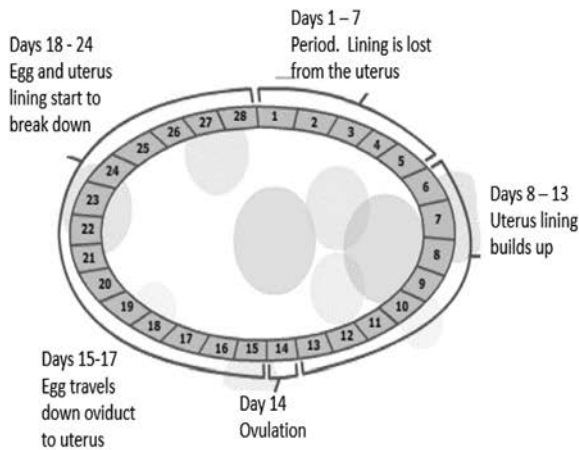
Puberty is the process when by the body undergoes changes to start the process of becoming an adult.

Changes include:

- Growth of underarm and pubic hair
- Growth of facial hair in males
- Development of sperm in testes of males
- Voice gets deeper in males
- Periods (the menstrual cycle) start in females
- Breast development in females

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40. The Menstrual Cycle and Pregnancy



Pregnancy

A normal human pregnancy lasts for 9 months/40 weeks and the baby develops inside the uterus.

The developing foetus relies on the mother to provide it with oxygen and nutrients, to remove waste and protect it against harmful substances.

Smoking and drinking alcohol can damage the health of the baby.

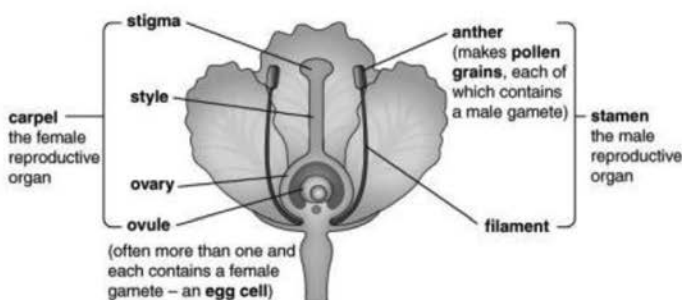
Birth

At the end of pregnancy the baby is born and leaves the female's body through the vagina, or through a cut in the abdomen called a caesarean.

Keyword	Definition
Amniotic fluid	Liquid that surrounds and protects the foetus.
Embryo	A developing baby before organs develop (up to week 8 of pregnancy)
Foetus	A developing baby after 8 weeks of pregnancy
Placenta	Organ that gives the foetus oxygen and nutrients and takes away waste.
Zygote	A fertilised egg cell

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41. Plant Reproduction

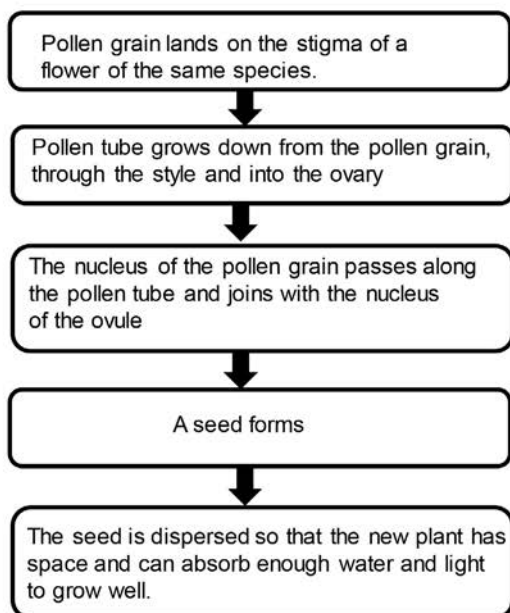


Male parts of the flower	Female parts of the flower
Stamen Each consists of an anther held up on a filament	Stigma The top of the female part of the flower which collects pollen grains
Anthers Produce male sex cells (pollen grains)	Ovary Produces the female sex cells (ovules)
Pollen grain Contains male sex cell	

Structure	Function
Sepal	Protect the unopened flower
Petal	May be brightly coloured to attract insects
Nectary	Produce a sugary solution called nectar, which attracts insects

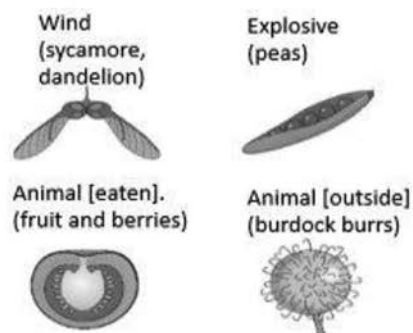
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42. Plant Fertilisation and Pollination



Pollination

Pollen can be carried by the wind, or by pollinating insects such as bees or other animals.



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43. Maths in Science

Anomalous result	A number that does not fit the pattern.
Mean	Adding up a list of numbers and dividing by how many numbers are in the list. Exclude any anomalous results.
Median	The middle value when a list of numbers is put in order from smallest to largest.
Mode	The most common value in a list of numbers. If two values are tied then there are two modes. If more than two values are tied then there is no mode.

Person	Heart rate after 10 star jumps (bpm)	Heart rate after running 200 metres (bpm)	Heart rate after 10 squats (bpm)
1	98	104	87
2	102	107	91
3	96	105	94

Calculating a mean:

Adding up a list of numbers and dividing by how many numbers are in the list.

Example from above: Calculate the mean heart rate in bpm for person 1 over the 3 exercises.

$$98 + 104 + 87 = 289.$$

$$289 \div 3 \text{ (as we have 3 results)} = 96.33 \text{ bpm.}$$

Rounded to 96.3 (1d.p.)

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1	2											3	4	5	6	7	8
		Key relative atomic mass atomic symbol name atomic (proton) number															
7 Li lithium 3	9 Be beryllium 4											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[98] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La* lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86
[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[264] Bh bohrium 107	[277] Hs hassium 108	[268] Mt meitnerium 109	[271] Ds darmstadtium 110	[272] Rg roentgenium 111	[285] Cn copernicium 112	[286] Uut ununtrium 113	[289] Fl flerovium 114	[289] Uup ununpentium 115	[293] Lv livermorium 116	[294] Uus ununseptium 117	[294] Uuo ununoctium 118



INDEPENDENCE: DIAGNOSIS – THERAPY – TEST

NAME: CLASS:

TOPIC:

DIAGNOSIS: The thing I don't understand

THERAPY: Where am I going to learn about this?

Which of the templates will I use to transform the information?

TEST: 5 questions someone can ask me about my new understanding.



INDEPENDENCE: DIAGNOSE

NAME: CLASS:

SUBJECT:

Be clear about what you know and what you don't know before you begin.

First, use a contents page or a topic list for the subject you are going to revise.

Then, fill in the following table – the topics, and how well you know them.

Next, prioritise. Which topics will you revise first? Spend time studying the topics which will make the biggest difference to your results.

Topic	Knowledge	Priority
	Know it/Sort of know it/Don't know it	
	Know it/Sort of know it/Don't know it	
	Know it/Sort of know it/Don't know it	
	Know it/Sort of know it/Don't know it	
	Know it/Sort of know it/Don't know it	
	Know it/Sort of know it/Don't know it	
	Know it/Sort of know it/Don't know it	
	Know it/Sort of know it/Don't know it	
	Know it/Sort of know it/Don't know it	
	Know it/Sort of know it/Don't know it	
	Know it/Sort of know it/Don't know it	
	Know it/Sort of know it/Don't know it	
	Know it/Sort of know it/Don't know it	
	Know it/Sort of know it/Don't know it	

Finally, use the **diagnosis – therapy – test** worksheet to plan your independent study.



INDEPENDENCE: PRIORITISE, REDUCE, CATEGORISE, EXTEND

NAME:	CLASS:
TOPIC:	

Take a section of text and do the following:

Prioritise: write out the three most important sentences. Rank 1-3 in terms of importance. Justify your decision.
Reduce: reduce the key information to 20 words.
Categorise: sort out the information into three categories. Give each category a title which sums up the information.
Extend: write down three questions you would like to ask an expert in this subject.



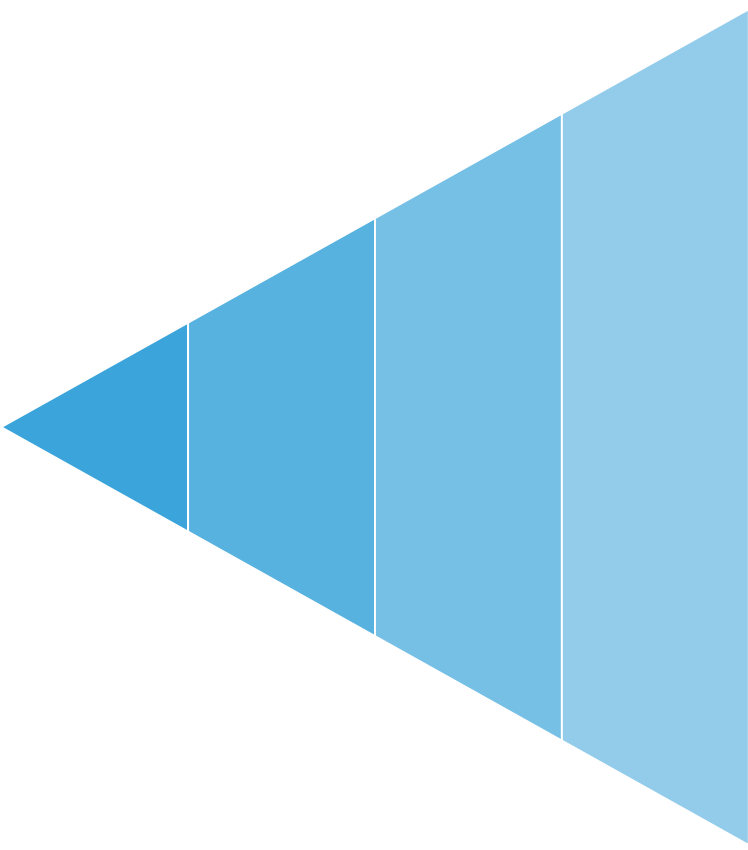
INDEPENDENCE: RANKING TRIANGLE

NAME:	CLASS:
TOPIC:	

The most important information goes at the top.

The least important information goes at the bottom.

Justify WHY. Why is it the most important? Why is it the least important?





INDEPENDENCE: QUIZZING

NAME: CLASS:

TOPIC:

Read the text and transform it into 10 questions to ask someone.

Question	Answer
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Question stems:

State...

Explain...

Suggest...

Describe...

Evaluate...

Compare...



INDEPENDENCE: BOXING UP

NAME: CLASS:

TOPIC:

Take a section of text. Read it and put your thoughts about the text into different boxes.

Needs a boost: 3 things I did not know:	
Almost there: 3 things I understand better now:	
I've got these: 3 things I already knew:	



INDEPENDENCE: OTHER IDEAS

Steps → flow chart Transform a sequence of steps into a flow chart or a diagram.

Flow chart → steps Transform a flow chart or a diagram into a sequence of steps.

Look, cover, write, check Cover a list of key words. Write them down. Check which ones you have got right. Repeat until you get them all right.

Link key words Take three words from a topic. Link them together in a sentence or a diagram. Repeat until all the key words have been linked.



INDEPENDENCE: Pictionary

NAME:

CLASS:

TOPIC:

Transform the material into 6 pictures – one per paragraph or one per key piece of information. The pictures should represent the information so that they can act as a reminder of what the text said. Underneath each picture, explain your thinking.

1.	2.	3.

4.	5.	6.

