



Year 8 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.

4

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

5

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)



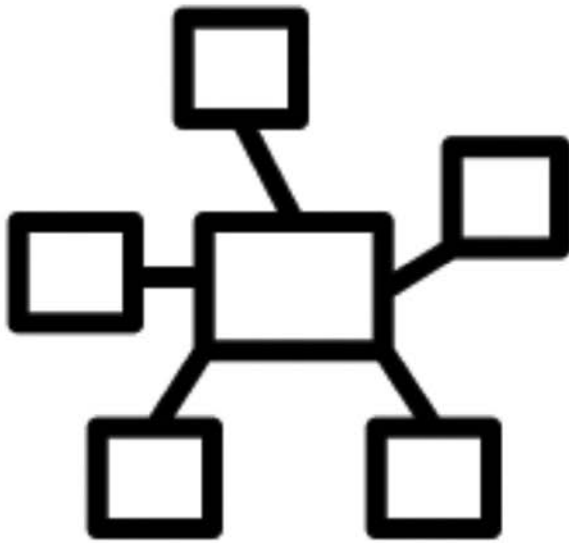
Repeat the self quiz.

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

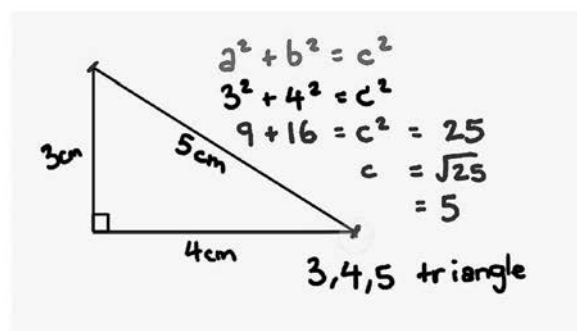


Pythagoras theorem example

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

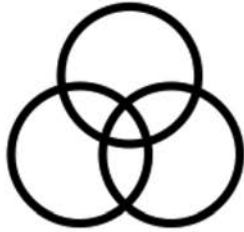
A concrete example is an clear example of an abstract idea



4

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 8 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 its 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.

4

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 <i>Table, love</i>
Pathetic fallacy	When the weather reflects the mood or tone of a character.
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	When the poet writes about a character who isn't the speaker
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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Compound Sentences
Complex Sentences

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Semi-Colon
Colon

Page 12-14 SPACED
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



Explanation

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

Example

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.



Explanation

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

Example

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.

When to use	Explanation	Example
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

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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.



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.

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



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

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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...

Challenging/ disagreeing

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

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...

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...

Passing on the dialogue...

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

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RESPONDING TO A TEXT

Ask yourself:

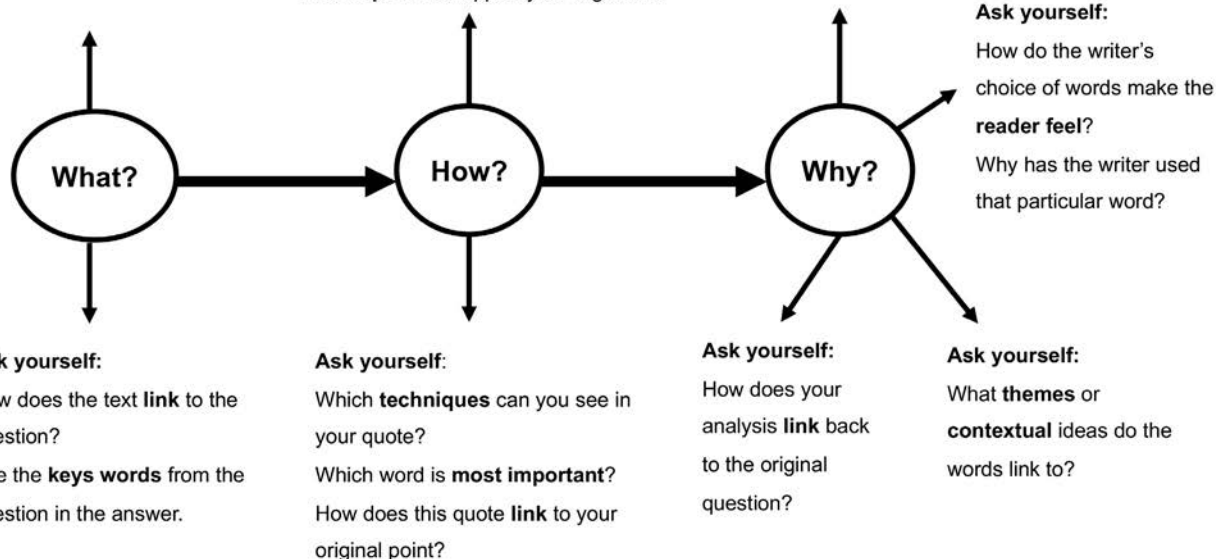
Do you **agree or disagree** with the statement?
Does the text **support** or go against the question?

Ask yourself:

How did you reach that decision?
Which **words or phrases** from the text made you agree or disagree with the question?
Find a **quote** to support your argument.

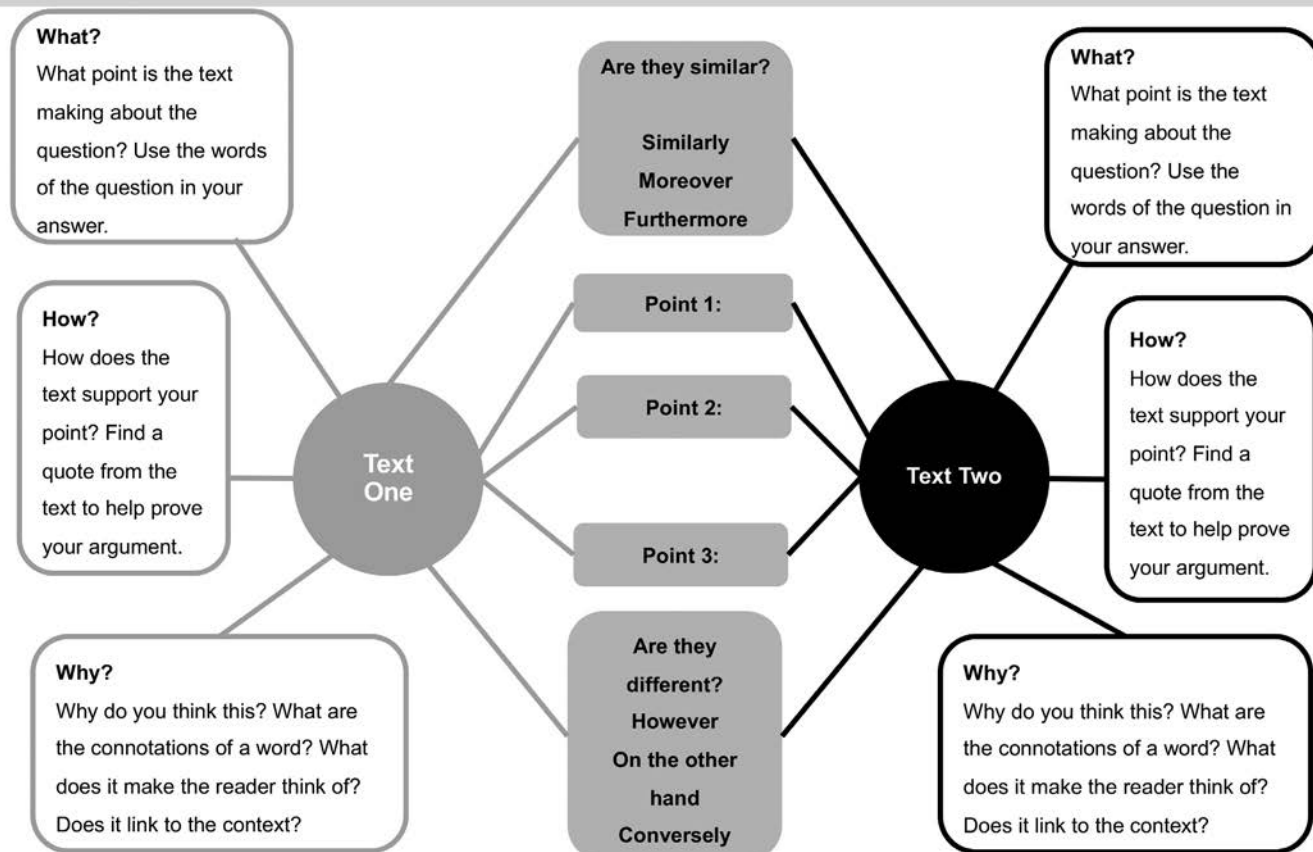
Ask yourself:

Zoom into one word.
What are the **connotations** of a word?
What other words or **ideas** do they make you think of?

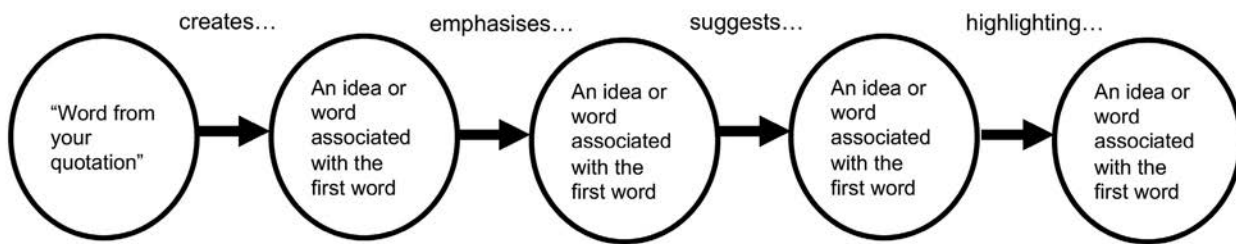


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COMPARING TWO TEXTS



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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 8 Texts



Full academic year

Pride not Prejudice Poetry



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Themes and Influences

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Key Themes

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TIER TWO VOCABULARY- PRIDE NOT PREJUDICE

WORD	DEFINITION
Bilingual	The ability to speak two languages fluently.
Culture	The ideas, customs, and social behaviour of a particular people or society.
Empowerment	The process of becoming stronger and more confident.
Ethnicity	The state of belonging to a social group that has a common national or cultural tradition.
Expectations	A strong belief that something will happen or be the case.
Discrimination	The unfair or prejudicial treatment of people and groups based on characteristics such as race, gender, age or sexual orientation.

	DEFINITION
Family	A group consisting of two parents and their children living together as a unit.
Gender	The range of characteristics pertaining to, and differentiating between, masculinity and femininity.
Hierarchy	A system in which members of an organisation or society are ranked according to relative status or authority.
History	The whole series of past events connected with a particular person or thing.
Justice	Fair behaviour or treatment.
Language	The method of human communication, either spoken or written, consisting of the use of words in a structured and conventional way.

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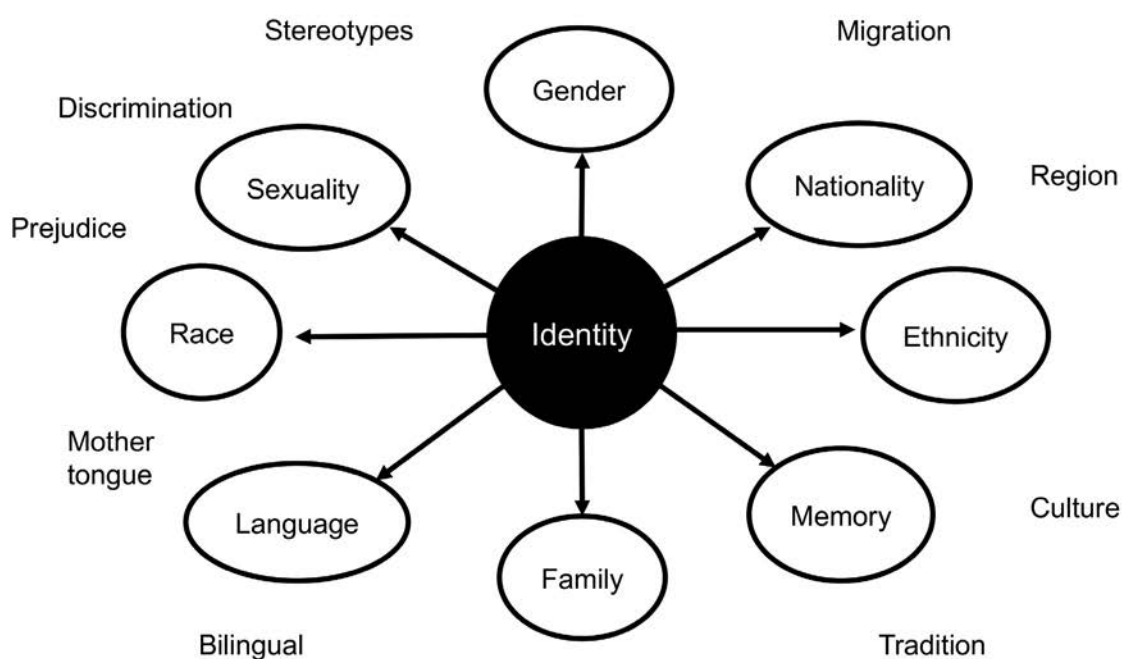
TIER TWO VOCABULARY- PRIDE NOT PREJUDICE

WORD	DEFINITION
Memory	Something remembered from the past.
Morality	Knowing the difference between right and wrong.
Mother tongue	The language which a person has grown up speaking from early childhood.
Nationality	The status of belonging to a particular nation.
Region	An area, especially part of a country or the world having definable characteristics, but not always fixed boundaries.
Revolution	A forcible overthrow of a government or social order, in favour of a new system.

	DEFINITION
Patriarchy	A society where men hold more power than women.
Sexuality	A person's sexual orientation or preference.
Society's norms	The informal rules which govern people's behaviour in groups.
Stereotypes	A widely held but fixed and oversimplified image or idea of a particular type of person or thing.
Tradition	The transmission of customs or beliefs from generation to generation, or the fact of being passed on in this way.

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PRIDE NOT PREJUDICE THEMES AND INFLUENCES



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PRIDE NOT PREJUDICE POETRY KEY THEMES

Migration 	Gender and Sexuality 	Race 
The experience of immigrants and the barriers they face when settling in a new country	The experiences of female and gay writers as they celebrate the progress they have made	The experience of black writers whom fight back against past discrimination and injustices
Migration = the movement of a person from one country to another with the intention of settling there	Sexuality = a person's identity in relation to the gender or genders to which they are attracted to	Race = a grouping of humans based on shared physical or social qualities, viewed as distinct by society
Dual identity = identifying with the country you were born in and the country you live in	Gender = the range of characteristics relating to femininity and masculinity	Prejudice = preconceived opinion that is not based on reason or actual experience
Key Words Nationality Bilingual Ethnicity Hierarchy Region Mother tongue	Key Words Stereotypes Memory Empowerment Patriarchy Oppression Society's norms	Key Words Discrimination History Revolution Justice Expectations Morality
Key Texts <i>The Weight of Water</i> <i>Hurricane Hits England</i> <i>And Still I Rise</i>	Key Texts <i>I Come From</i> <i>A Litany for Survival</i> <i>And Still I Rise</i>	Key Texts <i>Half-Caste</i> <i>A Litany For Survival</i> <i>And Still I Rise</i>

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Life, Labour and Loss: A Victorian Childhood

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TIER TWO VOCABULARY- LIFE, LABOUR AND LOSS

WORD	DEFINITION
Capitalism	An economic or political system where a country's trade and industry is controlled by private owners for profit not the state.
Capital Punishment	The legally authorised killing of someone as punishment for a crime.
Charity	The voluntary giving of help, typically in the form of money, to those in need.
Child Labour	The employment of children in an industry or business.
Control	The power to influence or direct people's behaviour or the course of events.
Corporal Punishment	Physical punishment, such as caning or flogging.
Despair	The complete loss or absence of hope.

WORD	DEFINITION
Desperation	A state of despair, typically one which results in rash or extreme behaviour.
Despondent	In low spirits from a loss of hope or courage.
Destitution	Extremely poor and lacking the means to provide for oneself.
Dilapidated	In a state of disrepair or ruin as a result of age or neglect.
Exploitation	The action or fact of treating someone unfairly in order to benefit from their work.
Industrial	Economic activity concerned with the processing of raw materials and manufacture of goods in factories.
Inequality	Lack of equality.

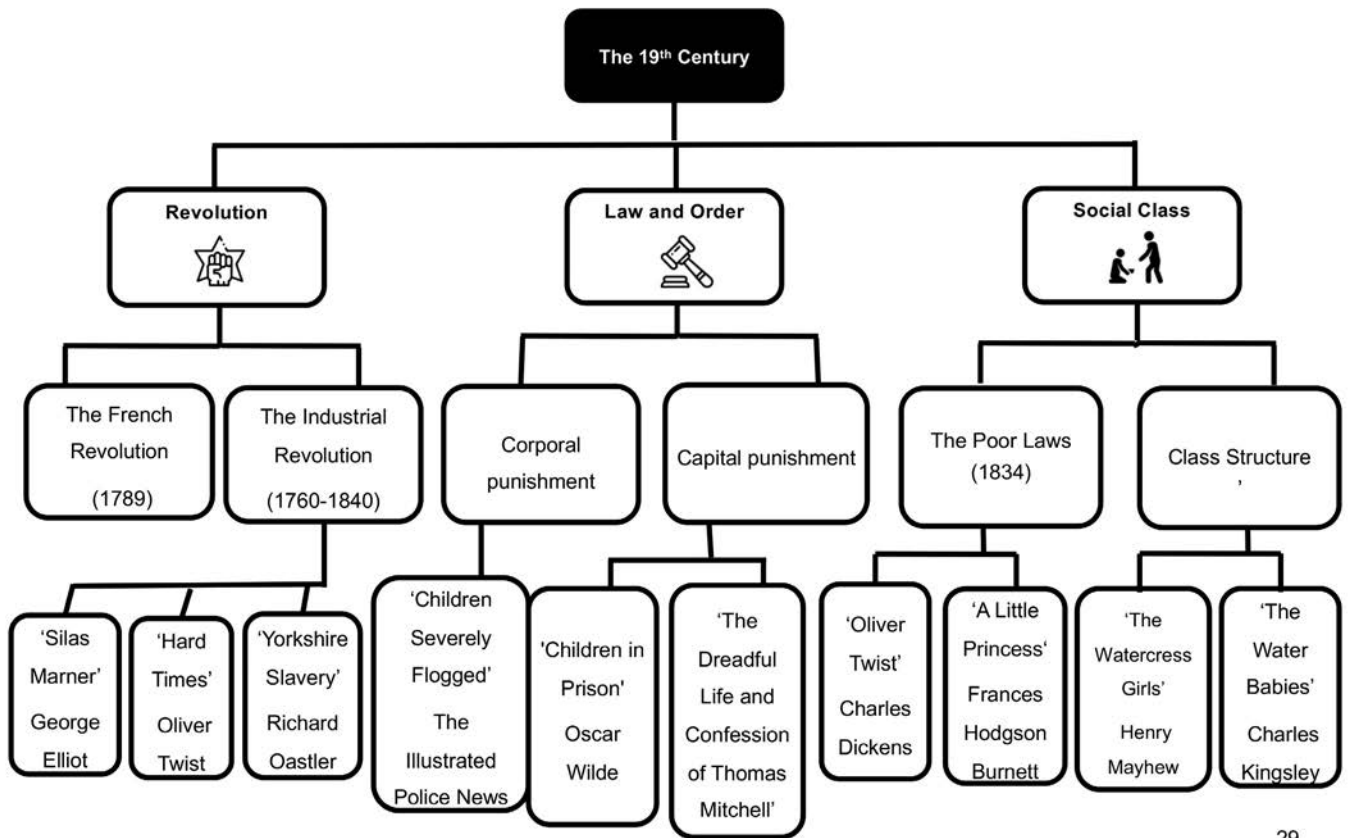
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TIER TWO VOCABULARY- LIFE, LABOUR AND LOSS

WORD	DEFINITION
Labour	Employment in an industry or business.
Malnutrition	Lacking proper nutrition.
Neglect	The failure to provide care for property.
Oppression	The prolonged cruel or unjust treatment or exercise of authority.
Pauper	A recipient of relief under the provisions of the Poor Law or public charity.
Poverty	The state of being extremely poor.

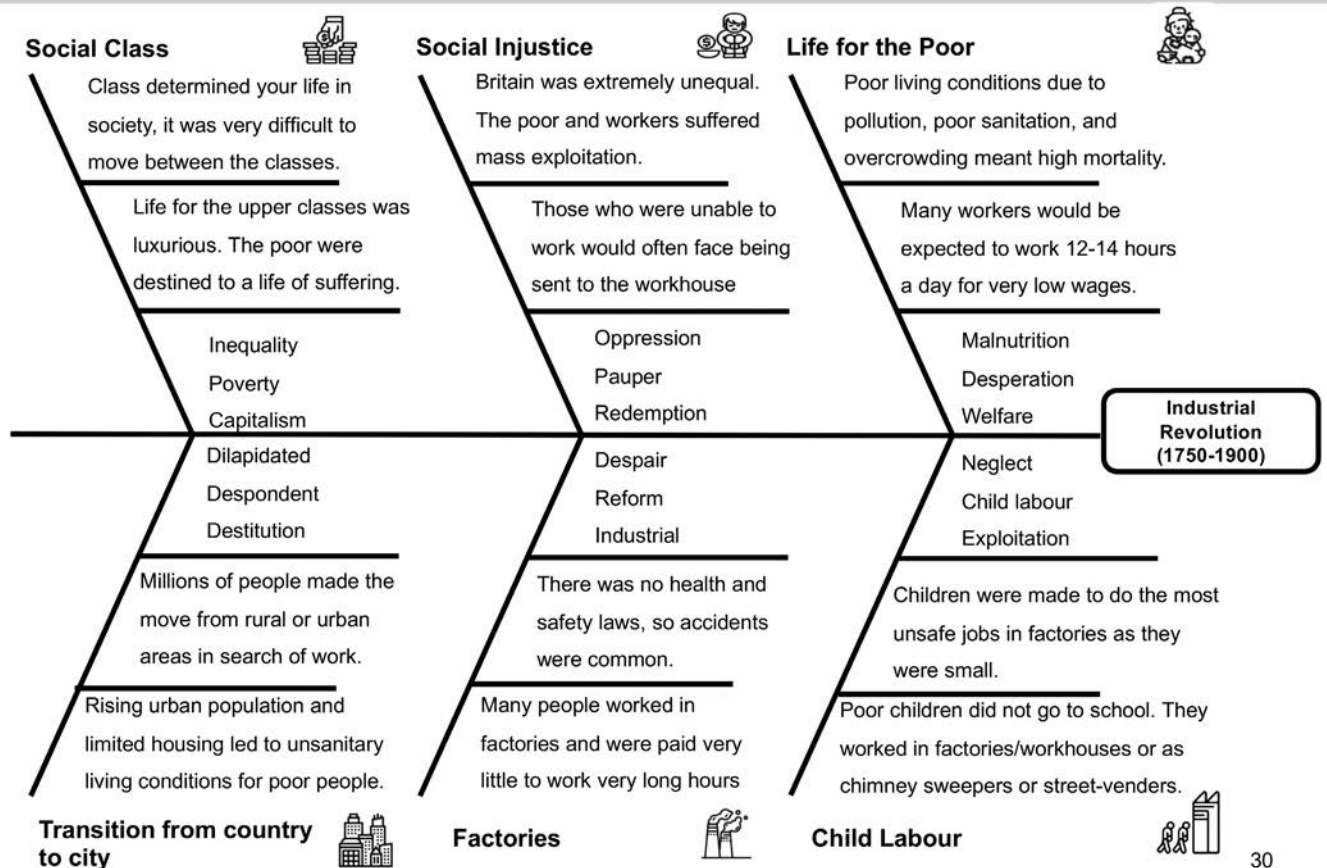
WORD	DEFINITION
Redemption	The action of saving or being saved from sin, error or evil.
Reform	Make changes in (something, especially an institution or practice) in order to improve it.
Superiority	Higher ranking in status or quality.
Voracious	Wanting great quantities of food.
Welfare	The statutory procedure and social effort designed to promote the basic physical and material well-being of people in need.

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19TH CENTURY LIFE



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Shakespeare: Richard III

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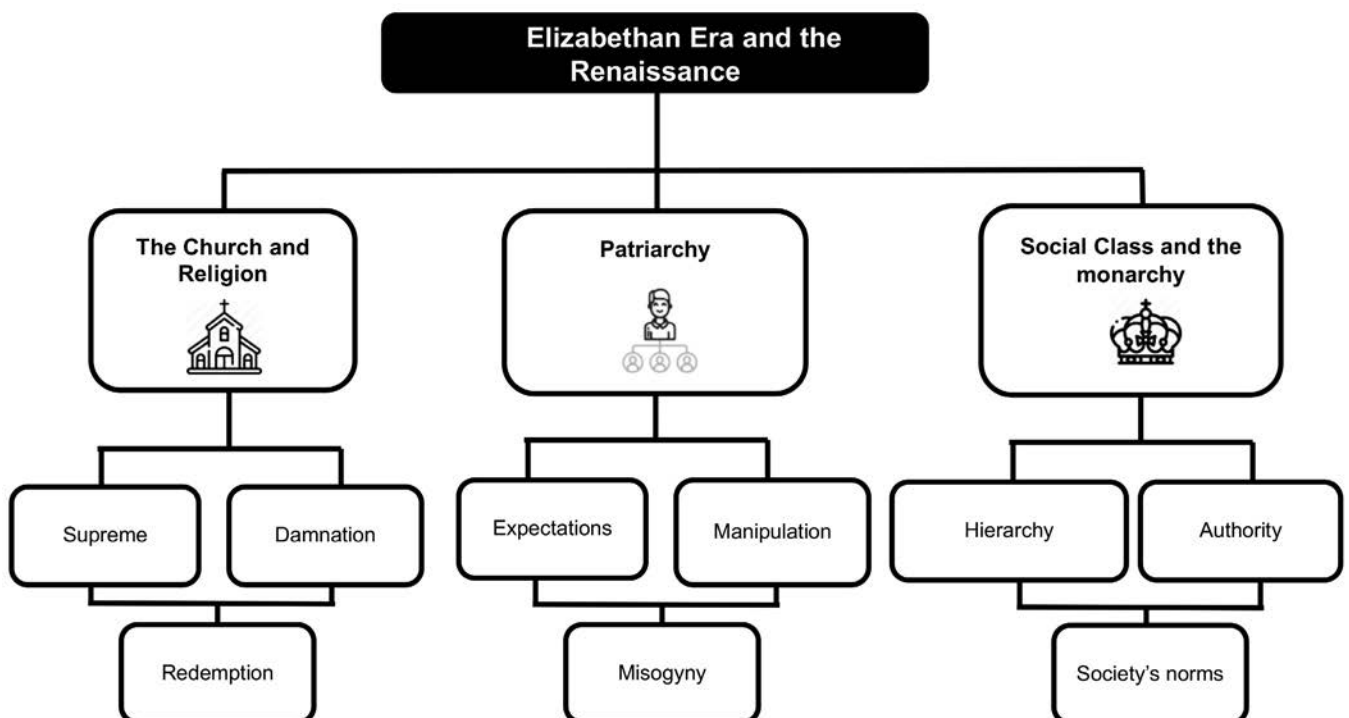
TIER TWO VOCABULARY

WORD	DEFINITION
Misdirection	the action or process of directing someone to the wrong place or in the wrong direction:
Motive	a reason for doing something: a driving force or desire.
Obsequious	obedient or attentive to an excessive or servile degree:
Paranoia	unjustified suspicion and mistrust of other people or their actions:
Portent	a sign or warning that a momentous or calamitous event is likely to happen:
Remorse	deep regret or guilt for a wrong committed:
Sanctuary	refuge or safety from pursuit, persecution, or other danger:
Sycophant	a person who acts obsequiously towards someone important to gain advantage.
Sovereign	a supreme ruler, especially a monarch:
Treachery	betrayal of trust or the quality of being deceptive.
Unscrupulous	Having no friends or company; isolation
Machiavellian	Cunning and scheming

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WORD	DEFINITION
Artifice	Clever or cunning devices to trick or deceive others
Betrayal	Violation of a person's trust or moral standard
Conscience	a person's moral sense of right and wrong, viewed as acting as a guide to one's behaviour:
Corrupt	having or showing a willingness to act dishonestly in return for money or personal gain.
Cunning	having or showing skill in achieving one's ends by deceit or evasion.
Despotism	the exercise of absolute power, especially in a cruel and oppressive way.
Ego-centric	thinking only of oneself, without regard for the feelings or desires of others; self-centred.
Emancipator	someone who frees others from bondage
Favour	approval, support, or liking for someone or something:
Hamartia	A fatal flaw leading to the downfall of a tragic hero
Hubris	Excessive pride or self- confidence
Hypocrisy	the practice of claiming to have higher standards or more noble beliefs than is the case.

SHAKESPEAREAN HISTORY THEMES AND CONTEXT





The War of the Roses

The problems began in the late 14th century with the death of the long-reigning King Edward III, of the house of Plantagenet. Edward III had seven sons, of whom the fourth and fifth became the fathers of dynasties. The elder was called John of Gaunt, the duke of Lancaster, and his younger brother was called Edmund of Langley, Duke of York. Their descendants formed two important clans—the Lancasters and the Yorks. Both clans derived from royal blood, and both produced ambitious men who were willing to fight for the throne. England's royal family was locked in a power struggle that periodically erupted into violence. The name "Wars of the Roses," references the symbols of the two related but competing families.



The Tudor Dynasty

Richmond is a Lancaster and his later marriage to Princess Elizabeth of House York brought an end to the War of the Roses and established the Tudor line that was still in control during Shakespeare's time. It is possible that Shakespeare aimed to flatter the current royal family (who were his patrons) by including such a glowing account of their ancestor in his play.

While Shakespeare's Richard is unarguably a villain, the historical figure is more contested. Richard III was the last Plantagenet king, whose defeat in 1485 at the **Battle of Bosworth** against the man who would become Henry VII marked the beginning of the Tudor dynasty.

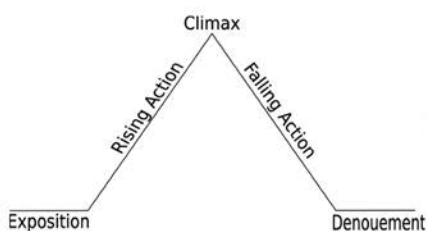


Elizabethan Politics and Power Struggles

Queen Elizabeth I was *sovereign* of England: she had the upmost authority and rule. Considered one of England's most popular and successful monarchs: responsible for a period of economic prosperity and shaped England to become an enormously influential and powerful country. Elizabeth's reign saw lots of plots and rebellions from: disgruntled nobles; Catholics, Puritans and from overseas. Plots often had an aim replacing Elizabeth with Mary, Queen of Scots. In Richard III, Shakespeare was writing about a form of civil war. As England got closer to the death of Elizabeth I [in 1603], there was a great fear of the conflict and dissent people knew might follow.

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RICHARD III: Structure and Themes



Exposition

Richard, the power-hungry younger brother of the king of England, longs to seize control of the throne, but he is far back in the line of succession.

Rising Action

Richard persuades Lady Anne, Prince Edward's widow, to marry him; he has his brother Clarence murdered; he has the two young princes in line for the throne murdered.

Climax

In Act III, scene vii, Buckingham and others entreat Richard to accept the crown, which he pretends to refuse and then accepts.

Falling Action

Richard turns against Buckingham and murders the young princes and his wife Anne.

Denouement

Richmond defeats Richard at the battle of Bosworth.

Themes



Power: Shakespeare uses tyrants like Richard as commentaries on power; how power draws people who aren't suited to wielding it. Once Richard gets the power he desires, he has no idea what to do with it, because he's so unfit to lead – like many of our current leaders



Paranoia: Richard's **paranoia** is a representation of political **hypocrisy**— he expects ultimate loyalty while giving none to anyone else. He feels vulnerable in his own circle of enablers and sycophants.



Family: the play deals with **loyalty** and **betrayals** within families. It looks at the relationship between power, politics and blood-ties.



Leadership: Richard gains power through **deception**, **fear** and **crime**. Because he has used corruption to achieve leadership, he starts to lose control as he loses power. Shakespeare shows that **true leadership** must be just and inspire loyalty.



Fate, Dreams and Omens: The idea that life's journey is already mapped out and cannot be changed.

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Richard III  Also known as the Duke of Gloucester. Richard is ambitious and ruthless. He kills those in line to the throne that stand before him. Machiavellian Ego-centric Corrupt	Buckingham and Richard's supporters  Buckingham is a supporter of Richard. He does a lot of lying and tricking to help Richard become King. When he falls out with Richard, Richard has him killed. Ambitious Sycophantic Cunning	Queen Margaret and Lady Anne  Queen Margaret was married to Henry VI: the old King (until Richard killed him). Vengeful Bitter Lady Anne was married to Margaret's son (until Richard killed him). Richard marries her and then has her killed. Weak	Richmond and Stanley  Richmond is Richard's rival for the throne. He fights Richard and kills him. Richmond becomes King Henry VII. Stanley is a nobleman who secretly supports Richmond. Emancipator Brave
Edward IV and Queen Elizabeth  Edward IV is Richard's brother. Edward IV is King to start with but soon dies. Queen Elizabeth is his wife. Edward tries – but fails – to keep the peace. He is suspicious of his brother Clarence and shows poor judgement when he chooses to trust Richard. Queen Elizabeth is presented as weak at the start of the play, but as it progresses becomes stronger and stands up to Richard.	The Young Princes, Sons of Edward IV and Elizabeth  Prince Edward is next in line to the throne after Edward IV dies. Richard has him and his brother, the young Duke of York, killed. Prince Edward is brave and obedient. He wants to serve his country well. His younger brother is witty and lively. Innocent Victims	Clarence and Hastings  Clarence is Richard's older brother. He's fooled by Richard's fake sympathy. He cares deeply about his family and pleads to be punished for his mistakes against them during the War of the Roses. Richard has him killed in Act 1. Naiive Hastings is a nobleman who is also killed by Richard. He thinks Richard is honest, but is loyal to Edward IV, so won't support him to be King. Foolish	Rivers Dorset and Grey  The Woodvilles – Queen Elizabeth's relatives. Earl Rivers is suspicious of Richard – just like Elizabeth is. All 3 are loyal to Prince Edward. Rivers and Gray are killed on Richard's orders. Richmond is Richard's rival. He fights Richard and kills him. Richmond becomes King Henry VII. Stanley is a nobleman who secretly supports Richard.

King Richard III Act One



The wars are over; but Richard's not happy. England is at peace and now Edward IV is King. But peace doesn't suit Richard – he says he's ugly and deformed and determined to cause trouble: he pits Edward against Clarence.

Clarence enters on his way to being imprisoned in the Tower of London. Richard tells Clarence it isn't the King behind it, but his wife, Queen Elizabeth. Richard lies and tells Clarence he will stick up for him and get him freed.

RICHARD

"And therefore since I cannot prove a lover
To entertain these well-spoken days,
I am determined to prove a villain."



Hastings tells Richard the King is ill. Hastings leaves. Richard talks about his plan to get Clarence killed and then marry Lady Anne. When King Edward IV dies, Richard wants to take his place.

Anne is mourning for her husband and father-in-law. Richard tries to woo Anne but she resists. Anne curses him, and he admits he killed them. He talks his way into her affections by claiming her beauty drove him to it and he is in love with her. He eventually manages to convince her to meet him later.

RICHARD

"Teach not thy lip such scorn;
for it was made
For kissing, lady, not for such
contempt."



Queen Elizabeth is with her relatives. News arrives that the King is keen to sort out the quarrels between Richard and the Queen's family from his sick-bed.

Richard enters and claims that people have been spreading lies about him, but Elizabeth says he's just jealous because her family has come into power. Margaret comes forward and warns Richard is a murderer, but Elizabeth won't listen. She curses them all.

Richard reflects on his plan to blame Clarence's imprisonment on Queen Elizabeth's relatives, and to set Stanley, Hastings and Buckingham against them for it. He then gives two murderers instructions to kill Clarence.

MARGARET

"Hie thee to hell for shame, and leave
this world,
Thou cacodemon! There thy kingdom is!"



Clarence dreams that he and Richard were on a ship, and Richard slipped and pushed him overboard.

The murderers enter. Clarence wakes up and sees them. He thinks that Edward has sent them. He talks one of them out of killing him, but the other stabs him from behind and drowns him in a barrel of wine.

Clarence:

O, do not slander him, for he is kind.
FIRST MURDERER:
Right, as snow in harvest. Come, you deceive yourself.
'Tis he that sends us to destroy you here.

King Richard III Act Two



King Edward gets Queen Elizabeth and her relatives to make peace with Buckingham and Hastings.

Richard arrives and pretends to make peace too. He tells them Clarence is dead and claims the King's reversal of the death sentence came too late. The King is distraught. Richard tells Buckingham that Clarence's death was the fault of Queen Elizabeth's relatives.

KING EDWARD

Is Clarence dead? The order was reversed.

RICHARD

But he, poor man, by your first order died,
And that a wingèd Mercury did bear.



Clarence's two children ask the Duchess of York — their grandmother (Richard's mother) about their father's death. His son tells the Duchess that Richard claimed it was Elizabeth's relatives' fault, but she tells him Richard is a liar.

Elizabeth and her relatives arrive and tell them that King Edward IV is dead. Rivers reminds Elizabeth that her young son, Prince Edward, will now be King.

DUCHESS OF YORK:

"Oh, that deceit should steal such gentle shapes,
And with a virtuous vizard hide foul guile!..."



Richard and Buckingham arrive, and Buckingham orders for a small group of people to fetch the Young Prince Edward to be crowned as King. Then Buckingham tells Richard that he'll arrange for the Prince to be separated from Elizabeth's relatives.

Meanwhile, the citizens discuss what life will be like under the new King. One points out that Richard is dangerous, and having a child-King will lead to trouble.

BUCKINGHAM

My lord, whoever journeys to the prince,
For God's sake let not us two at home.
For by the way I'll sort occasion,
As index to the story we late talked of,
To part the queen's proud kindred from the prince.



The Archbishop of York, the old Duchess of York, Elizabeth and the young Duke of York chat about the arrival of young Prince Edward.

A messenger arrives with bad news. Rivers, Grey and Vaughan have been arrested by Richard and Buckingham. Elizabeth realises her family is in danger and she and the young Duke go to sanctuary, where they are safer.

DUCHESS OF YORK

He was the wretched'st thing when he was young,

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King Richard III Act Three



Richard tells Prince Edward his relatives are evil people, but the Prince isn't convinced. Hastings reports that Elizabeth is holding the prince's brother, the young Duke of York, in sanctuary. Buckingham orders cardinal Bouchier to fetch them by force.

Richard comments to himself on the Prince's cleverness. Then the two princes reluctantly go off to the tower.

Buckingham sends Catesby to find out whether Hastings will support Richard's bid to be king. Richard tells Buckingham that if Hastings won't support him, he'll have him killed. He promises Buckingham he'll be made Earl of Hereford when Richard becomes King.

RICHARD

"Short summers lightly have a forward spring."



Hastings is woken by a messenger from Stanley. He warns Hastings of the danger from Richard and suggests they go north together. Hastings says there's nothing to worry about.

Catesby tells Hastings that Elizabeth's relatives are to be killed. Catesby asks Hastings if he'll support Richard's claim to be king - he says he won't.

Hastings tells Catesby that he's friends with Richard and Buckingham. Stanley reminds him what happened to Elizabeth's family. But Hastings says that they are perfectly safe because Richard likes them.

HASTINGS

Tell him his fears are shallow, without instance. And for his dreams, I wonder he's so simple To trust the mock'ry of unquiet slumbers.



Ratcliffe leads Rivers, Grey and Vaughan to their execution. Richard hopes that Margaret's curse on them is coming true. Rivers hopes the same.

Hastings, Buckingham, Stanley and the Bishop of Ely meet to discuss the date of the coronation. The Bishop asks Buckingham's opinion, but Buckingham says that Hastings is closer to Richard than him. Richard enters and privately tells Buckingham he's going to have Hastings killed.

Richard says there's been a plot against him. Hastings says whoever's behind it deserves to be killed. Richard says it's Elizabeth and mistress Shaw (Hastings's mistress) and orders the execution of Hastings. Hastings wishes he'd listened to Stanley's warnings.

RICHARD

If? Thou protector of this damned strumpet, Talk'st thou to me of "ifs?"
Thou art a traitor—Off with his head.



Dressed up in arms, Richard and Buckingham tell the Mayor that there's been a plot against them. Ratcliffe enters with Hastings' head. Richard pretends to be sad. The mayor is fooled and explains the situation to the citizens.

Richard tells Buckingham to tell the citizens that Edward's children are illegitimate, meaning Richard should be king.

A scrivener looks over a document accusing Hastings of being a traitor. He realises the accusation is false, as he was given it the previous night before Hastings was accused.

The mayor and Catesby ask Richard to be King. Richard pretends to be busy praying and says he doesn't want to be king. Buckingham (who's in on the trick) and the mayor persuade him.

SCRIVENER

Here's a good world the while. Who is so gross
That cannot see this palpable device?
Yet who so bold but says he sees it not?

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King Richard III Act Four



Queen Elizabeth, Anne and the Duchess are denied access to visit the Princes in the tower by Richard. Stanley arrives to summon Anne to be crowned as Richard's Queen.

They realise Richard is up to no good. The Duchess directs Anne to go to Richard, and Elizabeth to go find sanctuary. She instructs Dorset to go and join Richmond who is forming an army against Richard.

Meanwhile, Richard asks Buckingham to murder the Princes but he wants to think about it. Richard orders Tyrell to do it in his absence.

QUEEN ELIZABETH

Go, hie thee, hie thee from this slaughterhouse, Lest thou increase the number of the dead



Richard spreads rumours that his wife Anne is sick and about to die.

Buckingham returns and asks for his rewards, but Richard makes clear he is out of favour. Buckingham plans to run away.

Richard learns from Tyrell that the Princes are dead. Richard says Anne is dead too so he can go after his niece Elizabeth: he is worried she might marry Richmond. Ratcliffe warns that Richmond and Buckingham are raising armies. Richard gathers his own army.

RICHARD

"I must be married to my brother's daughter,
Or else my Kingdom stands on brittle glass."



Margaret hears Elizabeth and the Duchess discussing Richard's antics and tells them she warned them this would happen.

Richard enters and Queen Elizabeth and the Duchess chastise him for the murders. The Duchess tells him his death will be violent.

Richard persuades Queen Elizabeth to help him marry her daughter. She resists at first but he convinces her.

Ratcliffe reports that Richmond's army is sailing from France to join Buckingham's. Richard tells Stanley to summon his friends to support him; he distrusts Stanley and keeps his son George hostage to make sure he follows through.

DUCHESS

Bloody thou art; bloody will be thy end.
Shame serves thy life and doth thy death attend.



Three messengers share differing announcements about the arrival of Richmond's army and Buckingham's wellbeing. Richard demands they stop talking and prepare to battle.

Stanley tells Sir Urswick to tell Richmond he can't openly support him because his son is being held hostage. He tells him that Queen Elizabeth wants her daughter to marry Richmond. He passes along a letter assuring Richmond that he is on his side.

RICHARD

Go then and muster men, but leave behind
Your son George Stanley. Look your heart be firm. Or else his head's assurance is but frail.

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King Richard III Act Five



Buckingham is led to his execution and told Richard won't speak with him. He realises he is getting what he deserves and remembers Margaret's prophecy.

Richmond is feeling confident. He and his supporters march towards battle – they are only 1 day away. Richmond has received Stanley's letter of loyalty and feels reassured.

The night before the battle, Richard and Richmond set up camp. Richard's side set up in Bosworth field. He claims his army is 3 times bigger than Richmond's.

BUCKINGHAM:

Come, lead me, officers, to the block of shame.
Wrong hath but wrong, and blame the due of blame.



Richard sends for Stanley. He is feeling tense. He tells Catesby to send for Stanley's regiment, then talks to Ratcliffe about preparations for the battle.

Stanley then secretly talks to Richmond and wishes him good luck. He explains they cannot be seen because Richard has his son held hostage. Richmond prays and then sleeps.

The ghosts of Richard's victims visit Richard and Richmond in their dreams. They wish despair on Richard and success for Richmond.

GHOSTS:

"DESPAIR AND DIE!"



Richard awakes terrified and haunted by his conscience.

Richmond wakes after having pleasant dreams. He gives an oration to his soldiers. Richard does the same. A messenger tells Richard that Stanley won't support him. Richard orders the death of Stanley's son, but there isn't time before the battle.

In the battle, Catesby and Norfolk come across Richard. His horse has been killed, but he's desperate for another one so he can go and fight Richmond, after having killed five other men dressed like him. Catesby advises him to flee, but Richard is determined to fight Richmond.

RICHARD:

"A horse, a horse, my Kingdom for a horse!"



Richard and Richmond fight, and Richmond kills Richard. Stanley congratulates him and presents him with the crown, taken from Richard's head. Stanley tells us his son is safe and well.

In the closing speech, Richmond says he will bring together the warring sides of the Royal family. He says he'll unite the houses of York and Lancaster by marrying the Yorkist princess Elizabeth (Richmond is Lancastrian) so that England can be peaceful again.

RICHMOND:

Now civil wounds are stopped, peace lives again.
That she may long live here, God say amen.

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Opinion Writing

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GENRES

Letter Letters can be formal and informal, besides a means of communication and a store of information. The should contain: • The Heading: this contains the return address (usually two or three lines) with the date on the last line. • The inside address: this is the address you are sending your letter to. • The greeting: is also called the salutation. • The body. • The complimentary close and the signature line. 	Article An article is a written work published in a print or electronic medium. It may be for the purpose of propagating news, research results, academic analysis, or debate. • Headline and subheading • In the first sentence sum up what the story is about. • Write your report in the third person and the past tense. • Fill your newspaper report with both facts and opinions, using the 5 Ws. 
Speech Speech Writing is an art of conveying a message to your audience. Either through oral communication, speech writing has the same function as normal writing. Features include: • Clarity. Clarity is an essential feature of a good speech. ... • Definiteness of message or opinion • Conciseness. • Considering the Audience. • Use of rhetoric. • Clear ending to summarise main message. 	Leaflet A leaflet is a small sheet of printed paper that puts across a short message clearly and concisely. Businesses use leaflets to advertise their products and services. They're often also used to let people know about new stores, special offers and events. • Heading • Imperative language to give the reader a direct command • Sub-headings guide the reader through each section • Use of bullet points • Clear sections and paragraphs • Factual information 

AUDIENCE

Formal

The formal register is more appropriate for professional writing. You should not apply contractions or slang.

Generally used when writing for:



Headteacher

Local MP

Informal

The informal register (also called casual or intimate) is conversational and appropriate when writing to friends and people you know very well.



School/college peers



Parents

Neutral

The neutral register is non-emotional and sticks to facts. It is most appropriate for technical writings.



Local community



When explaining a process

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PURPOSE

Argue An argumentative essay is a type of essay that presents arguments about both sides of an issue. • Make your claim or viewpoint clear • Use counterarguments to refute your opposers • Give logical reasons • Provide factual evidence. 	Persuade Persuasive writing intends to convince readers to believe in an idea or opinion and to do an action. • Use repeated words • Use emotional language • Create a strong argument • Apply rhetorical questions 	Advise Advice writing offers opinions or recommendation as a course of action, or formally provide information. • The tone is reassuring to the reader • Give step-by-step advice • Use personal pronoun • Be enthusiastic with the rule of three 
Inform An informative essay educates your reader on a topic. They can have one of several functions: to define a term or provide a how-to. They do not, however, present an opinion or try to persuade your reader. • clear opening and summarising conclusion. • general and more specific information. • present tense. • connectives to make it clear and coherent. 	Explain An explanation text is a non-fiction piece of writing which is meant to describe a process. They include specific features that include: • Written in the present tense • The text is arranged into numbered points • Use of time connectives • Clear understanding of process being explained. 	

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The Lie Tree and The Gothic Genre



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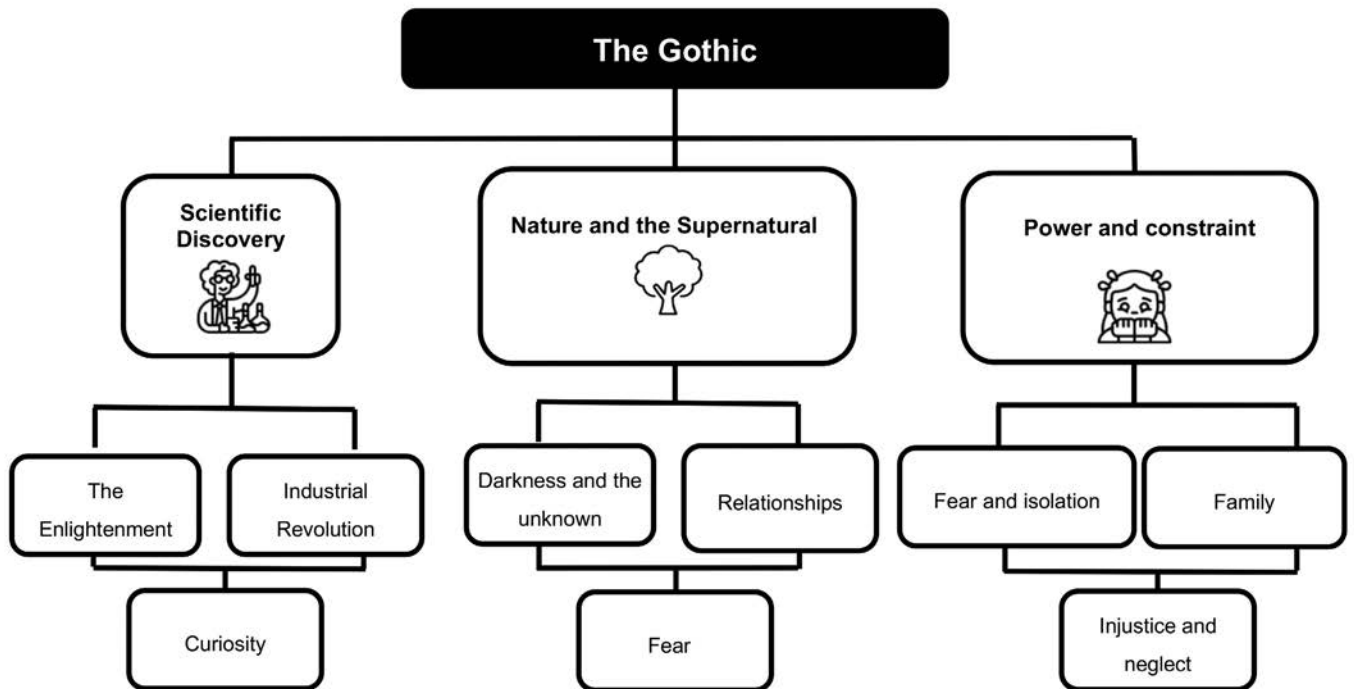
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TIER TWO VOCABULARY

WORD	DEFINITION
Curiosity	A strong desire to know or learn something.
Femme Fatale	A woman who suffers at the expense of a villain and needs rescuing.
Gothic	A genre of literature and film that combines fiction and horror, death and, at times, romance.
Grotesque	Comically or repulsively ugly or distorted.
Injustice	Lack of fairness or justice.
Isolation	Being on your own away from others.

WORD	DEFINITION
Monstrous	Having the ugly or frightening appearance of a monster.
Neglect	Fail to care for properly.
Paranormal	Denoting to events or phenomena which are beyond the scope or normal scientific understanding.
Resurrection	The action or fact of rising from the dead.
Supernatural	Manifestations or events considered to be of supernatural origin, such as ghosts.
Telepathic	Able to read the minds of other people.

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The Lie Tree CHARACTERS

Faith	Reverend Erasmus	Clay	Jeanne Bisette
The protagonist and narrator of the novel who loves science.	Faith's father, a famed natural scientist who is caught in a scandal.	Clay is around the same age as Faith, he shows Faith the photographs.	A young house maid
Faith creates a series of lies of her own in the hope the tree will reveal its secrets.	Creates an elaborate lie because he believes in a powerful plant.	Clay is of a lower social class than Faith and she exploits this.	Despite her lowly social class, Jeanne challenges Faith.
Curious Stubborn Loyal	Intelligent Hot-tempered Authoritative	Loyal Isolated Intelligent	Untrustworthy Curious Vengeful
Faith's six-year-old brother.	Faith's mother, she struggles to navigate the patriarchy	Anthony Lambent's wife, pursues science.	Faith's Uncle and Myrtle's brother.
Howard is the treasured son because he is not limited by gender expectations.	Has a strained relationship with Faith, often due to Myrtle's obsession with reputation.	A parallel to Faith's character, she is also frustrated by gender expectations.	Miles is jealous of Erasmus' scientific success.
Naïve Loving Immature	Vain Protective Controlling	Vengeful Manipulative Corrupt	Jealous Deceptive Controlling
Howard	Myrtle Sunderly	Agatha Lambent	Uncle Miles

The Lie Tree: historical context.



Scientific discovery

In the **1860s**, the scientific community was still coming to terms with the theory of **evolution** which contradicted the long-standing Religious belief that God had created everything.

Religious beliefs in the Victorian Period may seem old fashioned now. For example, Howard is forced to keep his dominant arm in a sling out of a religious belief that the right hand should be dominant. Nonetheless, **it was expected that you would adhere to these beliefs.**



The Lie Tree

A magical tree that consumes people's whispered lies, converting them into truths. The tree only flowers and bears fruit if it is fed whispered lies, which the whisperer must then spread to other people.

Archaeology: The study of human history through the excavation of burial sites.

Dig sites: Areas where numerous fossils are found and analysed.

Gin traps: small traps designed for catching birds or small mammals.



Gender

Faith experiences sexism throughout the novel, she is resentful of having spent her fourteen years alive treated as **incompetent, weak, and stupid.**

Gender expectations meant young girls were expected to be **meek and quiet**, whilst boys were expected to be strong and opinionated.

These limitations prevent Faith from pursuing her love of Science. Myrtle also struggles to effect change in this **male-dominated society.**



Reputation

Victorian society had a **rigid and stifling class system, reputations were everything** and families must keep up their appearances at all costs. **Gossip and rumours** could lead to a loss in reputation.

Linking to reputation, attitudes to suicide were negative, it was viewed as a sin to take your own life because it went against the Bible and would bring shame upon the family.

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The Lie Tree: Exposition



PLOT

The book begins with a damp and bleak journey through the English channel to the Island of Vane. The characters travel by boat.



Faith Sunderly, the fourteen-year-old protagonist, is reluctantly traveling with her parents to Vane, to allow her father to help with an archaeological site



In their 1860s world, the scientific community is still coming to terms with the theory of evolution, trying in different ways to fit it in with its adamant Creationist religious beliefs.



We learn that Faith's father Reverend Erasmus has recently landed a place in the spotlight for his discovery of the fossil of a winged man.



Faith's father becomes increasingly mysterious and horrid towards Faith when she enters his study.

KEY QUOTES

"The boat moved with a nauseous, relentless rhythm, like someone chewing on a rotten tooth (CH 1)

"On Myrtle's orders, Faith was sitting on the family's largest crate, to stop anybody dragging it out again"

"Lamarck and Darwin are leading the world into a great error! He declared. If we say that species change, then we say that they were created imperfect! We criticise God himself!" (CH 5 Clay)

"Get out." It was a whisper, but with more venom than Faith had ever heard in her father's voice.(CH 6 Erasmus) 52

The Lie Tree: Rising Action

					
KEY PLOT QUOTES	The family struggle to adjust to their new lives in Vane, the island is isolated and full of mystery.				
	"The first early-morning movements in the house nudged her from her dreams." (CH 7)	"It felt blasphemous seeing him asleep." (CH 7)	"The scandal surrounding her father had arrived on Vane, formally and in print." (CH 7)	"It was a man who was draped over a tree. The cold air was a knife in Faith's throat." (CH 11)	"Not an accident. Not suicide. Murder"(CH 13)

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The Lie Tree: Climax

					
KEY PLOT QUOTES	Faith first traces her father's footsteps to his most recent discovery. The specimen is a strange tree whose fruit is supposed to induce visions in the people who consume it..				
	"Her thoughts slid to the shrouded plant pot that her father had been so desperate to conceal." (CH 15)	"If the tree could deliver secrets, then perhaps it would unravel for her the mystery of her father's death."	"I have a lie for you. My father's ghost walks, seeking revenge on those who wronged him." (CH 16)	"They are all looking for smuggler's treasure and they want to keep it for themselves." (CH 21)	"A lie was like a fire, Faith was discovering. At first it needed to be nursed and fed." (CH 25)

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The Lie Tree: Falling Action

KEY PLOT QUOTES					
	The Lie Tree soon becomes a tool for Faith to express her most malicious impulses. Yet, her usage of the tree is presented as human given the discrimination she continues to suffer as a girl. "Miss Hunter had poisoned the islanders' minds against the Sunderly family. Now Faith had the chance to return the favour." (CH 26)	Faith terrorises a young servant girl who was the first to suggest that Erasmus committed suicide. She also blackmails a village boy into assisting with her murder mystery. "No! Paul gripped his own hair, closed his eyes for a moment and let out a breath. You Win." (CH 26 clay)	Then, in one of her worst rumors, she convinces the islanders to hurt Miss Hunter, who is in charge of the post office. "People were animals, and animals were nothing but teeth. You bit first, and you bit often." (CH 27)	The morality of Faith's actions is ambiguous: she is causing harm to her community, but in doing so, is enabled to see and understand more about the world. "You must be ruthless, said the voice in her head. You have come too far to turn back now." (CH 28)	Through the Lie Tree, She meets people she would normally never be allowed to talk to, gaining exposure to the darker parts of her seemingly polite world. In some ways she becomes empowered. "A tree that could give you secrets nobody else possessed and unpeel the mysteries of the World." 55

The Lie Tree: Resolution

KEY PLOT QUOTES					
	Faith ultimately finds that the perpetrator of the murder was Agatha, a brilliant scientist and naturalist who found it impossible to succeed in her place and time despite her brilliant mind "Now you little viper" (Agatha Lambert to Faith CH 33)	Ironically, Faith sympathises with her father's murderer, having felt the same misogyny and oppression throughout her young life. "A clever and vengeful woman." (Faith on Agatha CH 34)	However, Faith's goal is to better understand a confusing external world, Agatha's downfall is in her decision to get rich by committing murder and stealing the Lie Tree from Erasmus. "Here was the mythical beast that everybody had told her could not exist: a female natural scientist."	As the novel progresses, Agatha contracts malaria and falls into deep alcoholism. By the end of the novel, she has committed suicide, Agatha's suicide foreshadows how Faith's life could end. "And then spread her arms as she took her longest stride into eternity." (CH 35)	Avoiding that path, Faith reconciles with her mother and brother, learning to internalise the values of the family to furnish an identity and gain some semblance of freedom and self-determination. "I want to help evolution." (CH 36)

Knowledge Book Maths

Year 8

1

1	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

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



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

Inequalities

$$a > b$$

a is greater than b

$$a \geq b$$

a is greater than or equal to b

$$a < b$$

a is less than b

$$a \leq b$$

a is less than or equal to b

$$a < b < c$$

a is less than b which is less than c

8

Brackets

Indices

Divide

Multiply

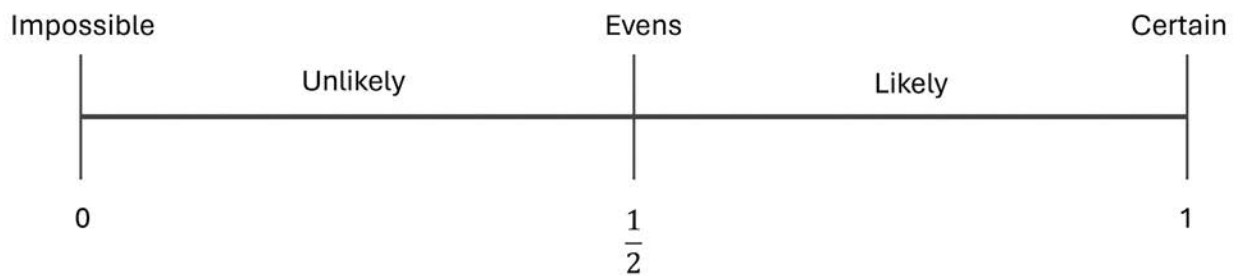
Add

Subtract

B
I
D
M
A
S



Probability Scale



Probability

Mutually Exclusive

Events cannot happen together

Exclusivity

Probability of all outcomes adds to one

$$P(\text{Event not Occuring}) = 1 - P(\text{Event Occuring})$$

11

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.

12

Highest Common Factor

The largest factor that goes into both numbers

Lowest Common Multiple

The smallest multiple both numbers go into.

13

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

14

Square Numbers

The result when a number is multiplied by itself.

Square Numbers



$$\begin{aligned}1 \times 1 &= 1 \\2 \times 2 &= 4 \\3 \times 3 &= 9 \\4 \times 4 &= 16 \\5 \times 5 &= 25 \\6 \times 6 &= 36 \\7 \times 7 &= 49 \\8 \times 8 &= 64 \\9 \times 9 &= 81 \\10 \times 10 &= 100 \\11 \times 11 &= 121 \\12 \times 12 &= 144 \\&\text{etc}\end{aligned}$$

Cube Numbers

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

Cube Numbers



$$\begin{aligned}1 \times 1 \times 1 &= 1 \\2 \times 2 \times 2 &= 8 \\3 \times 3 \times 3 &= 27 \\4 \times 4 \times 4 &= 64 \\5 \times 5 \times 5 &= 125\end{aligned}$$

15

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

16

Product of Prime Factors

A multiplication involving only prime numbers that will multiply out to give a number.

Each number has a unique product of prime factors.

17

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

18

Notation: Signs

=

Equal to

≠

Not equal to

≈

Approximately
equal to

≡

Equivalent to

<

Smaller than

>

Greater than

≤

Smaller than or equal to

≥

Greater than or equal to

19

Difference of Two Squares

$$(x - a)(x + a)$$



$$x^2 - a^2$$

↖
A square number

20

Equations, expressions, identities, formulae and inequalities

$$2a - b^2 + 3ab$$

EXPRESSION

No equals sign or inequality sign.

$$x^2 + 3x + 2 = (x + 2)(x + 1)$$

IDENTITY

Both sides are exactly the same

$$x^2 + 3x + 2 = 0$$

EQUATION

Possible to find a value for the unknown

$$x^2 + 3x + 2 < 0$$

INEQUALITY

Similar to an equation but an inequality sign.

Can find a range of values for the unknown

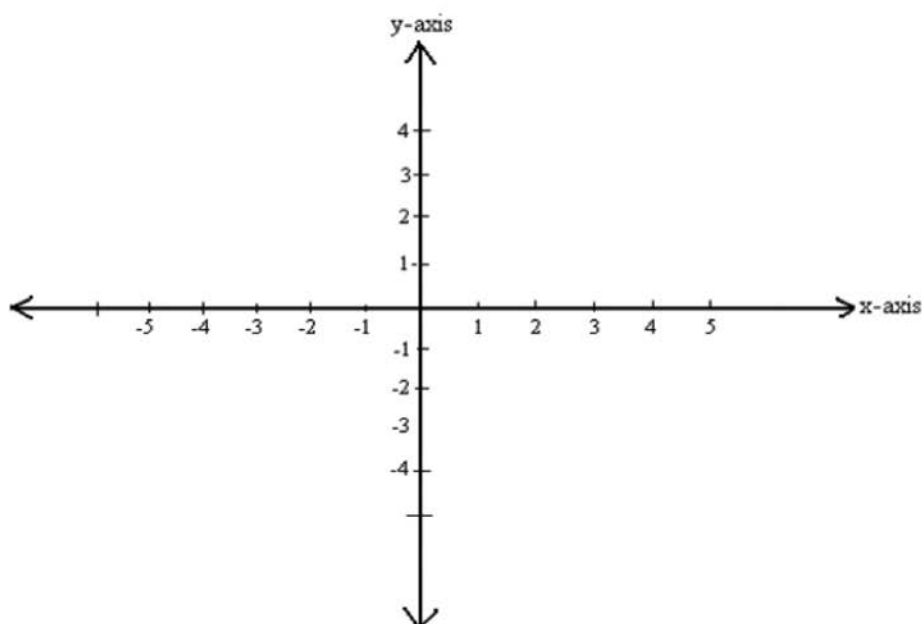
$$s = ut + \frac{1}{2}at^2$$

FORMULA

Used to find the value of the subject when the other values are known

21

Coordinates and Axes



Coordinate

(x, y)

22

Equation of a line

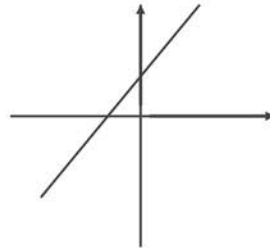
Equation of a straight line is in this form.
Rearrange to this form.

c is the y intercept.
The y value where the line crosses the y -axis.
Coordinates $(0, c)$

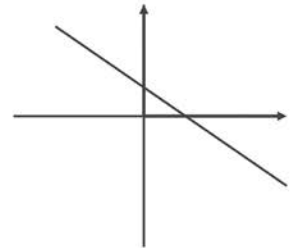
$$y = mx + c$$

m is the gradient
Gradient is the rate of change of y for every change of 1 in x

$$m = \frac{\text{difference in } y}{\text{difference in } x}$$



Positive Gradient



Negative Gradient

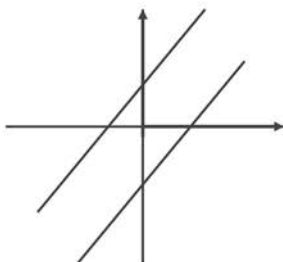
23

Parallel and Perpendicular Lines

$$y = mx + c$$

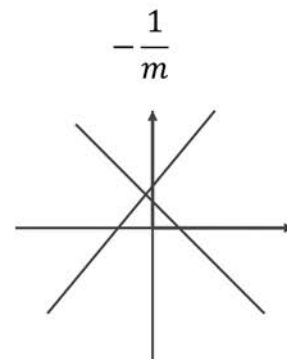
Parallel

Parallel lines will have the same gradient.
They will have different y -intercepts.



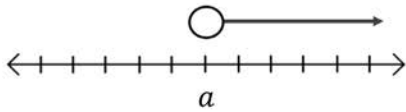
Perpendicular

Perpendicular lines are at 90° to each other.
If a line has a gradient m
Then a line perpendicular to it will have a gradient

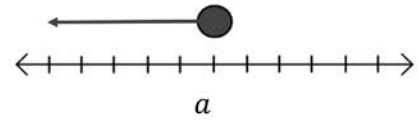


24

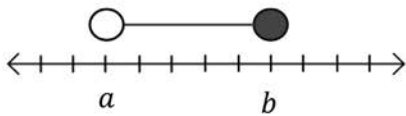
Inequality on a number line



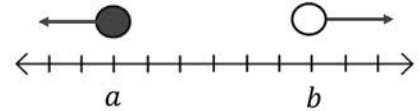
$$x > a$$



$$x \leq a$$



$$a < x \leq b$$



$$x \leq a \text{ or } x > b$$

25

Sequences

Linear or Arithmetic

Changes by the same amount each time.

Geometric

Multiplied or divided by the same amount each time

Quadratic

Second difference is the same

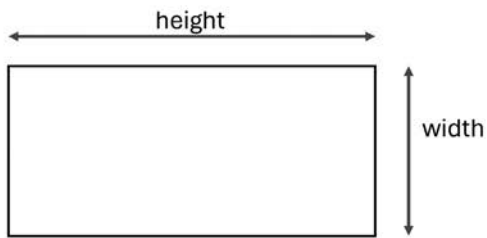
Fibonacci

The next term is the sum of the previous two terms

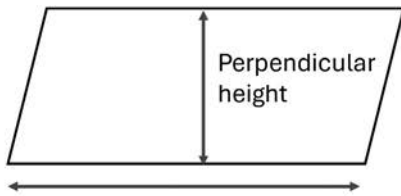
26

Area

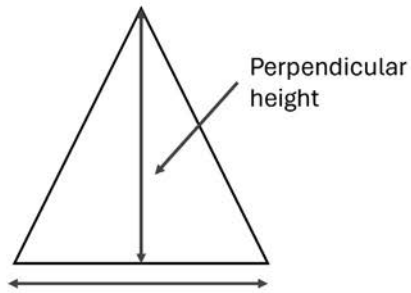
The space inside a shape



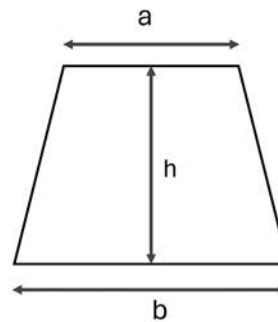
$$\text{Area} = \text{length} \times \text{width}$$



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



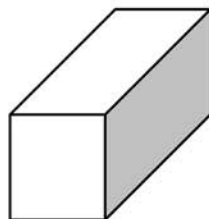
$$\text{Area} = \frac{1}{2} \times \text{base} \times \text{perpendicular height}$$



$$\text{Area} = \frac{(a + b)h}{2}$$

27

Volume



$$\text{Volume of a Cuboid} = \text{length} \times \text{width} \times \text{height}$$

A prism is a 3D shape with a constant cross section.

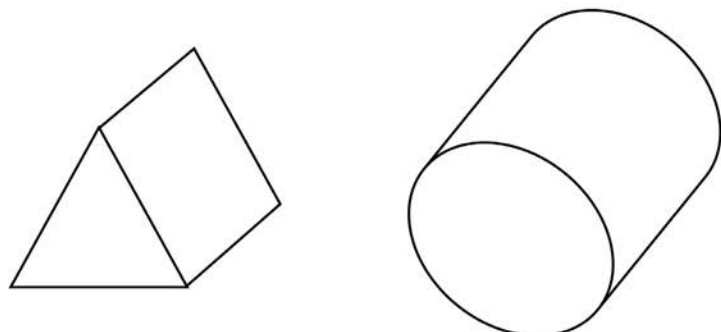
Prisms include

Cuboid

Cylinder

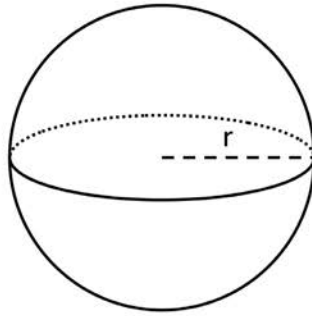
Triangular Prism

$$\text{Volume of a Prism} = \text{Cross Sectional Area} \times \text{Length}$$

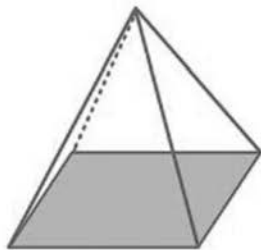


28

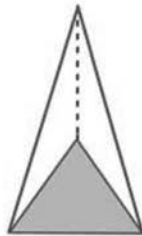
Volume



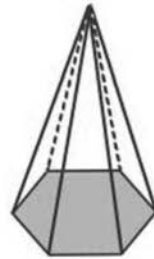
$$\text{Volume of a sphere} = \frac{4}{3}\pi r^3$$



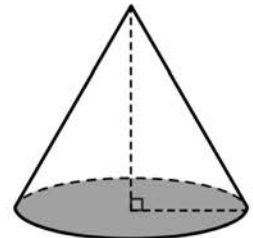
SQUARE PYRAMID



TRIANGULAR PYRAMID



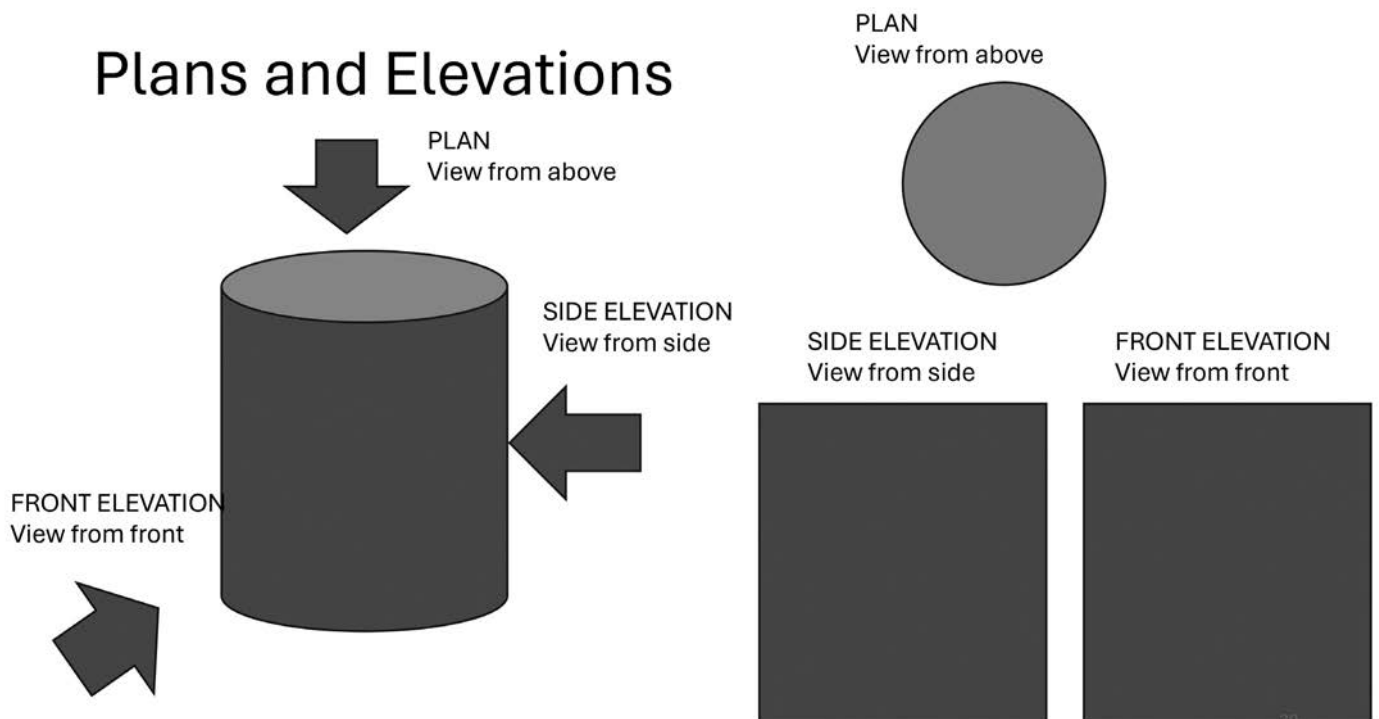
HEXAGONAL PYRAMID



Cone
(A circle-based pyramid)

$$\text{Volume of a Cone} = \frac{1}{3} \times \text{height} \times \text{area of base}$$

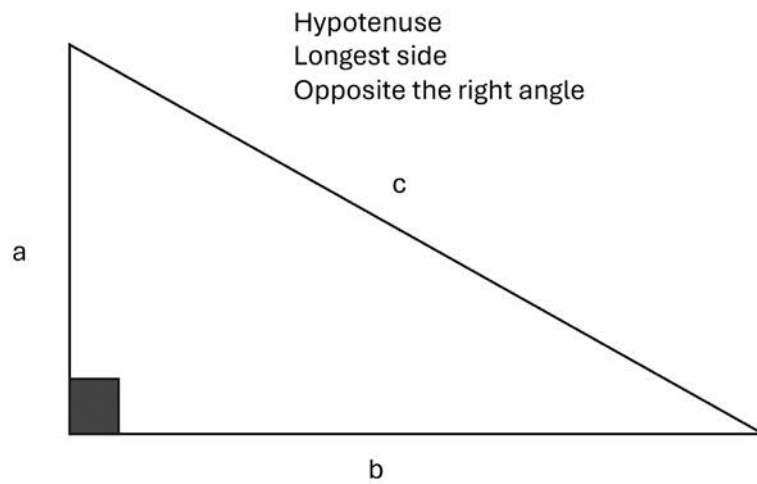
Plans and Elevations



Pythagoras Theorem

To find a missing side

$$a^2 + b^2 = c^2$$



Must be a right angled triangle

Year 8 Science

CONTENTS

1. Practical Skills
2. Hazards and Equipment
3. Presenting data
4. Earth structure and rocks
5. Weathering and the rock cycle
6. Day, night and seasons
7. The Moon and the Universe
8. The Periodic Table
9. Elements
10. Compounds
11. Chemical formulae
12. Types of forces
13. Effects of forces
14. Speed
15. Mass, weight and pressure
16. Work done and moments
17. Magnetism
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18. Conduction and Specific Heat Capacity
19. Convection and radiation
20. Food chains and webs
21. Interdependence
22. Carbon cycle
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25. DNA
26. Natural selection and evolution
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30. Earth resources
31. Photosynthesis and respiration keywords
32. Photosynthesis
33. Respiration
34. Maths in science 1
35. Maths in science 2

1. Practical Skills Key Terms

Keyword	Definition
Anomalous result	A piece of data that does not fit the pattern i.e. odd result
Bar chart	Used for categorical (discontinuous) data. e.g. eye colour
Categorical data	Has values that are words or discrete numbers.
Continuous data	Has values that can be any number.
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.
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
Mean	An average of a set of data, calculated by adding all the values and dividing by the number of values.

Keyword	Definition
Pie chart	Diagram to show the proportions or percentages that make up a whole.
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 deliberately changed
Dependent variable	The variable which changes as a result of hanging something else (the result)
Control variable	A variable which may affect the dependent variable, so 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

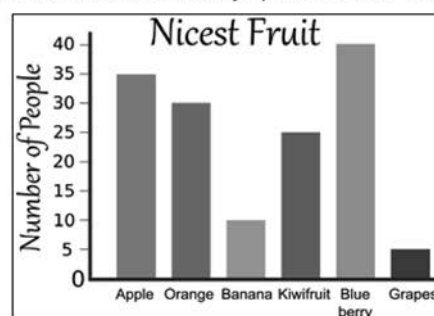
The independent variable is always in column 1.

Units should only be in the column heading.

Presenting data as a graph

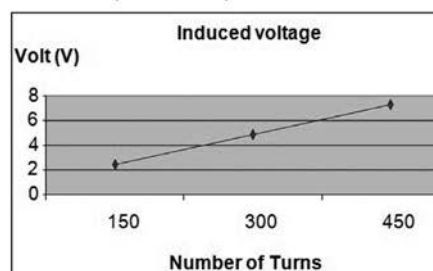
The independent variable is always plotted on the X axis.

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.

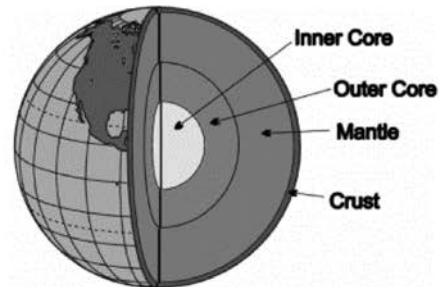
3

4. Earth Structure and Rocks

Keyword	Definition
Igneous rocks	Formed from cooled magma, with minerals arranged in crystals. Examples include granite, basalt and obsidian.
Metamorphic rocks	Formed from existing rocks exposed to heat and pressure over a long time. Examples include marble, slate and schist.
Minerals	Chemicals that rocks are made from.
Sedimentary rocks	Formed from layers of sediment, which can contain fossils. Examples include limestone, chalk and sandstone
Strata	Layers of sedimentary rock.

The Earth is made up of three different layers:

1. Crust
2. Mantle
3. Core

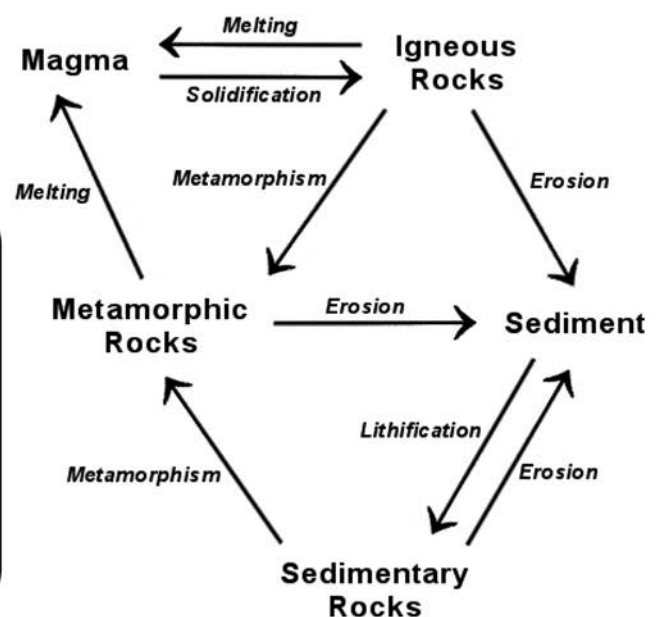
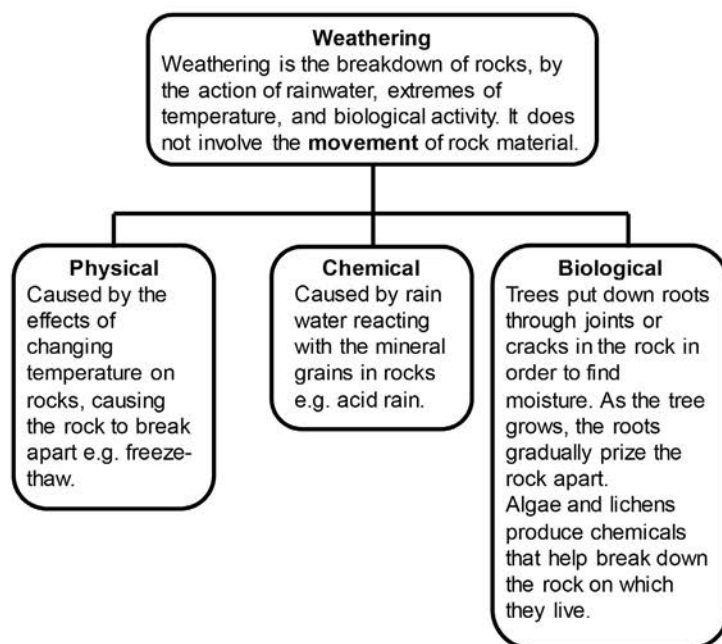


There are three main rock types found on Earth.

- 1: Sedimentary
- 2: Metamorphic
- 3: Igneous.

4

5. Weathering and the Rock Cycle



Erosion is the process by which soil and rock particles are worn away and moved elsewhere by gravity, or by a moving transport agent – wind, water or ice. This involves movement of rock particles

Transport refers to the processes by which the sediment is moved along e.g. pebbles rolled along a river-bed or sand grains whipped up by the wind

6. Day, Night and Seasons

Day

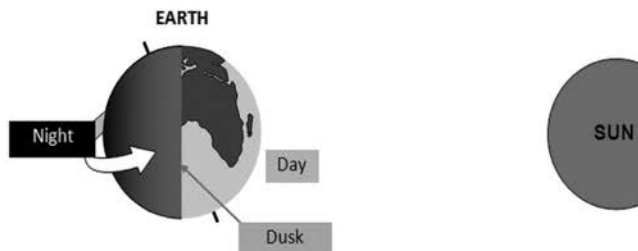
The time taken for the Earth to rotate on its axis.

This takes 24 hours

Day and Night

The Sun lights up one half of the Earth, and the other half is in shadow.

As the Earth spins, we move from shadow to light and back again.



Year

The time taken for a planet to orbit the Sun

The Earth orbit takes 365.25 days.

To make things easier, we call 365 days a year, and have a leap year every 4th year to add up the extra four lots of 0.25 years.

Seasons

The Earth tilts on its axis

Summer in the UK: The northern hemisphere is tilted towards the Sun.

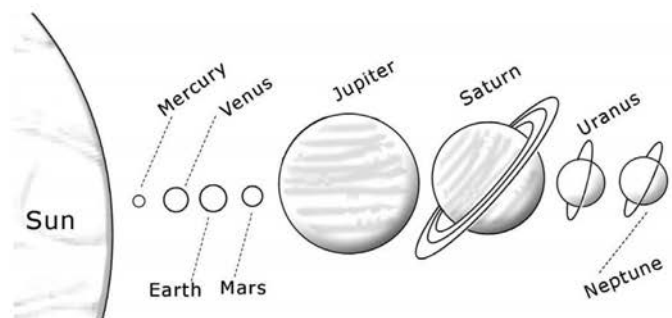
Winter in the UK: The northern hemisphere is tilted away from the Sun.

Light takes minutes to reach Earth from the Sun, four years from our nearest star and billions of years from other galaxies.

6

7. The Moon and the Universe

Keyword	Definition
Exoplanet	Planet that orbits a star outside our solar system.
Galaxy	Collection of stars held together by gravity. Our galaxy is called the Milky Way.
Light year	The distance light travels in a year (over 9 million, million km).
Orbit	Path taken by a satellite, planet or star moving around a larger body. Earth completes one orbit of the Sun every year.
Stars	Bodies which give out light, and which may have a solar system of planets.

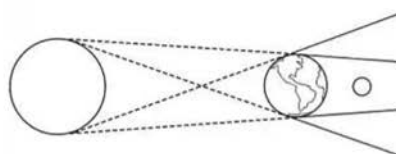


Solar eclipse: When the Moon comes directly between the Sun and the Earth. Part of the Earth is in the Moon's shadow.

Result: The sky goes dark even though it is day-time.



Lunar eclipse: when the Earth lies directly between the Sun and the Moon. The Moon lies in the shadow of the Earth.



7

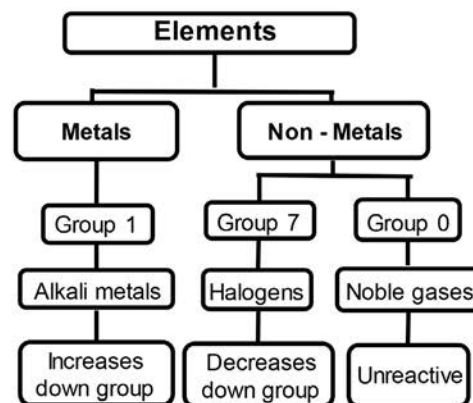
8. The Periodic Table

Keyword	Definition
Groups	Columns of the periodic table.
Periods	Rows of the periodic table.
Periodic table	Shows all the elements arranged in rows and columns in order of proton number.

GROUP NUMBER

GROUP NAME

REACTIVITY



Periodic table

The periodic table is a way of representing chemical elements according to the properties and mass.

As you go down a group and across a period the elements show patterns in physical properties.

Metals are found on the left side of the table. Non-metals are found on the right of the 'staircase'.

8

9. Elements

Keyword	Definition
Atom	The smallest particle of an element that can exist.
Chemical properties	An example is reactivity. Hard to observe, but you can react elements with other elements and see if a compound forms.
Elements	What all substances are made up of, and which contain only one type of atom.
Physical properties	Examples include colour, boiling point, conducting electricity. Something you can observe which doesn't change the substance itself.

Symbols

All element symbols start with a capital letter.

If the next letter is lower case, it is still the same element

Ca for calcium

Cu for copper

Co for cobalt

7 Top number (Mass number)

Li

3 Bottom number (Atomic number)

Proton = bottom number

Electron = bottom number

Neutron = top number – bottom number

9

10. Compounds

Keyword	Definition
Compound	2 or more elements chemically joined together e.g. H_2O
Mixture	More than one element, atom compound or molecule that is not chemically joined together.
Molecules	More than one element of <u>the same</u> element chemically joined together e.g. H_2
Polymer	A molecule made of thousands of smaller molecules in a repeating pattern. Plastics are man-made polymers, starch is a natural polymer.

To name simple compounds of metals and non-metals

1. Write down the name of the metal
 2. Write down the name of the non-metal, changing the ending of the word to “-ide”.
- magnesium and oxygen becomes **magnesium oxide**.

Naming complex compounds:

Chemical formula	Name
-SO ₄	Sulfate
-NO ₃	Nitrate
-OH	Hydroxide
-CO ₃	Carbonate

MgSO₄ - magnesium sulfate

NaOH – sodium hydroxide

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11. Chemical Formulae

Meaning of words

Mono means 1

Di means 2

Tri means 3

Carbon dioxide = 1 carbon and 2 oxygen

Carbon monoxide = 1 carbon and 1 oxygen

Meaning of numbers

A lower-case number next to an element tells you how many atoms of that **element** you have.

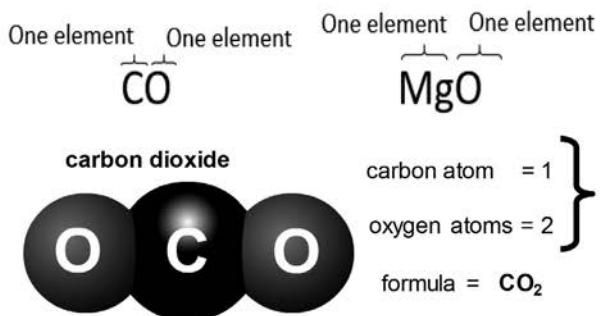
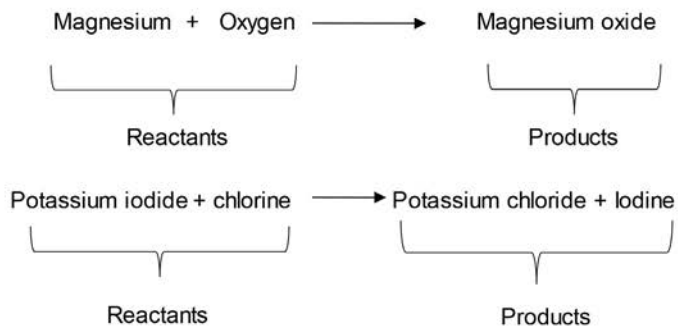
CO₂ Carbon dioxide

This compound has 1 carbon atom (the number 1 is not written) and 2 oxygen atoms.

A large number before a compound tells you how many of those **compounds** you have.

$2\text{H}_2\text{O}$ means 2 molecules of water.

Word equations



12. Types of Forces

Keyword	Definition
Compression	Force squashing or pushing together.
Friction	Force opposing motion which is caused by the interaction of surfaces moving over one another. It is called 'drag' if one is a fluid.
Gravitational field strength, g	The force from gravity on 1 kg (N/kg).
Newton	Unit for measuring forces (N).
Tension	Force extending or pulling apart.
Upthrust	The upward force that a liquid or gas exerts on a body floating in it.

Contact Forces (objects in contact with another)	Non-contact Forces (objects NOT in contact with another)
Friction	Gravitational force
Air/water resistance 'drag'	Electrostatic force
Upthrust/buoyancy	Magnetic force
Tension/pull	
Compression/push	

12

13. Effects of Forces

Effects of forces:

On a diagram, force is an arrow. The bigger the arrow drawn the bigger the force. The force is working in the same direction as the arrow is pointing

Forces have a size and direction



Resultant force	The sum of all the forces acting on an object
Resultant force = 0	The object does not move, or stays at the same speed in a straight line
Resultant force ≠ 0	The forces are unbalanced. The object will slow down, speed up or change direction.

Unbalanced forces

The object:

- Will accelerate or decelerate
- Change in direction/position/physical appearance (compressed or deformed)

Balanced Forces

The object will:

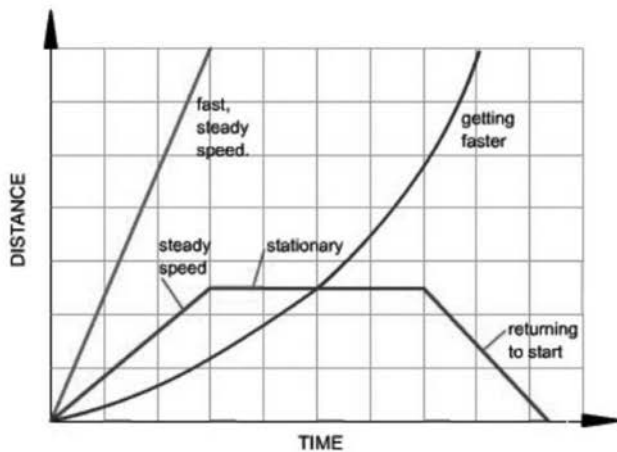
- Be stationary
- Be moving at a constant speed.

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14. Speed

Keyword	Definition
Acceleration	The rate of change of speed either increase or decrease.
Average speed	The overall distance travelled divided by overall time for a journey.

Distance-Time Graphs



Using the speed equation

$$\text{speed} = \text{distance} \div \text{time}$$

Use the EVERY model for calculations

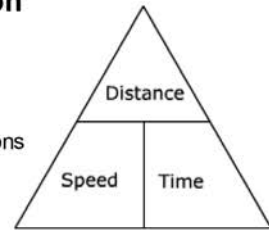
E = equation

V = values

E = enter results

R = result

Y = units



Example 1: Calculate the average **speed** of a runner who runs 100 m in 10 s.

E distance $\div$ time

V $d = 100 \text{ m}$ and $t = 10 \text{ s}$

E $100 \text{ m} \div 10 \text{ s}$

R 10

Y m/s

Example 2: The speed limit on a road is 13.4 m/s. Calculate the **distance** travelled by a car in 2 s at this speed.

E speed $\times$ time

V speed = 13.4 m/s and $t = 2 \text{ s}$

E $13.4 \text{ m/s} \times 2 \text{ s}$

R 26.8

Y m

14

15. Mass, Weight and Pressure

Keyword	Definition
Mass	The amount of matter/'stuff' in an object.
Weight	The force of gravity on an object (N).

Mass will not change but weight can change due to gravitational field strengths.

$$\text{weight (N)} = \text{mass (kg)} \times \text{gravitational field strength (N/kg)}$$

Use the EVERY model for calculations

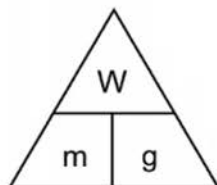
E = equation

V = values

E = enter results

R = result

Y = units



Example: Find the weight of a person on Earth if they have a mass of 65 kg ($g = 10 \text{ N/kg}$).

E mass $\times$ gravitational field strength

V $m = 65 \text{ kg}$ and $g = 10 \text{ N/kg}$

E $65 \text{ kg} \times 10 \text{ N/kg}$

R 650

Y N

Keyword	Definition
Fluid	A substance with no fixed shape, a gas or a liquid.
Pressure	The ratio of force to surface area, in N/m^2 .

Pressure acts in all directions.

Underwater - As the weight of fluid above you increases, it increases the pressure.

Objects sink or float depending on whether the weight of the object is bigger or smaller than the upthrust.

Air pressure decreases as we go higher into the atmosphere.

$$\text{Pressure (N/m}^2\text{)} = \text{force (N)} \div \text{area (m}^2\text{)}.$$

Example: A force of 20 N acts over an area of 4 m^2 .

Calculate the pressure

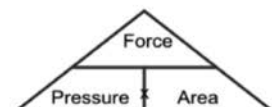
E force $\div$ area

V $F = 20 \text{ N}$ and $A = 4 \text{ m}^2$

E $20 \text{ N} \div 4 \text{ m}^2$

R 5

Y N/m^2



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16. Work Done and Moments

When a force causes a body to move, work is being done on the object by the force.

The amount of work done when a force acts on a body depends on two things:

- The size of the force acting on the object
- The distance through which the force causes the body to move in the direction of the force

$$\text{Work done (J)} = \text{Force (N)} \times \text{Distance (m)}$$

Use the EVERY model for calculations

E = equation

V = values

E = enter results

R = result

Y = units



Example: A horizontal force of 50 N causes a trolley to move a horizontal distance of 30 m. How much work is done on the trolley by the force?

E force x distance

V $F = 50\text{ N}$ and $d = 30\text{ m}$

E $50\text{ N} \times 30\text{ m}$

R 1500

Y J

Machines make work easier by lowering the force needed.

Lever: A simple machine which is a rigid bar that moves around a point.

When you apply effort, it works across a called a pivot and applies a greater load somewhere else.

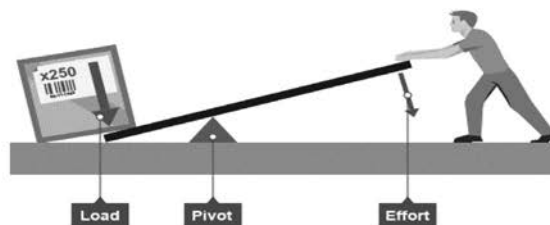
A **moment** is a turning force.

$$\text{Moment (N/m)} = \text{Force (N)} \times \text{Distance (m)}$$

The work done can be reduced by reducing the force applied and/or the distance from the pivot.

The effort is the force you apply.

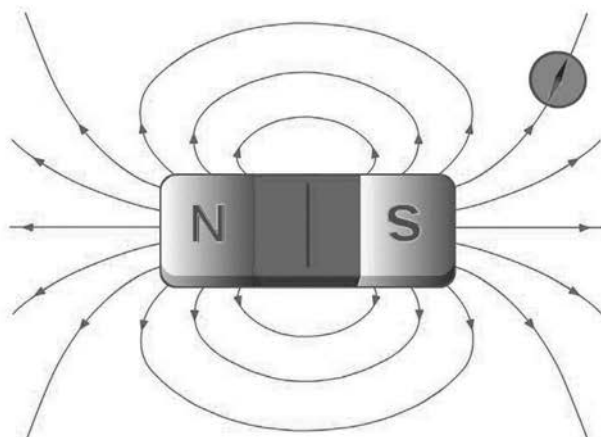
The pivot produces a bigger force to move the load, which requires less effort.



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17. Magnetism

Keyword	Definition
Magnetic force	Non-contact force from a magnet on a magnetic material.
Magnetic poles	The ends of a magnetic field, called north-seeking (N) and south-seeking poles (S).
Permanent magnet	An object that is magnetic all of the time



Magnetism

A permanent magnet is always magnetic.

Two 'like' magnetic poles repel (N with N, and S with S)

Opposite 'unlike' magnetic poles attract (N and S)

Field lines flow from the north-seeking pole to the south-seeking pole.

A compass will point to Earth's magnetic north pole.

Iron, nickel and cobalt are magnetic metals. Steel is magnetic because it contains iron.

Magnetic field lines

Magnetic materials, electromagnets and the Earth create magnetic fields.

We can show these fields using field lines.

The closer the field lines are, the stronger the magnetic force.

The magnetic field is strongest at the poles.

Field lines go from NORTH to SOUTH

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18. Electromagnets

Electromagnets:

When an electrical current passes through a wire it makes a magnetic field.

If you wrap this wire around a magnetic material such as iron, it becomes magnetically induced (only becomes magnetic when it is in a magnetic field).

Increasing the strength of an electromagnet:

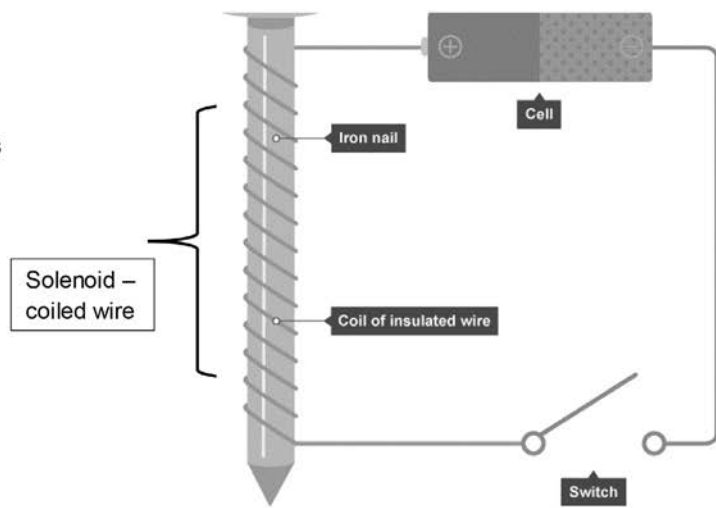
1. Increase the current through the wire.
2. Use an iron core.
3. Use a higher number of coils of wire around the core.

The magnetic field of an electromagnet decreases in strength the further away an object is.

Difference between magnets and electromagnets

In an electromagnet the magnetic field can be turned on and off, and the strength of the magnet can be changed.

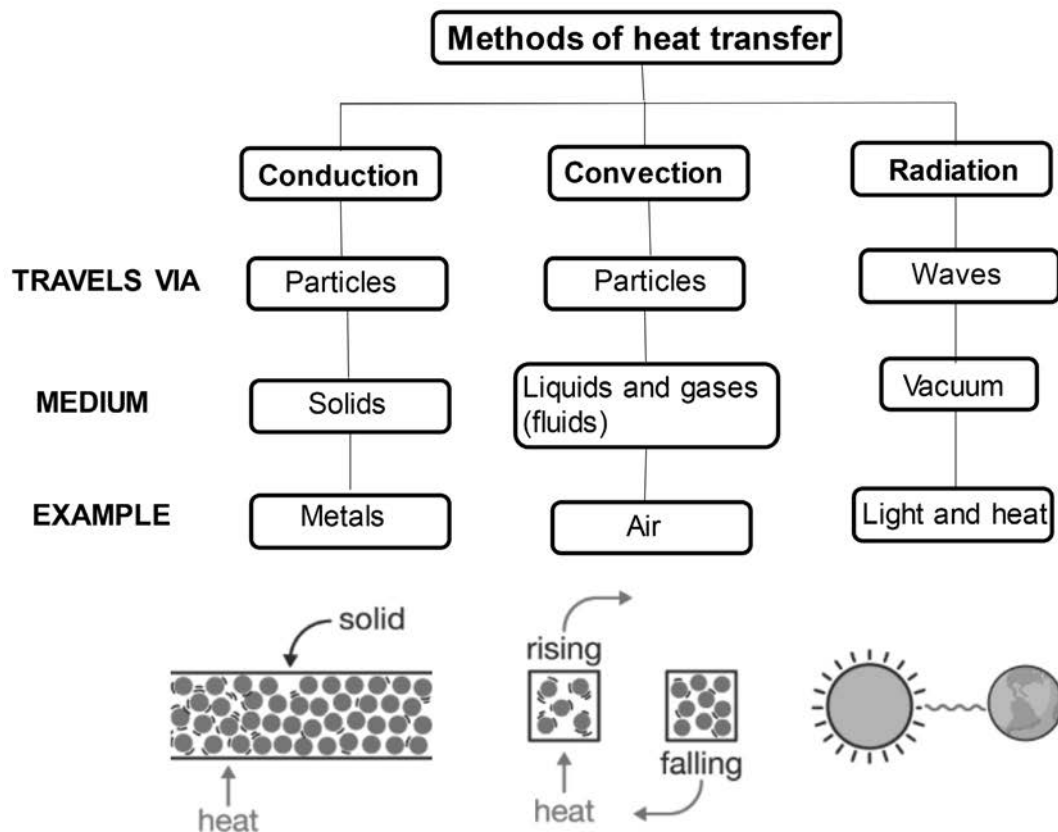
Electromagnets are useful in a variety of circuits such as in an electric bell.



Electromagnet	A non-permanent magnet turned on and off by controlling the current through it.
Solenoid	Wire wound into a tight coil, part of an electromagnet.
Core	Soft iron metal which the solenoid is wrapped around.

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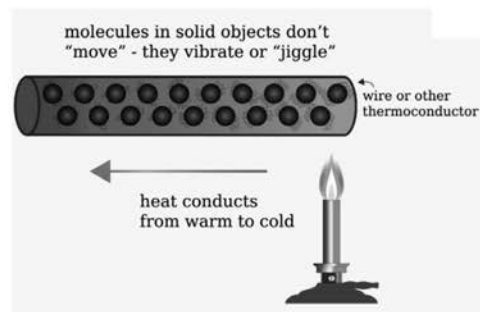
19. Methods of Heat Transfer



19

20. Conduction and Specific Heat Capacity

Keyword	Definition
Conduction	Transfer of thermal energy by the vibration of particles in a solid.
Temperature	A measure of the motion and energy of the particles.
Thermal conductor	Material that allows heat to move quickly through it.
Thermal energy	The amount of energy stored in a substance due to the vibration of its particles
Thermal insulator	Material that only allows heat to travel slowly through it



Happens in **solids** because particles are close together for the heat to transfer between them.

Particles gain internal energy and move more vigorously.

The particles bump into nearby particles and make them vibrate more.

This passes internal energy through the substance from the hot end to the cold end.

Specific Heat Capacity

The specific heat capacity of a material is the energy required to raise one kilogram (kg) of the material by one degree Celsius ($^{\circ}\text{C}$).

$$\begin{array}{l} \text{Change in} \\ \text{thermal} \\ \text{energy (J)} \end{array} = \text{mass (kg)} \times \begin{array}{l} \text{specific} \\ \text{heat} \\ \text{capacity} \\ \text{(J/kg}^{\circ}\text{C)} \end{array} \times \begin{array}{l} \text{change} \\ \text{in} \\ \text{temperature} \\ \text{(}^{\circ}\text{C)} \end{array}$$

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21. Convection and Radiation

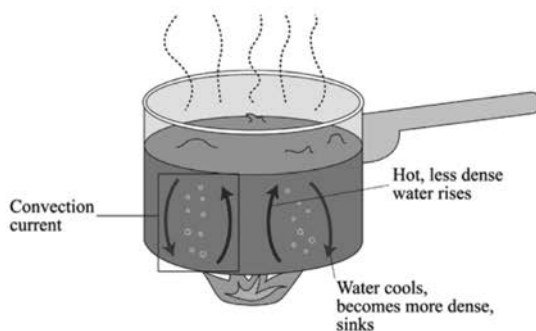
Convection

Particles with a lot of heat energy in a **liquid or gas** move and take the place of particles with less heat energy.

As areas of particles gain heat energy they move faster, become less dense and rise.

As they cool, they lose heat energy and become more dense, sinking to the bottom.

This process creates a convection current.



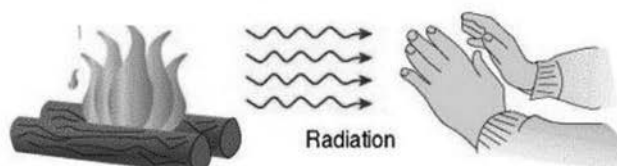
Infrared radiation

Energy transfer by radiation can occur in a vacuum (where there are no particles).

All objects transfer thermal energy by infrared radiation.

The hotter an object is, the more infrared radiation it gives off.

Radiation is how we feel the heat of the sun.



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22. Food Chains and Webs

Keyword	Definition
Consumer	An animal that eat other animals or plants.
Food chain	Part of a food web. Starts with a producer and ends with a predator.
Food web	Shows how food chains are linked together.
Interdependence	All organisms in an ecosystem depend upon each other
Producer	Green plant that makes its own food using sunlight.

Organisms (such as decomposers, consumers and producers) in a food web rely on each other for energy and food (nutrients).

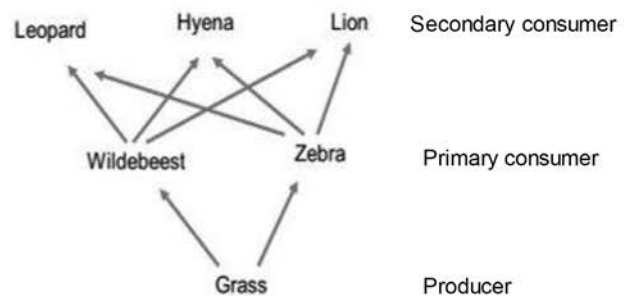
The **arrow** in a food chain shows the direction of energy.

A **food chain** always starts with a producer, a green plant or algae that uses photosynthesis to make sugar. For example:

Grass → Zebra → Lion

A **food web** shows multiple food chains together.

If there is a change in the number of one of plants or animals, there will be a knock-on effect to the others in the food web.



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23. Interdependence

Keyword	Definition
Decomposer	Organism that breaks down dead plants and animals so nutrients can be given back to the soil or water.
Ecosystem	The living things in an area and their non-living environment
Pesticide	Substance that is sprayed onto crops to kill organisms that can reduce plant growth such as weeds, insects and fungi e.g. DDT
Population	Group of the same species living in an area.

Bees are an example of a species that are involved in interdependence.

Bees pollinate crops including fruit, vegetables and cereals. Many organisms including humans, rely on these food sources.

The number of plants or animals in a species is affected by:

The number of predator animals

The number of prey animals

Diseases

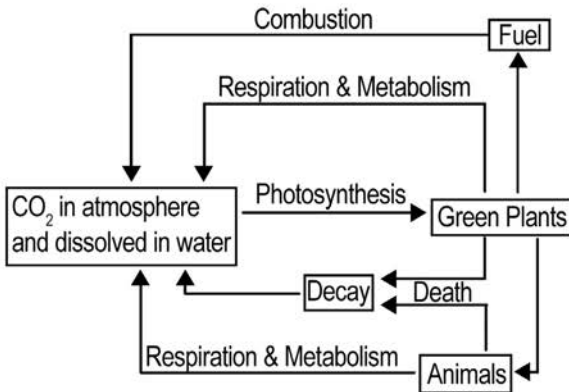
Pollution

Competition between plants and animals for water and food.

23

24. The Carbon Cycle

The carbon cycle shows how carbon moves through organisms and as carbon dioxide (CO₂) in the atmosphere.



Earth's atmosphere: 78 % nitrogen, 21 % oxygen, <1 % carbon dioxide, plus small amounts of other gases.

How carbon is recycled: By photosynthesis (COW GO) and respiration (GO COW).

Reasons why CO₂ levels have increased:

Human activities such as burning fossil fuels (FO COW) and deforestation.

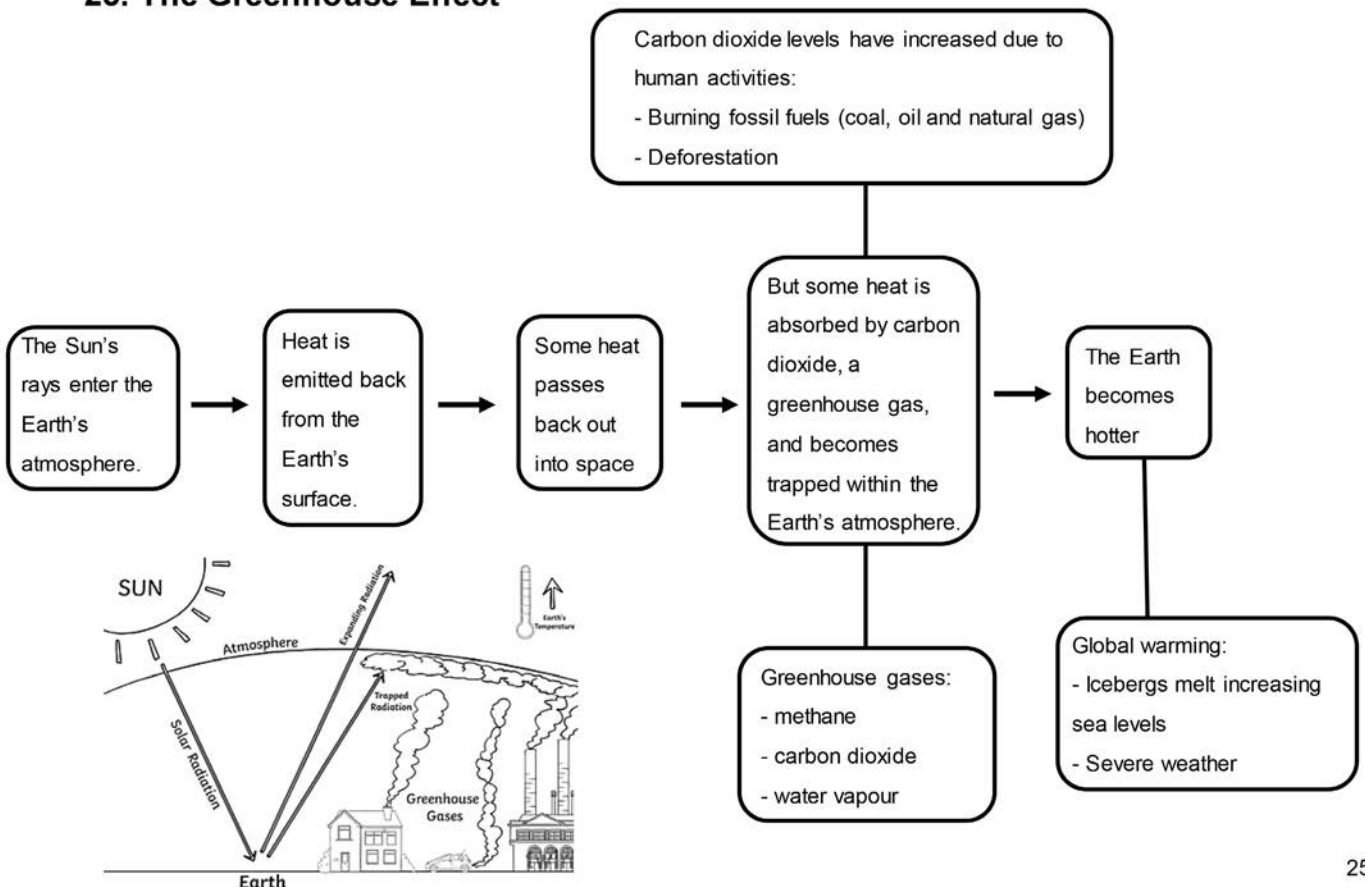
Greenhouse effect:

Greenhouse gases are carbon dioxide, methane, water vapour and ozone.

Scientists have evidence that global warming caused by human activity is causing changes in the climate.

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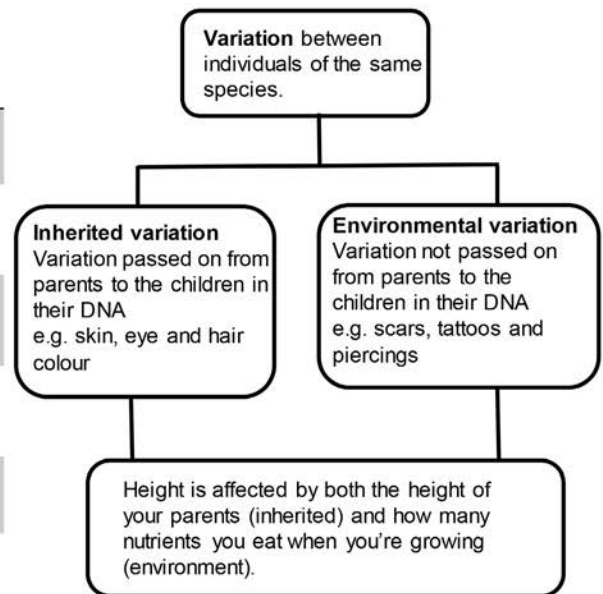
25. The Greenhouse Effect



25

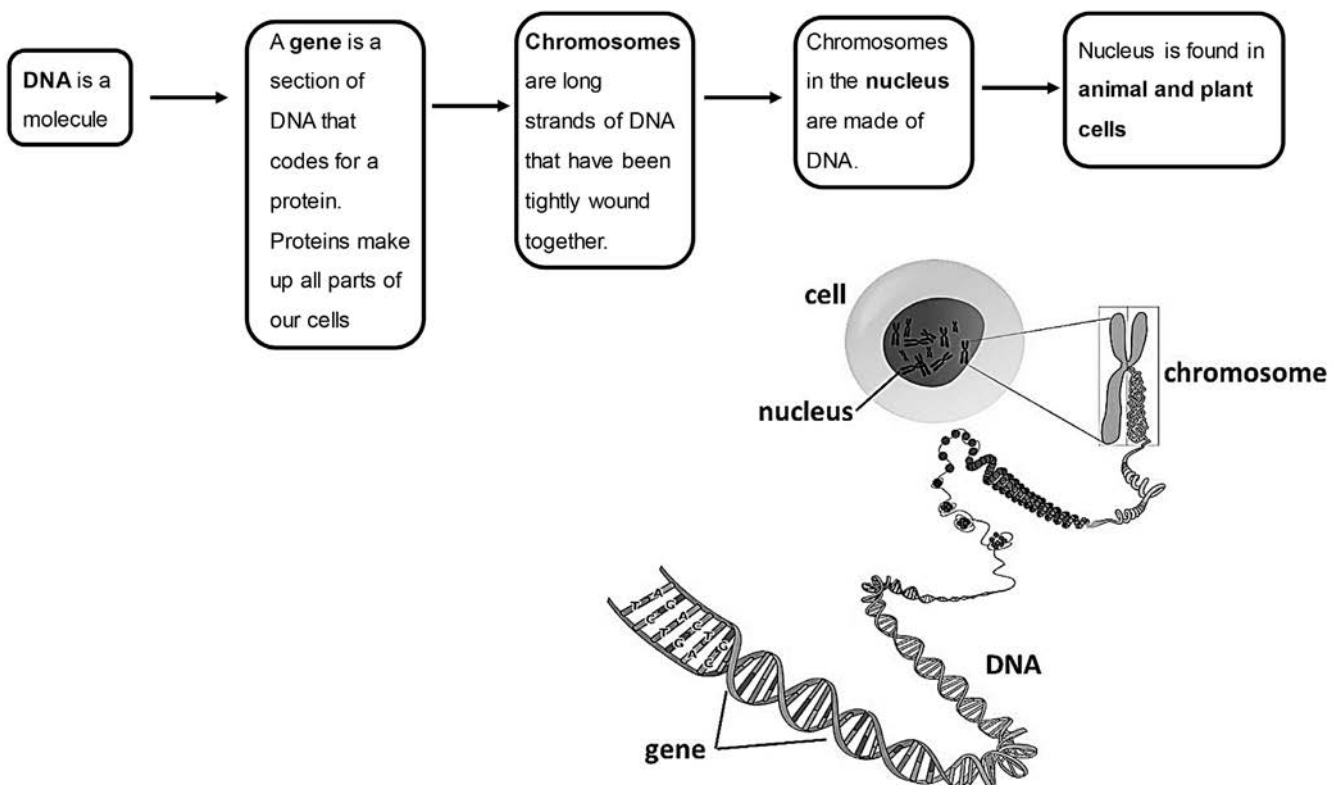
26. Variation

Keyword	Definition
Adaptation	The adaptations of organisms allow them to thrive in different habitats, including extreme environments.
Continuous variation	Where differences between living things can have any value (e.g. height, weight).
Discontinuous variation	Where differences between living things are grouped into categories (e.g. eye colour, hair colour).
Endangered	At risk of becoming extinct.
Evolution	How better adapted organisms have an advantage and are more likely to have offspring with this same adaptation.
Extinct	No living members of an organism exist in the wild.
Species	A group of living things that have more in common with each other than with other groups.
Variation	The differences within and between species.



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27. DNA



27

28. Natural Selection and Evolution

Charles Darwin stated that it is natural selection that drives the evolution of a species over time.

The key principles of **natural selection**:

1. Mutation causes variation in the population.
2. This variation gives some organisms an advantage (they are fitter).
3. These organisms are more likely to survive and reproduce.
4. The genes are passed onto the next generation.
5. Over many generations, the proportion of the population with that characteristic increases.

Charles Darwin was criticised in the 1800's as he didn't have sufficient evidence for his theory of natural selection. There is now a lot of evidence for natural selection.

Fossils are evidence for natural selection.

Fossils are the remains of organisms from millions of years ago, found in rocks.

We can learn from fossils about how life changed over time.

Fossils show us that extinctions happen.

Extinctions may be caused by:

New disease

New predator

Climate change

Habitat loss

Single catastrophic events e.g. an asteroid

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29. Energy Stores and Transfers

Keyword	Definition
Chemical energy store	Emptied during chemical reactions when energy is transferred to surroundings e.g. batteries and food
Dissipated	Become spread out wastefully
Elastic potential energy store	Filled when a material is stretched or compressed e.g. springs
Gravitational potential energy store	Filled when an object is lifted up.
Kinetic energy store	Filled when an object speeds up or increases movement.
Magnetic energy store	Filled when repelling poles have been pushed closer together or when attracting poles have been pulled further apart.
Power	How quickly energy is transferred by a device (measured in Watts).
Thermal/internal energy store	Filled when an object is warmed up.

Energy stores:

Mnemonic: MEN GET KC

Magnetic

Electrostatic

Nuclear

Gravitational potential

Elastic potential

Thermal

Chemical

Kinetic

Energy transfers from one store to another by:

Heating

Mechanical transfer (sound)

Electrical current

Waves (radiation/ light)

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30. Energy Costs

We pay for the electricity we use in our homes based on the amount of energy transferred.

$$\text{cost} = \text{power (kW)} \times \text{time (hours)} \times \text{price (per kWh)}$$

Different appliances in the home transfer different amounts of energy.

Appliances that heat (oven, hairdryer, kettle) transfer lots of energy.

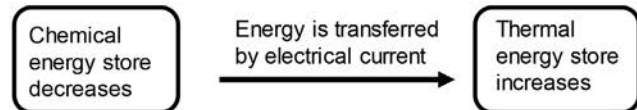
Appliances such as TVs and phones transfer less energy.

$$\text{Energy Efficiency \%} = \frac{\text{Useful energy output}}{\text{Total energy input}} \times 100$$

Food labels list the energy content of food in kilojoules (kJ).

When energy is transferred from one store to another, the total amount of energy stays the same.

Energy stores will increase or decrease but the total amount of energy in the system will not vary.



Some energy is transferred to unwanted or wasted energy (**dissipated**), reducing the amount of useful energy.

Energy is usually dissipated as heat or sound e.g. the waste energy of a light bulb, a TV or a car engine is heat.

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31. Energy Resources

Keyword	Definition
Energy resource	Something with stored energy that can be released in a useful way.
Fossil fuels	Non-renewable energy resources formed from the remains of ancient plants or animals. Examples are coal, crude oil and natural gas.
Non-renewable	An energy resource that cannot be replaced and will be used up. Examples are fossil fuels (natural gas, coal, oil) and nuclear power.
Renewable	An energy resource that can be replaced and will not run out. Examples are solar, wind, waves, geothermal and biomass.

Generating Electricity

Electricity is generated using a variety of different resources.

We separate the resources into renewable and non-renewable.

For both renewable and non-renewable energy resources, the same pathway is taken to generate electricity:

1. A fuel is burned (fossil fuels/nuclear/biofuel)/ OR a turbine is turned (wind power/hydroelectric power)
2. The fuel heats water which creates steam which turns a turbine.
3. The turbine turns a generator to generate electricity.

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32. Earth Resources

Keyword	Definition
Electrolysis	Using electricity to split up a compound into its elements.
Extraction	Separation of a metal from a metal compound (metal ore).
Mineral	Naturally occurring metal or metal compound.
Natural resources	Materials from the Earth which act as raw materials for making a lots of different products such as steel or plastics.
Ore	Naturally occurring rock containing large amounts of minerals for extraction.
Recycling	Processing a material so that it can be used again.

Natural resources such as iron, coal, oil and aluminium are found on Earth.

Most metals are found bound with other elements such as oxygen.

These compounds are called **ores** (e.g. bauxite, haematite)

Using the reactivity series to determine how to extract the metal from its ore

Potassium	Extract using electrolysis. Electrolysis requires lots of energy making it expensive to run
Sodium	
Calcium	
Magnesium	
Aluminium	
Carbon	Extract using carbon (reduction) by displacement. Carbon is cheap so this is an inexpensive process.
Zinc	
Iron	
Tin	
Lead	
Copper	Occurs native in the ground
Silver	
Gold	

Recycling lowers the amount of natural resources taken from the Earth.

Plastic items can be reused, recycled or burnt.

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33. Photosynthesis and Respiration Keywords

Photosynthesis Keywords	
Keyword	Definition
Chlorophyll	Green pigment in plants and algae which absorbs light energy.
Chloroplast	The site of photosynthesis inside a plant cell.
Fertilisers	Chemicals containing minerals that plants need to build new tissues.
Photosynthesis	A process where plants and algae turn carbon dioxide and water into glucose and release oxygen.
Stomata	Pores (holes) in the bottom of a leaf which open and close to let gases in and out.

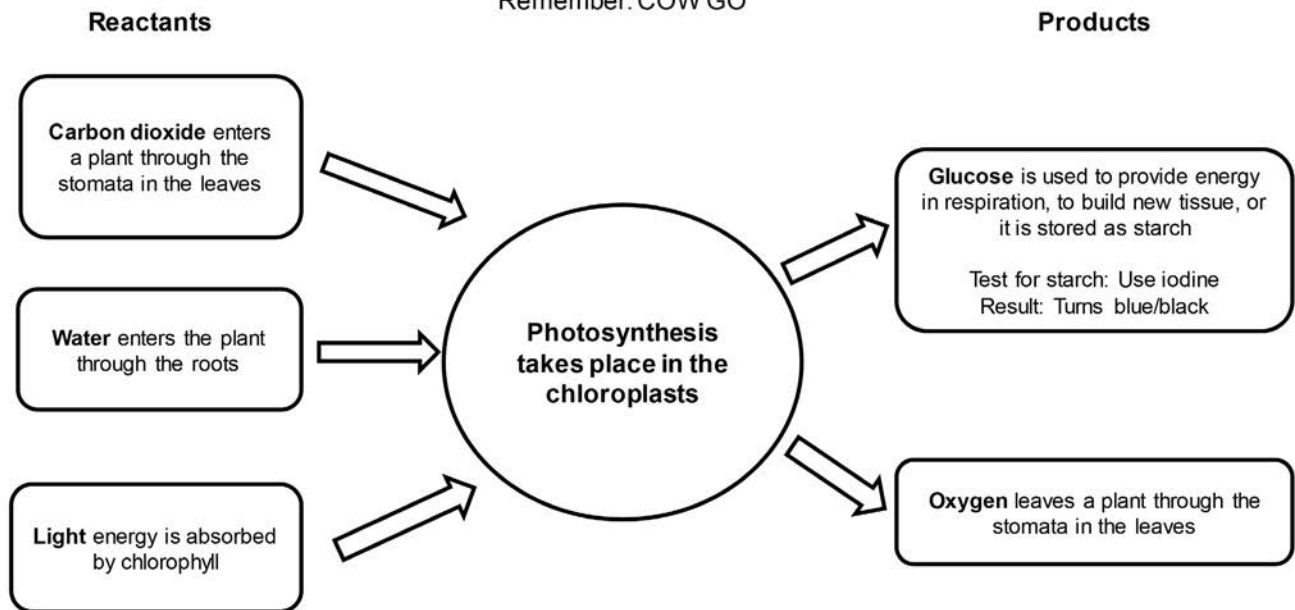
Respiration Keywords	
Keyword	Definition
Aerobic respiration	Breaking down glucose with oxygen to release energy and producing carbon dioxide and water.
Anaerobic respiration (fermentation)	Releasing energy from the breakdown of glucose without oxygen.
Mitochondria	The site of aerobic respiration inside a plant or animal cell.
Respiration	A chemical reaction that takes place in the mitochondria of cells

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34. Photosynthesis

Photosynthesis word equation: Carbon dioxide + Water → Glucose + Oxygen

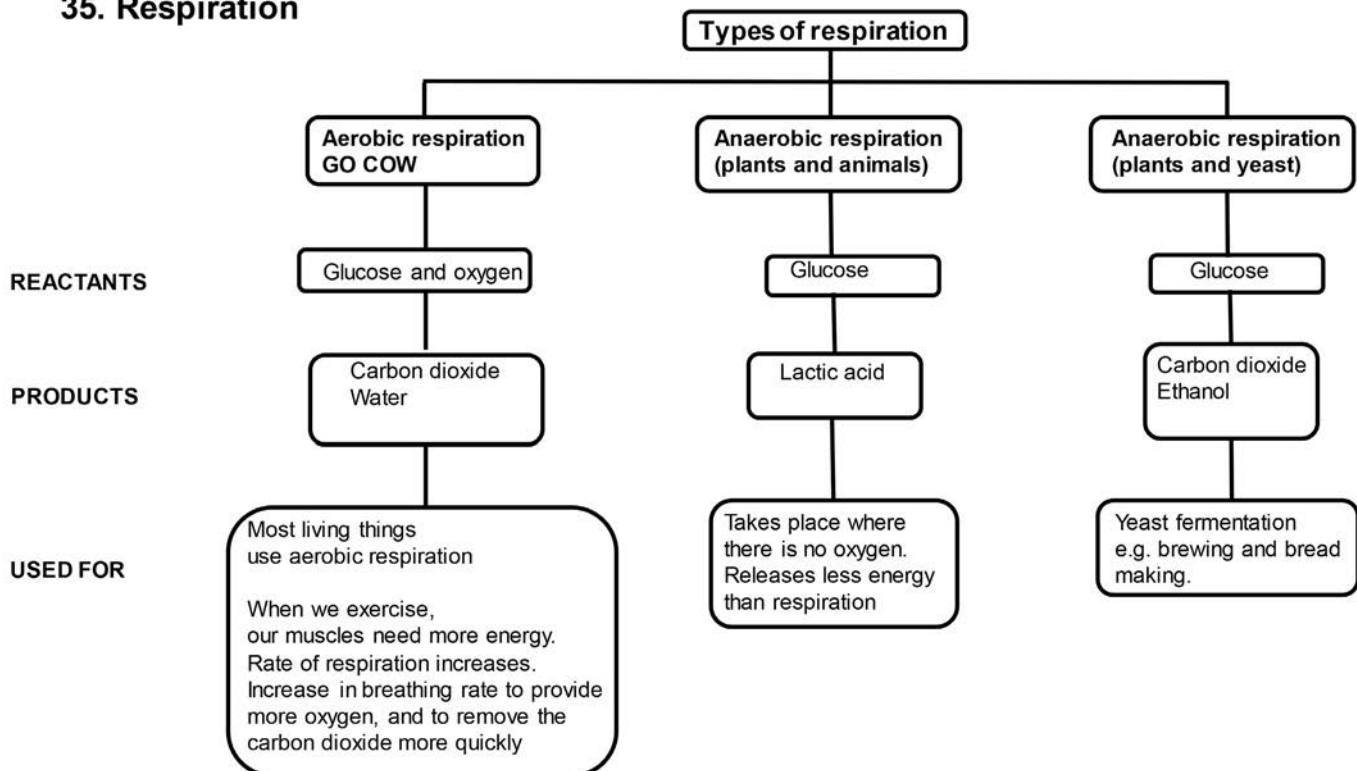
Remember: COW GO



Three factors can limit the rate of photosynthesis:
light intensity, **carbon dioxide concentration** and **temperature**.

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35. Respiration



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36. Maths in Science 1

Keyword	Definition
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.
Range	The maximum and minimum values of a variable.

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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37. Maths in Science

Calculating percentage:

$$(\text{Part} \div \text{whole}) \times 100$$

e.g. Out of 90 insects, 40 of them were ladybirds.

What is the % of ladybirds?

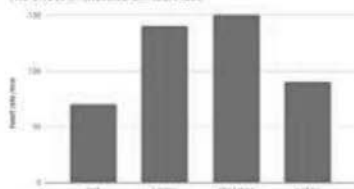
$$(40 \div 90) \times 100 = 44 \%$$

x - axis = left hand column in results table = independent variable

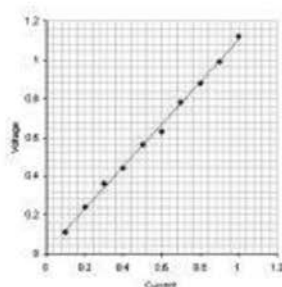
y - axis = right hand column in results table = dependent variable

Categoric data: data put into groups e.g. colour of eyes
Draw a bar chart

The effect of exercise on heart rate



Continuous data: data that can take any value e.g. current
Draw a line graph

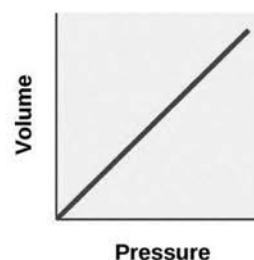


Linear relationship:

In science we use graphs to show relationships between two factors.

When a graph shows a straight line which goes through the origin (0,0).

We say the two variables are directly proportional.



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1		2																		3		4		5		6		7		0	
																														4 He helium 2	



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	
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	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.



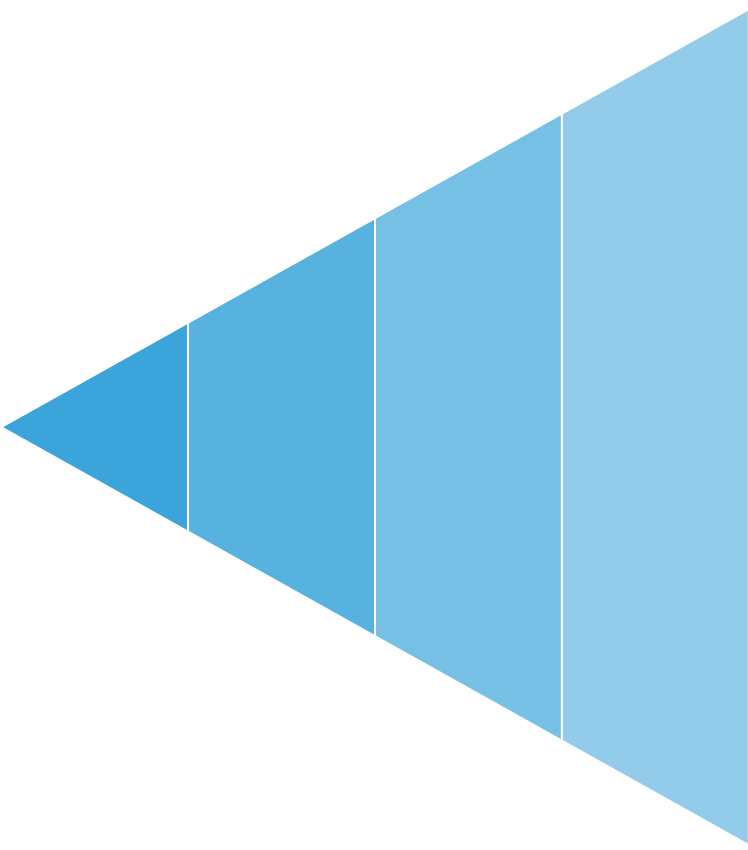
INDEPENDENCE: RANKING TRIANGLE

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.

