Wadham School

A Church of England Community School

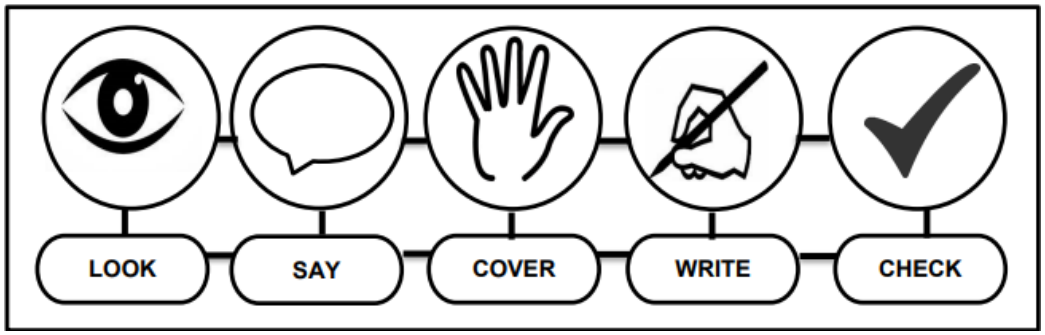
Knowledge Organisers
Year 10
Term 5 & 6
2025-2026

Name.....

Tutor group.....

"Life in all its fullness" John 10:10

Using Your Knowledge Organiser



Look-Say-Cover-Write-Check

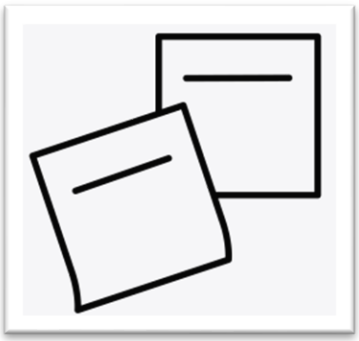
Retrieval practice using the look-say-cover-write-check technique, when done in regular small chunks, is one of the best ways you can learn relevant knowledge over time.

Working in Independent mode:

- Look at the first bullet point or sentence
- Read through it three to five times
- Cover
- Write it out exactly
- Remove and check what you wrote and tick if correct
- Repeat
- When you get it 100% right, move on to the next chunk of information

Flash Cards

Make flast cards with the definition on one side and key word on the other.

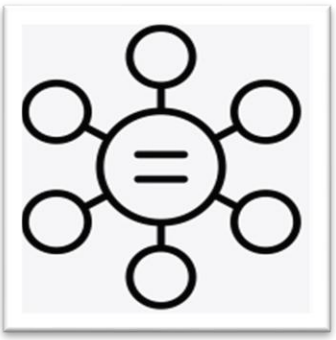


Self Quizzing

Write quizzes with answers to test yourself in the future.

Mind maps

Create mind maps linking key information you need to remember.



LIBRARY INFORMATION

BOOK BINGO

Book set outside the UK	Non-Fiction	Author who shares one of your initials
Book begining with R	Recommended book	Book with an animal in it
One word title	One of the 50 books to read before you leave Wadham	Blue book cover

How many different book types can you cross off before the end of the Summer Term? READ and REVIEW books from the library or on Sparx. PRIZE for completing a row. FREE BOOK for a FULL HOUSE.

IF YOU LOOSE A BOOK, DON'T PANIC! IT CAN BE REPLACED WITH ANOTHER BOOK OR WITH A SMALL CHARGE

The library is open to all.
it is a safe space where you will always find an adult at break or lunch.
There are tablets in the library that can be used for completion of homework, please ask Mrs George for access.

GCSE Fine Art Knowledge Organiser

To succeed in GCSE Fine Art, students must demonstrate the four assessment objectives across their portfolio.

Assessment Objective 1 (AO1)
Develop Ideas Through Investigations

What it means:
Students must research, explore and analyse a range of sources to develop ideas. This research should inform the creative journey.

How to evidence AO1:
- Mind maps, thought showers
- Artist analysis (content, style, media, purpose)
- Collecting references & contextual images
- Photographs, drawings from observation
- Notes explaining how research influences ideas

Assessment Objective 2 (AO2)
Refine Work Through Experimentation

What it means:
Students should explore and test different media, materials, techniques, and processes, showing purposeful refinement.

Ways to evidence AO2:
- Media testing (ink, paint, collage, print etc.)
- Exploring mark-making
- Practical experiments with 2D & 3D forms
- Comparing materials and selecting the most effective
- Developing samples that refine style, technique, or intention

GCSE Fine Art Knowledge Organiser

To succeed in GCSE Fine Art, students must demonstrate the four assessment objectives across their portfolio.

Assessment Objective 3 (AO3) Record Ideas, Observations & Insights

What it means:
Students must record through drawing, photography and annotation in a meaningful, purposeful way.

Recording can include:
- Observational drawing
- Drawings showing development
- Camera studies / photo shoots
- Diagrams, thumbnails, composition plans
- Notes explaining decisions, changes and insights

Assessment Objective 4 (AO4) Present a Personal, Meaningful Response

What it means:
Students bring ideas together into a final response that clearly realises their intention.

A personal response may be:
- A fully resolved outcome
- A series of pieces / developments
- A digital outcome

AO4 should show:
- Clear intention
- Connection to AO1, AO2 & AO3
- Understanding of visual language (composition, colour, tone, form etc.)

Art, Craft and Design

Assessment objectives
AO1 Develop ideas through investigations, demonstrating critical understanding of sources

AO2 Refine work by exploring ideas, selecting and experimenting with
appropriate media, materials, techniques and processes

AO3 Record ideas, observations and insights relevant to intentions as
work progresses

AO4 Present a personal and meaningful response that realises intentions and demonstrates understanding of visual language

A01
Critical studies:
Natural Forms
Andy Goldsworthy
Biomimicry

AO2/AO3/AO4

Developing practical skills:
Exploring cardboard manipulation and mod roc castings.

Exploration of materials in response to students chosen area of study.

Keywords:
Colour
Line
Form
Texture
Tone

Andy Goldsworthy

Areas of study:
- **Graphic communications**
- **Three Dimensional Design**
- **Textile Design**

AO1/A04 Analysis through critical studies

Context: When, where and why the work was created. Is the work characteristic of an artistic style, movement or time period?

Composition: Does the work communicate an action, narrative or story? Are there abstract elements? Has text been used? Does the title affect the way you interpret the work?

Shape and form: What is the overall size, shape and orientation of the artwork? Is there a dominant visual language within the shapes and forms? Are there any three-dimensional forms? How does this affect the work from different viewpoints?

Tone and contrast: Are there any reflective or transparent surfaces? Are shadows depicted in the work? What are the light sources within the artwork?

Colour: colour schemes? Contrasts? Colour palette?

Texture and pattern: Are there textural, tactile or surface qualities within the work? How are these created?

Materials and techniques: What materials have been used and why? Any specific properties? What's sills or processes have been used?

Personal Response: What is your emotional response to the piece? How does it connect to your work and how are you going to be inspired by the artwork.

Beliefs and World Views

Topic 3: Ethical Issues in Human Rights

1	**Human Rights**	A right or freedom given to every person
2	**Examples:**	Right to: education, privacy, free speech, a fair wage, religion,
3	**Universal Declaration**	List of Human Rights created by the UN
4	**United Nations**	Group of nations working together to improve life around the world
5	**Equality**	Human rights are for all people, equally.

6	**Prejudice**	Judging someone as inferior based on race, gender, religion etc.
7	**Discrimination**	Treating someone differently due to prejudice
8	**Liberal Freedoms**	How free and open a country is
9	**Capitalism**	Social system focused on private wealth

10	**Censorship**	Government use of control over media
11	**Free Speech**	Right to able to promote your views and beliefs without restriction

12	**Racism**	Prejudice and Discrimination against people of different races or nationalities
13	**Black Lives Matter**	Modern group aiming to bring greater equality and challenge racism

14	**Democracy**	Government by the people through elected representatives
15	**Free Elections**	AN election free form interference and corruption

Topic 4: Inspiring Individuals

1	**Martin Luther King Jr.**	civil rights leader in the U.S. who advocated for racial equality through nonviolent protest.
2	**Nonviolent Resistance –**	Protesting unfair laws peacefully.
3	**Civil Rights**	The rights of individuals to equal treatment.
4	**Mahatma Gandhi**	Indian leader who led the struggle for India's independence from British rule using nonviolent methods.
5	**Ahimsa**	The principle of non-harming and nonviolence.
6	**Vivienne Westwood**	British fashion designer known for shaping punk fashion and challenging social norms.
7	**Haute Couture**	High-end, custom-made fashion.
8	**Mother Teresa**	Catholic nun who dedicated her life to helping the poor and sick, founding the Missionaries of Charity.
9	**Charity**	Helping those in need without expecting anything in return
10	**Compassion**	Deep concern for the suffering of others.
11	**Dietrich Bonhoeffer**	German pastor and theologian who opposed the Nazis and was executed for his resistance.
12	**Theology**	The study of religious beliefs and God.
13	**Martyr**	A person who dies for their beliefs.

Business

3:1 The Role of Human Resources

Human resources: are the people who so the work for a business. They are the employees.

Human resource plan
A plan detailing the workers a business will need i.e. how many, when, full time or part time and the skills they need

Functions
Different types of work that need to be done in a business i.e. Marketing, production and finance

Human resource planning - things for a business to think about

- The number of workers needed
- The number of workers who will work full-time or part-time
- The number who should be employed on zero-hour contracts
- The number of workers to hire as contractors as and when needed
- When workers will be needed - times of the day, days of the week
- Where the workers will work - finance, production, marketing
- The skills the workers will need to have
- The need to manage and supervise some of the workers
- The age, gender, ethnicity of the workers
- How many staff members the business can afford to employ

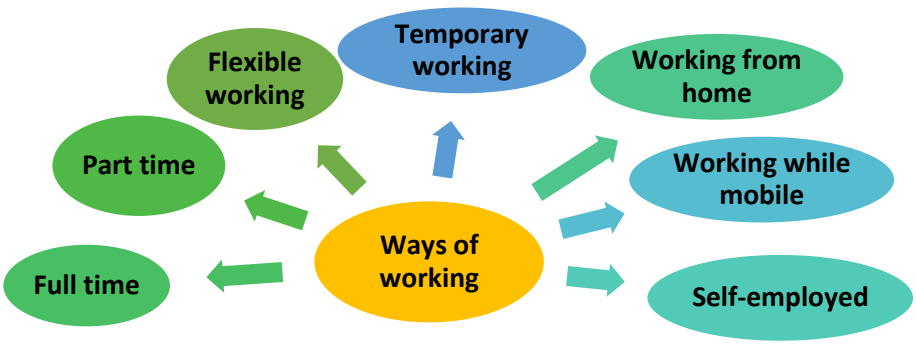
When might a business need to review its human resource needs?

- Workers may have to be replaced i.e. because they have left, retired or been promoted
- The business may grow or shrink so may need more or fewer workers
- The business may change its method of production so may need more or fewer skilled workers
- The business may decide to relocate so may have to recruit workers who live nearby - they could still take their current workforce
- The budget available for paying staff. If the budget is decreased they will need fewer staff and vice versa
- Changes in the law may affect employment i.e. Minimum wage which will impact on the budget

3:2 Organisational Structures

There are two different types of organisation structure:

Advantages of a tall structure	Advantages of a flat structure
▪ The span of control is likely to be narrower meaning that he does not have as many people to look after ▪ There will be plenty of opportunities for workers to gain promotion which will motivate them to work harder	▪Lines of communication are clear - communication will be quicker from top to bottom because there is not as many layers ▪ Fewer mistakes in communication will be made because there is fewer levels ▪ People at the bottom may be encouraged to share ideas ▪ wider span of control means tht managers can delegate work



Organisation chart
A diagram to show how workers are organised in a business
Authority
The power that one person has to make decisions
Chain of command
The order of authority from top to bottom
Span of control
The number of people a manager is in charge of
Delegation
Giving someone else permission to make a decision

Business

Communication is:
The transmission of a message from a sender to a receiver

Written communication
Communication by written words i.e. Text, email, letters
Verbal communication
Communication by speaking ie. telephone or meetings
Formal communication
Communication using the official channels within a business
Informal communication
Communication outside the official channels within business

3:3 Communication in Business

	Pros	Cons
Verbal	• Can check for understanding • Can emphasise points through tone and body language • Can use diagrams and pictures to help explain	• If lots of people not all may understand • Receiver may disrupt the message if they don't like it • No permanent record of the message • Some forms can be expensive
Written	• There is a record of the message • Receiver can re-read the message multiple times • Can be sent to multiple people at the same time • Can avoid confrontation	• Cant check immediately if the message was understood • The success depends on the clarity of the message • Risk of computer viruses •Emails could go to spam
Social media	• Huge numbers of users • Info can be updated regularly • Visual images can help explain • Can be cheaper to advertise • Customers can be involved by allowing feedback	• There is a cost in managing and updating the information • Can be difficult to measure the effectiveness of the business' use of social media

3:4 Recruitment and Selection

Businesses can recruit internally (from within the business i.e. promote an existing employee) or externally (someone from outside the business)

Methods of advertising

Businesses need to think about the costs of advertising for a job but can use the following:

- Websites
- Social media
- Local newspapers
- National newspapers
- Specialist magazines i.e. horse riding
- Job centres
- Word of mouth

Methods of selection

Business can use a range of methods to select the best candidate:

- Letter of application
- Application form
- CV
- Interviews
- Tests and presentations
- Group activities
- References

Selection
The process of choosing between applicants for a job
Job description
Lists the main duties, tasks and responsibilities of a worker
Person specification
Lists the qualities, qualifications and knowledge that a person should have
Interviews
Sessions where the people making the appointment ask questions of the applicants

Key Term	Definition
Role	The part someone plays in their job.
Responsibility	A duty or task that someone is expected to carry out.
Early Years Practitioner	A professional who works with children from birth to 5 years.
Key Person	A named adult who builds a strong relationship with a child and family.
Room Leader	The practitioner responsible for managing a specific room.
Manager	The person responsible for running the setting and supporting staff.
Employer	The organisation or person who provides jobs and pays staff.
Employee	A person who is paid to work for an employer.
Teamwork	Working together to achieve shared goals.
Communication	Sharing information clearly using speech, writing or body language.
Partnership Working	Different professionals working together to support children.
Parents and Carers	People with primary responsibility for a child.
Multi-agency Working	Different services working together to meet children's needs.
Internal Professionals	Specialists who work within the setting.
External Professionals	Specialists who work outside the setting.
SENCO	Special Educational Needs Coordinator who supports children with SEND.
Health Visitor	A health professional supporting children's health and development.
Speech and Language Therapist	Supports children with communication difficulties.
Social Worker	Supports children and families who may be at risk.
Educational Psychologist	Assesses learning and development needs.

SEND	Special Educational Needs and Disabilities.
Confidentiality	Keeping personal information private unless sharing is necessary.
Professional Behaviour	Acting responsibly, respectfully and appropriately at work.
Reliability	Being dependable and doing tasks on time.
Adaptability	Being able to change approach when needed.
Reflective Practice	Thinking about your work to improve practice.
Training	Learning new skills to improve work performance.
Policies and Procedures	Written rules explaining how a setting operates.
Code of Conduct	Rules outlining expected professional behaviour.

Key Term	Definition
What is Observation?	Watching and listening to gain information can be planned or unplanned.
Participant Observation	Observer joins in activity; close interaction; may influence behaviour.
Non-participant Observation	Observer stands back; less influence; may miss details.
Formative Assessment	Ongoing; informs planning and immediate responses.
Summative Assessment	Periodic summary of development at a point in time.
Objective Recording	Factual, no opinion, states what is seen/heard.
Subjective Recording	Opinion, assumptions, influenced by experience.
Recording Components	Aim, Recording, Evaluation, Planning.
Observation Methods	Media, Learning journal, Post-it notes, Narrative, Checklist.
Sharing Observations	Share with parents, professionals, children; GDPR applies.

Child Development and Care – Content Area 8

Key Area	Summary
Child-centred planning	Definition: Adults plan with child's needs and wishes at forefront. Includes observing, considering interests, listening, assessing, using appropriate resources.
Using child-centred planning	Practitioners observe, consider interests, know needs, listen, use assessments, use appropriate age resources, work with families & professionals.
Benefits of child-centred approach	Promotes independence, critical thinking, problem solving, self-esteem, motivation, holistic development; enables practitioner insight.
Planning cycle stages	Observation, Assessment, Planning, Implementation, Review.
Assessment types	Formative: ongoing; Summative: milestone snapshot.
Seven areas of learning & development	Communication & language, Physical, PSED, Literacy, Maths, Understanding the world, Expressive arts & design.

Child Development and Care – Content Area 9

Drama

The Crucible – Arthur Miller

Context - The Salem Witch Trials (1692)

- The play is a fictionalised account of the famous 17th Century witch trials.
- In a Puritan society, anything that could not be explained was said to be the work of the devil.
- Villagers began to accuse each other of witchcraft, which then extended to people with grudges and jealousies.
- Many made accusations as revenge for petty things.
- Within a few weeks, dozens of people were in jail.
- By the end of the trials, twenty innocent men and women were hanged and hundreds were convicted.

Context - McCarthyism (1947-1956)

- An American Senator called Joseph McCarthy rose to power by stirring up the nation into becoming terrified of Communists.
- Stemmed from the fear and tension between the U.S. and the Soviet Union during The Cold War.
- In 1947 he ordered all employees of the civil service to be screened for 'loyalty'
- Anyone named as a Communist was placed on "Blacklists" that prevented them from getting work.
- The McCarthy hearings (also known as McCarthy trials) ran from April to June 1954.
- Many non-Communists confessed to being Communists and falsely named others as Communists to escape punishment.
- Miller was brought before Congress in 1956 and convicted of contempt of Congress for refusing to cooperate (his conviction was later overturned).

Character list:

- **Abigail Williams:** the 17-year-old niece of Reverend Parris. She is an orphan and a former servant to the Proctors.
- **Reverend Parris**: the minister of Salem, Betty's father, and Abigail's uncle.
- **Betty Parris**: Reverend Parris's ten year old daughter.
- **Tituba**: A woman Barbados and slave of Rev Parris.
- **Mary Warren**: naïve and lonely servant of the Proctors.
- **John Proctor**: a farmer, and the husband of Elizabeth. He is well respected in the local community and values his reputation.
- **Elizabeth Proctor**: loyal wife to John Proctor. She fires Abigail Williams as her servant before the play begins.
- **Rev John Hale**: minister in the nearby Massachusetts town of Beverly, and an expert in witchcraft.
- **Thomas Putnam**: an influential, land owning citizen but not well liked in the community.
- **Ann Putman**: the wife of Thomas Putnam.
- **Rebecca Nurse**: the wife of Francis Nurse and is well respected in the community.
- **Francis Nurse**: an influential citizen. He is well liked in the community but is enemies with Thomas and Ann Putnam.
- **Giles Corey**: An elderly member of the community. A farmer and well known for filing lawsuits.
- **Mercy Lewis**: eighteen year old servant of Thomas and Ann Putnam.
- **Susanna Walcott**: Abigail William's friend.
- **Deputy Governor Danforth**: a Deputy governor of Massachusetts who comes to Salem to preside over the witch trials.
- **Judge Hathorne**: a bitter, remorseless Salem judge.

Drama

The Crucible – Arthur Miller

Plot Summary

Act 1

- Reverand Parris caught his daughter and niece dancing in the woods. His daughter is now ill and he accuses Abigail of conjuring spirits.
- Abigail had an affair with John Proctor, and drank a potion to kill his wife – Elizabeth. She threatens to hurt anyone who reveals this.
- Abigail tells John Proctor that Betty's illness isn't caused by Witchcraft
- Reverend Hale, the witchfinder arrives
- Abigail accuses Tituba of summoning the Devil, she confesses but then starts to accuse others too
- Abigail and Betty say that they have seen other people with the devil

Act 2 – The Proctors house – a week later

- The Witchcraft trials have begun, Elizabeth believes that John can stop them because he knows that Abigail is lying, but he is reluctant to do so.
- Mary Warren returns from Salem, 39 women are in jail for witchcraft and Elizabeths name has been mentioned in court. She gives Elizabeth a doll she has made
- Reverend Hale arrives to question Elizabeth
- Giles Cory and Francis Nurse arrive – Their wives have been arrested
- Court Officials arrest Elizabeth. Abigail has claimed that Elizabeth's spirit stuck a needle in her
- John tells Mary that she must tell the court that Abigail is lying.

Act 3 – The Court

- John takes Mary to court to tell the judges that Abigail is lying
- Danforth tells John that Elizabeth is pregnant and won't be hanged
- Villagers have signed testimony to say that Elizabeth, Martha Corey and Rebecca Nurse aren't witches. Danforth gives orders for anyone who has signed this to be arrested
- Mary tells the court that the girls are pretending to be bewitched so they start to pretend that Mary has bewitched them
- John admits to his affair to ruin Abigails reputation. Elizabeth, when questioned, says it isn't true which ruins Johns case against Abigail
- The girls pretend that Mary's spirit is attacking them. She accuses John of doing the Devil's work. John is arrested

Act 4 – Salem Jail

- Hale and Paris are persuading the prisoners to confess. Abigail has robbed Paris and has disappeared.
- The judges ask Elizabeth to get John to confess and she agrees to speak to him but not to persuade him.
- Over one hundred people confess. Giles Corey won't plead guilty or not guilty and is tortured to death.
- Jonn confesses but refuses to say that others have been with the Devil.
- John tears up his confession. He is led out to be hanged
- Parris and Hale ask Elizabeth to persuade John to confess but she refuses.

Key Facts	
Written	written in 1950-1952, first performed in 1953 at the height of the McCarthy trials
Era	1950s - at the time of The Cold War Set in Salem, Massachusetts, USA 1692 (17th Century)
Genre	Tragedy, tragic drama, American drama, realist drama, Historical drama
Structure	Each of the four acts ends with a climax (unusual structure)

AQA English Language – Paper 1

Question Guidance (do the paper backwards):

Q5 – use the 'Here > There > Then > Now' frame. Old Person Attic story example:

Here I am in our creaky old attic watching the motes of dust spark through the shivering light. It is evening outside and I can hear the birds prattling on with their warbling lullabies. Golden arcs of the aging sun lance through our small grimy window illuminating the detritus of our lives. The musty scent of aged photo albums almost breathe out their last willing themselves to be witnessed. It is stuffy here but comforting, like being held by you.

There is a painting, one of yours, I never really understood your work but the light falls on it now and…

Then, memories rush back of our time together and it slams into me like a dark ocean cascading upon my head. When we met, the idiotic beautiful accident as we both got on the wrong bus. Our first dance under melting moonlight. The long walks over misty moors. Your laugh that spread through any room like a song. Our wedding day with the fierce rain and your drunken collapsing uncle. The kids filling this old house with young life and love. They flew the nest, you always felt that loss harder than I. Holding your soft frail hand whilst you fiddled with my wedding ring. That glint of amusement in your eye that I was the one crying.

Now I sit here in this attic, alone. I can still see the tubes tangling from your skin feeding into machines monitoring your fragile heart. The endless trips back and forth to hospital. The not knowing and then the horrible certainty. Every second was everything yet it slips away like the tide and all I am left with are dry sobs. The light is fading and falls away from your painting but outside I can still hear evening birdsong and the last embers of the dying sun ripple across the sky. You filled this world with so much beauty.

I miss you my love.

Q4 (20 marks, 25m) – identify the key bits of the statement, agree then add and analyse (use quotations and analyse language and structure repeatedly):

Your evaluation – consider the statement and other interpretations (although, whilst, despite, etc.)
Neat evidence – use precise quotations
Additional – use more precise quotations (at least 6)
Language – analyse word choice, imagery and other methods
Structure and form – analyse perspective, pace, tone and other methods
Intentions of writer – consider WHY the writer wrote it and the impact upon readers

Q3 (8 marks, 10m) – structural methods (start-middle-end):

Start-middle-end
Neat evidence – use precise quotations
Structure and form – analyse perspective, pace, tone and other methods such as repetition, motif, cliffhanger, contrast, development, syntax, etc.

Q2 (8 marks, 10m) – language methods (imagery, word choice and other methods):

Imagery – always analyse this.
Neat evidence – as precise as possible – focus on word choices etc.
Additional – get a wide range of quotations
Language – analyse word choices, imagery and other methods such as metaphor, simile, personification, oxymoron, emotive language and syntax.

Q1 (4 marks, 5m) - identify 4 things.

AQA English Language – Paper 2

Question Guidance (do the paper backwards):
Q5 – use the Presently, Personally, Publicly, Predictably frame to structure your response:
[Form feature: IF Article: headline & subheading
IF Letter: Dear Mr ???,

I am writing to you about…
IF Speech: 'Today I am here to talk to you about…']
Presently, we are like mindless addicts; preferring the heady rush of flippant fools and funny failures. Today's society is so immersed in the blizzard of triviality that [link to topic].

Personally, my own children, Edward and Alice, [link to topic]. It is easy to dismiss this as unimportant but the noxious influence of [topic] is as pervasive as it is dangerous.

Publicly, they (like so many their age) have [link to topic]. According to figures from Exeter University, over 75% of people [link to topic]. Professor Hill, who co-authored the report, stated: 'The issue with [topic] is a different kind of epidemic; causing untold damage. It is arguably worse because there is no vaccine.'

We must stop this!

Predictably, some people will… [consider opposing view] but this only perpetuates the problem. We have two options: continue with this intolerable situation or move forward to a future where we [positive link to topic]. Which would you rather choose?
[Form feature:
IF Article: do not add anything - end on the rhetorical question.
IF Letter: Yours sincerely,
[Your Name]
IF Speech: Thank you for listening.]

Q4 (16 marks, 20m) - compare writer's perspectives
Make links
Neat evidence – use precise quotations
Additional – link quotations across both sources
Language – analyse imagery, word choice and other methods
Structure and form – analyse perspective, tone and other methods
Intentions of writer – consider why it has been written and the impact on the reader
Your evaluation – consider which text demonstrates more or less of something

Q3 (12 marks, 15m) - analyse language
Imagery – always analyse this.
Neat evidence – as precise as possible – focus on word choices etc.
Additional – get a wide range of quotations
Language – analyse word choices, imagery and other methods such as metaphor, simile, personification, oxymoron, emotive language and syntax.

Q2 (8 marks, 10m) - summarise an idea across both texts
Make links, use neat evidence (borrow from Q4) and infer considering impact on reader.

Q1 (4 marks, 5m) - identify 4 true statements from a list of 8.

AQA English Literature – Power and Conflict Poetry

Learn Exposure and Poppies in detail:

Title: Exposure - Wilfred Owen (1893-1918)
Overview: A soldier is in the trenches suffering from the cold. Nothing happens but the soldiers go home and then just go back to war.
Quotations:
'Merciless iced east winds that **knive** us' - personification
'But **nothing** happens' - refrain
'Slowly our **ghosts** drag home' - metaphor
Structure and form:
Rhyme scheme throughout (slant rhymes)
Collective first person ('our')
Shift in tone - from boredom, to despair to bitterness.
Context:
As a soldier he wanted to 'expose' the true horrors of war. He died a week before Armistice day. He was opposed to war despite being a soldier and returning to the front line.

Title: Poppies - Jane Weir (1963-present)
Overview: Mother sending off her child (probably to war) and remembering them.
Quotations:
"**spasms** of paper red, disrupting a **blockade**" - imagery (word choice - semantic field of injury and war).
"a single **dove**" - symbolises hope and peace + "The dove **pulled freely** against the sky / an ornamental stitch" - oxymoronic metaphor
"Leaned against it like a **wishbone**." - (memorial) - simile
Features:
Perspective is 1st person (mother addressing child) - a persona
Enjambment and caesuras throughout.
Time shifts both specifically and generally.
Context:
Could be inspired by Wilfred Owen's mother receiving news of his death around Armistice day and the impact of poppies as a symbol of remembrance. Weir also uses a lot of sensory language possibly due to having run a textiles business.

Know the rest of the poems:

Poet	Title
Percy Bysshe Shelley	Ozymandias
William Blake	London
William Wordsworth	Extract from The Prelude
Robert Browning	My Last Duchess
Alfred Lord Tennyson	The Charge of the Light Brigade
Wilfred Owen	**Exposure**
Seamus Heaney	Storm on the Island

Poet	Title
Ted Hughes	Bayonet Charge
Simon Armitage	Remains
Jane Weir	**Poppies**
Carol Ann Duffy	War Photographer
Imtiaz Dharker	Tissue
Carol Rumens	The Emigrée
John Agard	Checking Out Me History
Beatrice Garland	Kamikaze

Film Studies

Film Studies – Timeline of key developments in film and film technology	
THE EMERGENCE OF WIDESCREEN TECHNOLOGIES	
1950s	Emergence of widescreen and 3D technologies as a response to the growth of television and the corresponding decline in cinema attendance.
1952	Cinerama is unveiled by film bosses who decide that size really does matter. Unfortunately, they soon find that huge pictures mean huge costs. Cinerama eventually becomes obsolete.
Late 1952	The Golden era of 3D began with the release of the first colour stereoscopic feature, 'Bwana Devil' produced by Arch Oboler.
Late 1950s	Although not the first examples, lightweight, portable cameras were produced suitable for hand-held use (which had an immediate impact on documentary filmmaking and were used by a new generation of directors in France – French 'new wave' directors).
1970s	Steadicam technology developed by cinematographer Garrett Brown (a stabilising device for hand-held cameras to keep the image 'steady' whilst retaining fluid movement). First introduced in 1975 and was first used in the 1976 film 'Bound for Glory'.
1990s onwards	More widespread use of computer-generated imagery resulted in a move away from filmed 'special effects' to visual effects created digitally in post-production to the computer-generated imaging (CGI) of characters in films.
THE MOVE INTO MODERN CINEMA	
1995	First CG (computer generated) feature length cartoon – 'Toy Story' directed by Jon Lasseter for Pixar Animation Studios.
2000s	Technology available to ordinary people makes significant strides due to developments with lightweight cameras and mobile phone technology, seeing a rise in 'citizen filmmaking'.
2007	Netflix – the first legal streaming service for film and TV is launched.
2010s	Successful feature length films shot entirely on I-phones now released – notable releases include 'Tangerine' (Baker, 2015) and 'Unsane' (Soderberg, 2018).
2017	Film and TV streaming and download sites such as Netflix, Sky, Amazon and Apple overtake DVD sales for the first time increasing by 23% in one year.
2018	'Avengers: Infinity War' becomes the first Hollywood film to ever be shot entirely with IMAX cameras.

Good food hygiene and safety practices

Good food hygiene practices are necessary in order to produce, make and supply food that is safe to eat. This involves more than just being clean. A simple way to remember is the **4Cs**:

- **cleaning;**
- **cooking;**
- **chilling;**
- **cross-contamination.**

Cleaning

Cleaning the kitchen is important to keep food safe and prevent bacteria from spreading. 'Clean as you go' means people make sure that they clean the area and utensils they have been working in or with, as they prepare food. This avoids build-up of mess and leads to better hygienic conditions. Areas which need particular attention are:

- surfaces that come into contact with food, e.g. chopping boards, utensils;

Cleaning – personal hygiene and getting ready to cook

Good personal hygiene is essential to reduce the risk of food poisoning.

- **Hands**: Thoroughly wash and dry hands before and after touching food and regularly throughout cooking.
- **Clothing**: Clean clothing should be worn. Long sleeves should be rolled up and a clean apron or chef's jacket worn over outside clothes. Enclosed, non-slip, shoes should be worn in the kitchen.
- **Jewellery**: All jewellery, including a watch, should be removed (piercings should be covered if they cannot be removed).
- **Skin**: Cuts and wounds should be covered with a coloured, waterproof dressing. The plasters are often blue in colour so they can be easily identified if they fall into food.
- **Face**: Do not cough or spit near or over food, taste food with fingers, bite nails, eat, chew or smoke, touch nose, or remove earrings.

Cooking

To reduce the risk of food poisoning, hot food must be served steaming hot, that is above **63°C**.

- Bacteria will begin to die when the temperature rises above **60°C**.
- Some foods change colour when they are cooked.
- Cooking food thoroughly to a minimum core temperature of **75°C** will ensure most bacteria is destroyed.
- When cooking burgers, sausages, portions of pork and chicken, there should be no pink meat. They should also be steaming hot inside and the juices should run clear when cooked.
- Steak or other cuts of beef or lamb can be eaten less well done as long as they have been properly sealed. Sealing the meat will kill any bacteria on the outside.
- Leftovers should be cooled as quickly as possible within two hours and then stored in the fridge below **5°C**. When leftovers are re-heated, they need to be steaming hot. Leftovers should not be re-heated more than once and should be used within 48 hours from when it was made (24 hours for rice dishes).

Cross-contamination

The process by which bacteria are transferred from one area to another is known as **cross-contamination**. The main carriers of bacteria and causes of cross contamination are:

- humans;
- rubbish;
- pests and other animals;
- food, e.g. raw meat or poultry.

Cross contamination – raw meat

- Keep raw meat separate from ready-to-eat food.
- Do not let raw meat drip onto other food.
- Never use the same chopping board for raw meat and ready-to-eat food without washing the board (and knife) thoroughly in between. Ideally use a red board.
- Do not wash meat before cooking it.

Chilling

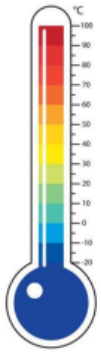
The temperature between **5°C– 63°C** is known as the 'danger-zone'. Bacteria will multiply most rapidly within this temperature range. Reducing the temperature below **5°C** slows the reproduction of microorganisms. Cold temperatures do not kill bacteria.

High-risk food, such as such as meat, fish and dairy products plus opened bottles, jars or tubes, should be stored below 5°C. Eggs should be stored in a cool, dry place. Ideally, eggs should be stored in the fridge.

Temperatures to remember

To reduce the risk of food poisoning, good temperature control is vital:

- 5-63°C – the danger zone where bacteria grow most readily.
- 37°C – body temperature, optimum temperature for bacterial growth.
- 8°C – maximum legal temperature for cold food, i.e. your fridge.
- 5°C (or below) – the ideal temperature your fridge should be.
- 75°C – if cooking food, the core temperature, middle or thickest part should reach at least this temperature.
- 75°C – if reheating food, it should reach at least this temperature. In Scotland food should reach at least 82°C.



Safe use of a food probe

Digital probes can be used to check the temperature of food. To use a food probe:

- clean with a disinfectant wipe before and after use;
- insert the probe into the core (centre) or the thickest part of the food;
- do not touch the bottom of the pan or cooking dish.

Key terms

Best-before-date: Relates to the quality of the food. Food may still be eaten beyond this date.

Cross-contamination: The transfer of bacteria from one source to another. Usually raw food to ready-to-eat food but can also be the transfer of bacteria from unclean hands, equipment, cloths or pests. Can also relate to allergens.

Danger zone: Bacteria will multiply most rapidly between 5-63°C.

Optimum temperature: Bacteria that cause food poisoning reproduce around body temperature (37°C).

The 4Cs: Cleaning, cooking, chilling and cross-contamination.

Use-by-date: Relates to the safety of the food. Food must be eaten by this date.

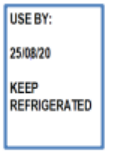
Food labelling

Food labels help consumers make healthier choices. Some information also helps to reduce the risk of food poisoning or other adverse reactions to food:

- date marks;
- list of ingredients with allergens in **bold**, highlighted, underlined or in *italics*;
- storage and preparation conditions.

Use-by-date

You have until the end of this date to use or freeze the food before it comes too risky to eat.



Best-before-date

You can eat food past this date but it might not be at its best quality.

Name: Date:

Food spoilage, contamination and food poisoning

Food spoilage: Autolysis – enzymes
Enzymes are chemicals which can cause food to deteriorate in three main ways:
- **ripening** – this will continue until the food becomes inedible, e.g. banana ripening;
- **browning** – enzymes can react with air causing certain foods to discolour, e.g. apples;
- **oxidation** – loss of nutrients, such as vitamin C from food, e.g. over boiling of green vegetables.

Food spoilage: Microbial spoilage
Spoilage can be caused by the growth of:
- **bacteria** – single celled micro-organisms which are present naturally in the environment;
- **yeasts** – single celled fungi;
- **moulds** – fungi which grow as filaments in food.

Food contamination
Food contamination can lead to food poisoning. There are three ways which food can be contaminated: **bacterial**, **chemical** and **physical**.

Chemical contamination
Chemical contamination can occur in a variety of ways at different stages of food processing and production. For example, chemicals from the farm; cleaning products used in the processing plant and fly spray used in the kitchen.

Physical contamination
This can occur in a variety of ways at different stages of food processing and production. Some examples are:
- soil from the ground when harvesting;
- a loose bolt from a processing plant when packaging;
- a hair from a chef in the kitchen.

Bacterial contamination
Most bacteria are harmless but a small number can cause illness. These are known as pathogenic bacteria. Food which is contaminated with pathogenic bacteria can look, taste and smell normal.
Bacteria can be transferred onto food through cross-contamination, via equipment, people or pests, or can be naturally present in the food. Some bacteria can produce toxins which can cause food poisoning.

Micro-organisms
Micro-organisms need conditions to survive and reproduce these can include:
- temperature;
- moisture;
- food;
- time;
- oxygen and pH level.

Temperature
Bacteria need warm conditions to grown and multiply.
- The ideal temperature for bacterial growth is 30°C – 37°C.
- Some bacteria can still grow at 10°C and 60°C.
- Most bacteria are destroyed at temperatures above 63 °C.
- Bacterial growth danger zone is 5°C - 63°C.

At very cold temperatures, bacteria become dormant – they do not die, but they cannot grow

Moisture
Where there is no moisture bacteria cannot grow. However, bacteria and moulds can both produce spores which can survive until water is added to the food.

Food
Bacteria need a source of food to grow and multiply, these food are usually high in moisture, fat and protein, and may be ready to eat. Food where bacteria rapidly multiply in is called a **high risk food**. For example:
- meat, meat products and poultry;
- milk and dairy products;
- eggs – uncooked and lightly cooked;
- shellfish and seafood;
- prepared salads and vegetables;
- cooked rice and pasta.

Time
Given the right conditions, one bacterium can divide into two every 10-20 minutes through a process called binary fission.

People at high risk of food poisoning
Elderly people, babies and anyone who is ill or pregnant needs to be extra careful about the food they eat.

Symptoms of food poisoning
Food poisoning can be mild or severe. The most common symptoms are:
- feeling sick;
- being sick;
- diarrhoea;
- abdominal pain.

Campylobacter
Sources
Raw and undercooked poultry, unpasteurized milk, contaminated water.
Signs and symptoms
Onset 2 – 5 days (can be longer). Fever, headache and dizziness for a few hours, followed by abdominal pain.

E Coli 0157
Sources
Raw and undercooked meat and poultry. Unwashed vegetables. Contaminated water.
Signs and symptoms
Onset usually 3-4 days. Diarrhoea, which may contain blood, can lead to kidney failure or death.

Listeria
Sources
Unpasteurised milk and dairy products, cook-chill foods, pâté, meat, poultry and salad vegetables.
Signs and symptoms
Onset 1-70 days. Ranges from mild, flu-like illness to meningitis, septicaemia, pneumonia.

Salmonella
Sources
Raw meat, poultry and eggs. Flies, people, sewage and contaminated water.
Signs and symptoms
Onset 6-48 hours. Headache, general aching of limbs, abdominal pain and diarrhoea, vomiting and fever. This usually lasts 1 – 7 days, and rarely is fatal.

Staphylococcus aureus
Sources
Humans: nose, mouth and skin. Untreated milk.
Signs and symptoms
Onset 1 – 6 hours. Severe vomiting, abdominal pain, weakness and lower than normal temperature.
This usually lasts 6 – 24 hours.

Key terms
Bacteria: Small living organisms that can reproduce to form colonies. Some bacteria can be harmful (pathogenic) and others are necessary for food production, e.g. to make cheese and yogurt.
Binary fission: The process that bacteria uses to divide and multiply.
Cross-contamination: The transfer of bacteria from one source to another. Usually raw food to ready-to-eat food but can also be the transfer of bacteria from unclean hands, equipment, cloths or pests. Can also relate to allergens.
Food spoilage: The action of enzymes or microorganisms which make the food unacceptable to consume.
Food poisoning: Illness resulting from eating food which contains food poisoning micro-organisms or toxins produced by micro-organisms.
Toxin: A poison produced by some bacteria which can cause food poisoning.

Allergens
Allergenic ingredients can cause adverse reactions in some people. Care must be taken at each stage of food processing to prevent contamination.

Desirable food changes
Desirable changes that can be caused by micro-organisms include:
- bacteria in yogurt and cheese production;
- mould in some cheeses, e.g. Stilton;

Food choice

Food choice

Food choices for a balanced diet depend on many factors, such as:

- advertising and other point of sale information;
- cost and economic considerations;
- cultural or religious practices;
- environmental and ethical considerations;
- food availability;
- food preferences;
- food provenance;
- health concerns;
- individual energy and nutrient needs;
- portion size;
- social considerations.

Consumer information

Information can help consumers make informed choices, including:

- advertising and marketing;
- media, online blogs/forums;
- packaging, nutrition and health claims;
- point of purchase information and product placement;
- recipe ideas.

Cost and economic considerations

The cost of food and money available will influence people's food choices. If money is limited, people may choose to buy more basic items. Luxury items might then be selected for special occasions.

Food prices

Food prices can and do change throughout the year and over time. This may be due to a variety of reasons, including:

- climate and weather patterns;
- crop failure;
- crop disease;
- seasonality;
- consumer demand;
- agricultural costs increase;
- fuel prices go up;

Budgeting

There are many things that we can do to spend money wisely on food. Examples can include:

- eating the seasons;
- stocking up on food with a long shelf-life;
- taking time to plan meals and write a shopping list;
- cooking using one pot;
- making fake-aways rather than buying takeaways;
- using leftovers;
- replacing branded items with cheaper items;
- comparing prices and shop around to find the cheapest items;
- growing your own food.

Cultural or religious practices

People around the world choose to eat or avoid certain food due to their cultural or religious practices.

Religion	Pork	Beef	Lamb	Chicken	Fish
Islam	x	Halal only	Halal only	Halal only	✓
Hinduism	x	x	✓	✓	✓
Judaism	x	Kosher only	Kosher only	Kosher only	✓
Sikhism	x	x	✓	✓	✓
Buddism (strict)	x	x	x	x	x
Seventh-day Adventist Church	x	x	x	✓	✓
Rastafari movement	x	x	x	x	x

Environmental and ethical considerations

Some considerations when buying food might be:

- fair trade;
- local food;
- genetically modified (GM) food;
- organic food;

Food availability

Buying food when it is in season will often mean that the price is lower. Technology and the importation of food has allowed food to be available all year round.

Personal preferences

A number of factors can influence personal preferences, including:

- colour, size and shape of crockery and cutlery used;
- portion size;
- serving style;
- taste, aroma, texture, appearance, shape and colour of food.

Food provenance

Food provenance is about where food is grown, caught or reared, and how it was produced. Food certification and assurance schemes guarantee defined standards of food safety or animal welfare. There are many in the UK, including:

Red Tractor

The British Lion mark

Marine Stewardship Council

Health concerns

People may choose their food based on their own or their family's health and wellbeing:

- allergy and intolerance, e.g. lactose intolerance, coeliac disease, wheat allergy, diary allergy;
- body image;
- health issues, e.g. coronary heart disease, type 2 diabetes, inflammatory bowel disease, over or under malnutrition;
- mental health.

Individual energy and nutrient needs

The amount of energy and nutrients needed differs between different age groups and between males and females.

Energy needs also depend on activity levels. For example, athletes will have much higher energy requirements due to their high level of physical activity.

Key terms

Advertising: Advertising is a form of communication for marketing and used to encourage, persuade, or manipulate an audience to continue or take some new action.

Ethical: Relating to personal beliefs about what is morally right and wrong.

Food certification and assurance schemes: Defined standards of food safety, quality or animal welfare.

Food provenance: Knowing where food was grown, caught or reared and how it was produced.

Marketing: Promoting and selling products or services, including market research and advertising.

Religion: A particular system of faith and worship.

Seasonal food: Food grown at a particular time of year.

Portion size

Having a healthy, balanced diet is about getting the right types of foods and drinks in the right amounts.

Social considerations

- Body image and peer pressure.
- Development of ready meals and a wider range of convenience foods.
- Development of labour saving devices.
- Lack of competence and confidence in the kitchen.
- Lack of time.
- Living arrangement (e.g. living alone).

Food labelling and health claims

Food labelling

Manufacturers include a range of information on food labels. Some of which is legally required and some of which is useful to the consumer or supermarket.

Nutrition information helps consumers make healthier choices. Back-of-pack nutrition information is legally required on food packaging.

NUTRITION
When heated according to instructions

Typical values	Per 100g	Each pack (390g**)
Energy	457kJ 109kcal	1781kJ 424kcal
Fat	3.9g	15.2g
of which saturates	1.9g	7.5g
Carbohydrate	12.1g	47.1g

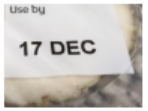
Legally required information

- Name of food or drink.
- List of ingredients (including water and food additives), in descending order of weight.
- Weight or volume.
- Date mark (Best-before and use-by).
- Storage and preparation conditions.
- Name and address of the manufacturer, packer or seller.
- Country of origin and place of provenance.
- Nutrition information.

Date marks

Best-before-date: The date after which foods may not be at their best, although probably safe to eat if stored according to instructions.

Use-by-date: The date given to foods that spoil quickly, such as cooked meats. It is unsafe to eat foods beyond their use-by-date.



Beetroot salad
Keep refrigerated. Once opened consume within 24 hours and by the 'use-by' date shown.

Additives

Food additives must be shown clearly in the list of ingredients on food labels, either by the additive's name or E number. Additives are added to ensure safety, increase shelf life or improve the taste, texture or appearance of food. Additives need to be approved before they can be used. Additives are given an 'E number' to show that they have been rigorously tested for safety and have been approved for use in food by the European Commission. An example is E100 or curcumin, made from turmeric.

Another example is caramel (E150), a synthetic colouring commonly used to

Key terms

Additives: Are added to ensure safety, increase shelf life or improve the taste, texture of appearance of food. They must be shown clearly on food labels.

Allergen labelling: Allergens must be clearly shown in **bold**, highlighted, underlined or in *italics*.

Back-of-pack labelling: Is legally required and can help consumers make healthier choices.

Claim: Any statement about the nutrient content or health benefit of a food product.

Front-of-pack labelling: Is voluntary but must provide certain information and can use red, amber and green colour coding.

Labelling: The term given to the information about the product which is displayed on the packaging.

Nutrition information: Helps consumers make healthier choices.

Front-of-pack labelling

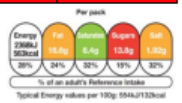
Front-of pack-nutrition information is voluntary but if a food business chooses to provide this, only the following information may be provided:

- energy only;
- energy along with fat, saturates, sugar and salt.

Red, amber and green colours, if used, show at a glance whether a food is high, medium or low for fat, saturates, sugars or salt. The colour coding can be used to compare two products.

Nutrient	Low	Medium	High	
Fat	≤3.0g/100g	>3.0g to ≤ 17.5g/100g	>17.5g/100g	>21g/portion
Saturates	≤1.5g/100g	>1.5g to ≤5.0g/100g	>5.0g/100g	>6.0g/portion
(Total sugars)	≤5.0g/100g	>5.0g and ≤22.5g/ 100g	>22.5g/100g	>27g/portion
Salt	≤0.3g/100g	>0.3g to ≤1.5g/100g	>1.5g/100g	>1.8g/portion

Note: Portion size criteria apply to portion sizes/servings greater than 100g.



Allergen labelling

An allergic reaction to a food can be described as an inappropriate reaction by the body's immune system to the ingestion of a food.

By law, food, drink and ingredients that are known to contain allergens are required to be in **bold**, highlighted, underlined or in *italics*.

Celery (and celeriac)
Cereals containing gluten
Crustaceans
Eggs
Fish
Lupin
Milk
Molluscs
Mustard
Nuts
Peanuts
Sesame
Soybeans
Sulphur dioxide

INGREDIENTS
Water, Carrots, Onions, Red Lentils (4.5%), Potatoes, Cauliflower, Leeks, Peas, Cornflour, **Wheat** flour, Cream (**milk**), Yeast Extract, Concentrated Tomato Paste, Garlic, Sugar, **Celery** Seed, Sunflower Oil, Herb and Spice, White Pepper, Parsley
ALLERGY ADVICE
For allergens, see ingredients in **bold**

Nutrition and health claims

Nutrition and health claims are controlled by European regulations. Claims on a food or drink should have been authorised and listed on the European register of claims and have met certain conditions.

Nutrition claims

A nutrition claim describes what a food contains (or does not contain) or contains in reduced or increased amounts. Examples include:

- Low fat (less than 3g of fat per 100g of food);
- High fibre (at least 6g of fibre per 100g of food);
- Source of vitamin C (at least 15% of the nutrient reference value for vitamin C per 100g of food).

Health claims

A health claim states or suggests there is a relationship between a product and health. In order to make a claim, the amount present of the nutrient, substance or food must fulfil the specific conditions of use of the claim. The types of health claims are:

- 'Function Health Claims';
- 'Risk Reduction Claims';
- Health 'Claims referring to children's development'.

Year 10 French Term 5: Mon petit monde à moi (Module 7)

Là, où j'habite	*Where I live*
1. Angleterre	*England*
2. bâtiment (m)	*building*
3. beau / belle	*beautiful*
4. calme	*calm*
5. campagne (f)	*countryside*
6. capitale (f)	*capital city*
7. grand	*big*
8. habiter	*to live*
9. historique	*historic*
10. montagne (f)	*mountain*
11. nord-est (m)	*northeast*
12. partie (m)	*part*
13. petit	*small*
14. quartier (m)	*neighbourhood*
15. région (f)	*area / region*
16. se trouver	*to be located / situated*
17. sud-ouest (m)	*southwest*
18. vieux / vieille	*old*
19. village (m)	*village*
20. ville (f)	*town*

En ville	*In town*
21. à droite	*on the right*
22. à gauche	*on the left*
23. aller	*to go*
24. boulangerie (f)	*bakery*
25. centre (m)	*centre*
26. château (m)	*castle*
27. collège (m)	*secondary school*
28. continuer	*to continue*
29. entreprise (f)	*business*
30. musée (m)	*museum*
31. pâtisserie (f)	*cake shop*
32. piscine (f)	*swimming pool*
33. place (f)	*square*
34. plan (m)	*map*
35. port (m)	*port / harbour*
36. poste (f)	*post office*
37. rue (f)	*street*
38. tourner	*to turn*
39. tout droit	*straight ahead*
40. visiter	*to visit*

Le shopping	*Shopping*
41. argent (m)	*money*
42. billet (m)	*bank note (also ticket)*
43. boîte (f)	*box / tin*
44. cadeau (m)	*present*
45. caisse (f)	*checkout*
46. centre commercial (m)	*shopping centre*
47. couleur (m)	*colour*
48. courses (fpl)	*shopping*
49. magasin (m)	*shop / shopping*
50. monnaie (f)	*change / currency*
51. sac (m)	*bag*
52. (super)marché (m)	*(super)market*
53. taille (m)	*size*
54. tendance	*trendy / fashionable*
55. acheter	*to buy*
56. chercher	*to look for*
57. coûter	*to cost*
58. échanger	*to exchange*
59. payer	*to pay*
60. vendre	*to sell*

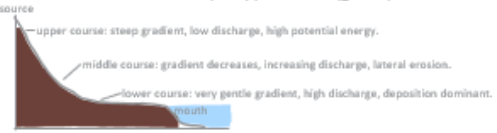
Ma maison	*My house*
61. accès (m)	*access*
62. ancien / ancienne	*old*
63. appartement (m)	*flat / apartment*
64. chambre (f)	*bedroom*
65. cher	*expensive/ dear*
66. cuisine (f)	*kitchen / cooking*
67. en bois	*wooden*
68. entrée (f)	*entrance*
69. espace (f)	*space*
70. fenêtre (f)	*window*
71. jardin (m)	*garden*
72. maison (f)	*house / home*
73. moderne	*modern*
74. neuf	*brand-new / nine*
75. propre	*clean / own*
76. partager	*to share*
77. salle à manger (f)	*dining room*
78. salle de sport / jeux (f)	*games room*
79. vivre	*to live*
80. voisin (m)	*neighbour*

habiter (to live)					
Past		***Present***		***Future***	
J'ai habité	*I lived*	**J'habite**	*I live*	**Je vais habiter**	*I am going to live*
Tu as habité	*You lived*	**Tu habites**	*You live*	**Tu vas habiter**	*You are going to live*
Il a habité **Elle a habité**	*He lived* *She lived*	**Il habite** **Elle habite**	*He lives* *She lives*	**Il va habiter** **Elle va habiter**	*He is going to live* *She is going to live*
Nous avons habité	*We lived*	**Nous habitons**	*We live*	**Nous allons habiter**	*We are going to live*
Ils/elles ont habité	*They lived*	**Ils/elles habitent**	*They live*	**Ils/elles vont habiter**	*They are going to live*

UK River Landscapes

1. River Profiles

Long profile Describes the gradient of a river from source (steep) to mouth (gentle).



Cross profile The river's cross-section at a particular point. The channel cross-profile includes only the river itself. The valley cross profile includes the river channel, valley floor, and the valley sides.

upper	middle	lower
Narrow, V-shaped valley, steep sides, shallow channel.	Wider valley floor, channel becomes wider and deeper, gently sloping sides.	Very wide, flat valley floor, meanders, floodplains.

2. Processes

Erosion Wearing away of land by a river.

Abrasion: sediment scrapes against bed and banks.

Attrition: sediment particles knock into each other, becoming smaller/rounded.

Hydraulic action: water enters cracks, air compressed, rock breaks apart.

Solution: soluble minerals dissolve in river water.

Transportation The process by which a river carries its load.

Traction: large boulders rolled along the riverbed.

Saltation: smaller pebbles "bounced" along.

Suspension: fine sediment carried in the water column.

Solution: dissolved materials carried invisibly in water.

Deposition The process by which a river drops its load.

Occurs when a river loses energy (e.g., shallower water, decrease in velocity, or during low flow), e.g. during flooding, at the base of a waterfall, the inside of a meander, and at the mouth where it meets another body of water.

3. Landforms Of Erosion

Waterfalls and gorges

1. Occur where hard rock overlies softer rock.
2. Undercutting of softer rock by hydraulic action and abrasion.
3. Undercutting leads to collapse of cap of more resistant rock.
4. Waterfall retreats upstream leaving a gorge.

Interlocking spurs

Projecting ridges of high land that alternate from each valley side where the river winds around more resistant rock in the upper course.

4. Landforms of erosion and deposition

The river flows through alternating pools and riffles creating variations in velocity that begin to direct the river's flow side to side, initiating a bend.

The bend becomes more pronounced because ongoing outer bend erosion and inner bend deposition create a deeper curve.

Continued erosion (hydraulic action and abrasion)on the outer banks narrows the meander's neck, bringing opposite bends closer together.

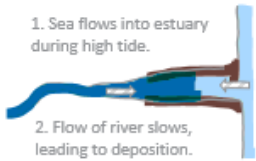
In a high flow or flood event, the river may cut through the narrow neck, forming a new, straighter channel.

Deposition seals off the old loop, leaving an oxbow lake isolated from the main river.

5. Depositional Landforms

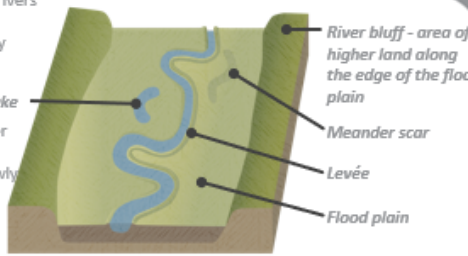
Levées: Naturally raised riverbanks formed by coarse sediment deposited close to the channel edge during floods.

Estuary: A wide, sheltered body of water found at a river's mouth, where it broadens into the sea.



Flood plain: Flood plains are associated with rivers in their middle and lower course. They are extensive, flat areas of land covered mainly by grass. Flood plains are formed during flood conditions.

The width of the flood plain is due to meander migration. The outside bends erode laterally into the edge of the valley. Their position slowly moves downstream.



Notes

Quizzes

internet geography

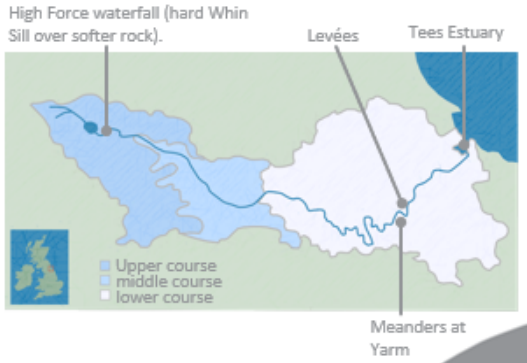
UK River Landscapes

6. UK River Valley

TEES

Northeast England | 137 km (85 miles)

The River Tees flows east from its source in the Pennines to its mouth on the North Sea coast.



7. Flood Risk

An increase in discharge causes river levels to increase. Flooding occurs when the bank full capacity of a river is exceeded (water spills over the banks of the river). Human and physical factors cause flooding.

Physical Factors

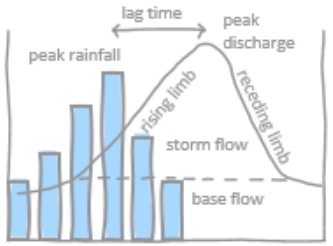
- Heavy rainfall, prolonged rainfall (saturated ground), snowmelt, geology (impermeable rock), relief (steep slopes increase run-off).

Human Factors

- Urbanisation (impermeable surfaces), deforestation (less interception), agriculture (reduced vegetation cover).

8. Hydrographs

Hydrograph A graph which shows the discharge of a river, related to rainfall, over a period of time.



Flashy hydrographs have a steep rising limb and a small lag time. This indicates that river discharge increases rapidly over a short period, indicating rainwater reaches the river very quickly. This means the river is more likely to flood.

A **gentle hydrograph** shows the river is at low risk of flooding. These types of hydrographs have a gentle rising limb and a long lag time, which means it takes longer for the peak rainfall to reach the river channel, so the river discharge is increasing slowly.

Factors affecting the shape of a hydrograph:

- Basin shape
- Slope
- Land use
- Soil type
- Vegetation.

9. Hard Engineering

Hard engineering Involves the building of entirely artificial structures using various materials such as rock, concrete and steel to reduce, disrupt or stop the impact of river processes.

Strategies	Advantages	Disadvantages
Dams and reservoirs	Store water, can generate hydroelectric power, controls flow.	Expensive, displaces people, can affect ecosystems downstream.
Channel straightening	Speeds flow away from flood-prone areas.	Can increase flooding downstream, expensive, unnatural.
Embankments	Increases channel capacity.	Risk of severe flooding if they fail.
Flood-relief channels	Diverts water away from high-value areas.	Expensive, requires significant maintenance.

10. Soft Engineering

Floodplain zoning: Controls what can be built on floodplains to reduce damage.

✓ Low cost, reduces future damage.

✗ Restricts land use, may not be an option in existing urban areas.

Planting trees (afforestation): Increases interception, reduces surface runoff.

✓ Improves environment, reduces flood risk.

✗ Takes time for trees to mature.

River restoration: Allows river to return to natural state (re-meandering, removing hard defences)

✓ creates habitats, aesthetically pleasing, can slow flow.

✗ Can conflict with existing land use, initial costs.

11. Flood Management

Jubilee River Flood Relief Channel | River Thames | Funded by the EA - £330 million

The Jubilee River is a flood relief channel. It was constructed to reduce the risk of flooding high-value areas such as Windsor and Eton by diverting water from the River Thames.

Management strategy:

- An 11.7 km artificial channel diverts excess water from the Thames.
- Designed to reduce flood risk for vulnerable communities.

Issues:

- Social: Protects thousands of homes but raises fairness concerns for downstream areas.
- Economic: High construction and maintenance costs (~£110 million), though can reduce insurance premiums.
- Environmental: Blends natural features but alters river habitats downstream.

Notes

Quizzes

internet geography

Year 10 German Term 5: Meine Ecke (Module 5)

Wo ich wohne	*Where I live*
1. Berg (m)	*mountain*
2. Deutschland (m)	*Germany*
3. die Schweiz (f)	*Switzerland*
4. Dorf (nt)	*village*
5. Fluss (m)	*river*
6. Gegend (f)	*region / area*
7. Haus (nt)	*house*
8. hoch	*high*
9. Kleinstadt (f)	*small town*
10. Küste (f)	*coast*
11. Land (nt)	*country / countryside*
12. lang	*long*
13. Meer (nt)	*sea / ocean*
14. Ort (m)	*place / location*
15. Österreich (m)	*Austria*
16. Region (m)	*region*
17. Stadtmitte (f)	*town centre*
18. Straße (f)	*street*
19. wohnen	*to live*
20. Wohnung (f)	flat / apartment

Die Stadt	*The town*
21. Bank (f)	*bank / bench*
22. Bibliothek (f)	*library*
23. Brücke (f)	*bridge*
24. Garten (m)	*garden*
25. geradeaus	*straight ahead*
26. in der Nähe von	*near / nearby*
27. Kino (nt)	*cinema*
28. links	*to / on the left*
29. Platz (m)	*square*
30. Post (f)	*post office*
31. rechts	*to / on the right*
32. Richtung (f)	*direction*
33. Schloss (m)	*castle*
34. Schule (f)	*school*
35. Schwimmbad (nt)	*swimming pool*
36. sich befinden	*to be situated*
37. Stadion (m)	*stadium*
38. Strand (m)	*beach*
39. Weg (m)	*path / way / route*
40. Zentrum (nt)	*centre*

Die Verkehrsmittel	*Modes of Transport*
41. ankommen	*to arrive*
42. Bahn (f)	*rail / railway*
43. Bahnhof (m)	*station*
44. Boot (nt)	*boat*
45. Bus (m)	*bus*
46. fahren	*to travel*
47. Flughafen (m)	*airport*
48. Flugzeug (m)	*plane*
49. Fuß (m) / zu Fuß	*foot / on foot*
50. Karte (f)	*ticket*
51. öffentlich	*public*
52. reservieren	*to book / reserve*
53. Rückfahrkarte (f)	*return ticket*
54. Schiff (nt)	*ship / boat*
55. schnell	*quick / fast*
56. U-Bahn (f)	*underground*
57. Verkehrsmittel (nt)	*means of transport*
58. verlassen	*to depart*
59. verpassen	*to miss (the bus)*
60. Zug (m)	*train*

Einkaufen	*Shopping*
61. Angebot (nt)	*offer*
62. bezahlen	*to pay*
63. billig	*cheap*
64. einkaufen	*to shop / go shopping*
65. Einkaufszentrum (nt)	*shopping centre*
66. Euro (nt)	*euro*
67. Geld (m)	*money*
68. Geschenk (nt)	*present*
69. Größe (f)	*size*
70. Kasse (f)	*till*
71. kaufen	*to buy*
72. Kleidung (f)	*clothes*
73. kosten	*to cost*
74. Laden (m)	*shop*
75. Preis (m)	*price*
76. Rechnung (f)	*bill*
77. (Super)markt (m)	*(super)market*
78. teuer	*expensive*
79. verkaufen	*to sell*
80. wechseln	*to change / exchange*

wohnen (to live)					
Past		***Present***		***Future***	
Ich habe…gewohnt.	*I lived*	**Ich wohne**	*I live*	**Ich werde…wohnen.**	*I will live*
Du hast…gewohnt.	*You lived*	**Du wohnst**	*You live*	**Du wirst…wohnen.**	*You will live*
Er/sie hat…gewohnt.	*He/she lived*	**Er/sie wohnt**	*He/she lives*	**Er/sie wird…wohnen.**	*He/she will live*
Wir haben…gewohnt.	*We lived*	**Wir wohnen**	*We live*	**Wir werden…wohnen.**	*We will live*
Sie haben…gewohnt.	*They lived*	**Sie wohnen**	*They live*	**Sie werden…wohnen.**	*They will live*

Section 2: Challenges to Elizabeth at Home and Abroad 1569-88

1	Elizabeth faced many serious threats both within England and from aboard. Many still wanted Mary Queen of Scots on the throne. Philip II of Spain also wanted to remove Elizabeth from the throne. Spain and England were religious and political rivals. There was particular tension when Drake tried to challenge Spanish dominance in the New World.
Key events	
2	**1492** Discovery of the New World
3	**1567** Spanish travel to Netherlands to crush Protestant revolt.
4	**1568** Mary Queen of Sots arrives in England
5	**1569** Revolt of the Northern Earls
6	**1570** Elizabeth excommunicated
7	**1571** The Ridolfi Plot
8	**1572** Elizabeth hired Drake as a privateer
9	**1576** Spanish Fury and Pacification of Ghent
10	**1577-80** Drake circumnavigated the globe.
11	**1583** Throckmorton Plot
12	**1584** Treaty of Joinville
13	**1585** Act of Preservation of the Queen's Safety/Treaty of Nonsuch
14	**1586** Babington Plot
15	**1587** Mary Queen of Scots executed
16	**1587** Attack on Cadiz
17	**1588 Spanish Armada**

History

Section 2: Challenges to Elizabeth at Home and Abroad 1569-88

Key Words/Events/People		
18	New World	North and South America.
19	Revolt of the Northern Earls	When northern earls encouraged Catholics to rebel.
20	Mary Queen of Scots	Supported the plan to marry the Duke of Norfolk.
21	Conspiracy	A secret plan with the aim of ding something illegal.
22	Papal Bull	A written order by the Pope.
23	Council of the North	Used to implement Elizabeth's laws and authority in the North of England.
24	Ridolfi Plot	Plan to murder Elizabeth, launch a Spanish attack and put Mary Queen of Scots on the throne.
25	Throckmorton Plot	Planned for the French Duke of Guise to invade England, free Mary , overthrow Elizabeth and restore Catholicism in England.
26	Babington Plot	The Duke of Guise (France) would invade England and put Mary on the throne.
27	Sir Francis Walsingham	Elizabeth's Secretary of State.
28	Act of Preservation of the Queen's Safety	In the event of Elizabeth's assassination, Mary would be banned from the succession.
29	Foreign Policy	The aims of objectives that guide a nation's relations with other states.
30	Privateer	Individuals with their own armed ships that capture other ships for their cargo, often with the support of the Queen.
31	Francis Drake	Elizabeth hired him as a privateer.
32	Circumnavigate	To travel all the way around the world.
33	Spanish Fury	The Spanish rampaged through Dutch provinces as they left.
34	Pacification of Ghent	Spanish troops expelled from Netherlands, political autonomy to be returned and end of religious persecution.
35	Mercenary	A soldier who fights for money rather than a nation or a cause.
36	Treaty of Joinville	The King of France and the King of Spain became allies against Protestantism.
37	Treaty of Nonsuch	Effectively put England and Spain at war.
38	Singeing of the King of Spain's beard	Drake sailed into Cadiz harbour, Spain's most important Atlantic port, and over 3 days destroyed 30 ships.

History

Section 3: Elizabethan Society in the Age of Exploration 1558-88

1	Elizabeth's I's reign was a time of expansion with growth in many different areas of society and life.
Key events	
2	**1563** Statute of Artificers
3	**1570** Norwich Survey
4	**1572** Vagabonds Act
5	**1576** Poor Relief Act
6	**1580** Drake returns from circumnavigating the globe with spices, treasure and tales of Nova Albion.
7	**1584** Raleigh begins planning new colonisation attempt by sending a fact finding mission to Virginia.
8	**1585** Colonists set sail for North America and begin the English colonisation of Virginia.
9	**1586** Surviving colonists abandon Virginia and return to England
10	**1587** New group of colonists arrive in Virginia and establish colony at Roanoke
11	**1590** English sailors arrive at Roanoke only to find it abandoned
Key Concepts	
12	**Education** – Expanded during Elizabeth's reign but it was expensive and mostly for boys. The large majority of people were illiterate.
13	**Pastimes** – Theatre thrived. Elizabethan leisure was similar to modern day but sport was much more violent.
14	**Population Growth** – During the reign of Elizabeth, population grew by as much as 35%. Food prices rose, wages fell and enclosure brought problems. The urban poor grew and poverty was a real problem.
15	**Exploration** by Drake led to conflict with Spain over the New World.
16	**Attitudes** – Unemployment was recognised as a genuine issue.
17	**Poverty** was an issue that Elizabeth wanted to address.

Section 3: Elizabethan Society in the Age of Exploration 1558-88

Key Words/Event/People		
18	Social mobility	Being able to change your position in society.
19	Humanists	Believed that learning was important in its own right and not for just practical reasons.
20	Grammar schools	Private schools set up for boys considered bright who largely came from well off families in towns.
21	Apprentice	Someone learning a trade or a skill.
22	Petty schools	Set up in a teacher's home. For boys.
23	Dame schools	Set up in a teacher's home. For girls.
24	Mystery plays	Plays base on the Bible and saints' stories.
25	Globe	Shakespeare's theatre.
26	Alms	Charity
27	Poor relief	Financial help.
28	Enclosure	The process of replacing large, open fields that were farmed by villages with individual fields belonging to one person.
29	Vagabonds	Homeless people without jobs who roamed the countryside begging for money or perhaps committing crimes.
30	Deserving poor	People unable to work because of illness or old age.
31	Idle poor	People who were fit to work but didn't.
32	Triangular trade	Route from Europe to Africa to the Americas.
33	Quadrant/ Astrolabe	Used by sailors to help with navigation at sea.
34	Cartographer	Map maker.
35	Galleons	Ships that were much larger than traditional trading ships.
36	Nova Albion	Region named by Drake, probably north of modern day San Francisco.
37	Walter Raleigh	Explorer who encouraged colonists to Virginia.
38	Manteo and Wanchese	Two native American Indians who came back to England.
39	Native Americans	People who lived in the New World before the colonists.

Mathematics 10.12 Non-calculator methods…

Key words	
Truncate	to shorten, to shorten a number (no rounding), to shorten a shape (remove a part of the shape)
Round	making a number simpler, but keeping its place value close the what it originally was
Credit	money that goes into a bank account
Debit	money that leaves a bank account
Profit	the amount of money after income - costs
Tax	money that the government collects based on income, sales and other activities
Balance	The amount of money in a bank account
Overestimate	Rounding up - gives a solution higher than the actual value
Underestimate	Rounding down - gives a solution lower than the actual value

Sparx codes for this topic	
U417, U478, U417, U478	Addition/subtraction
U127, U293, U453, U868	Multiplication/division
U736, U793, U293, U544, U538	Four operations with fractions
U319, U627	Exact values
U480, U298, U731, U965	Rounding
U102, U225, U299	Estimation
U657, U301	Limits of accuracy

Exact Values

Leave in terms of π

$= \frac{120}{360} \times 36\pi$

$= \frac{1}{3} \times 36\pi = 12\pi$

Leave as a surd

$\tan 30 = \frac{1}{\sqrt{3}}$

Rounding R

2.46192 (to 2dp) - is this closer to 246 or 247

246 — 247

2.46 | 192

This shows the number is closer to 246

Significant Figures

370 to 1 significant figure is 400
37 to 1 significant figure is 40
3.7 to 1 significant figure is 4
0.37 to 1 significant figure is 0.4
0.00000037 to 1 significant figure is 0.0000004

SF: Round to the first nonzero number

Estimation R

Round to 1 significant figure to estimate

$21.4 \times 3.1 \approx 20 \times 3 \approx 60$

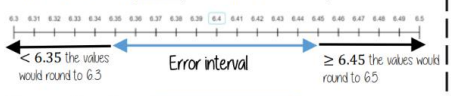
The equal sign changes to show it is an estimation

This is an **underestimate** because both values were rounded down

It is good to check all calculations with an estimate in all aspects of maths – it helps you identify calculation errors.

Limits of accuracy

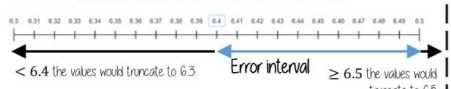
A width w has been rounded to 6.4cm correct to 1dp



The error interval $6.35 \leq w < 6.45$

Any value within these limits would round to 6.4 to 1dp

A width w has been truncated to 6.4cm correct to 1dp



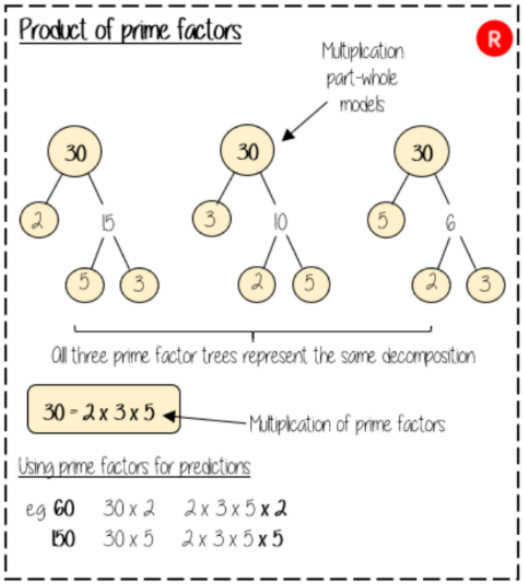
$6.4 \leq w < 6.5$

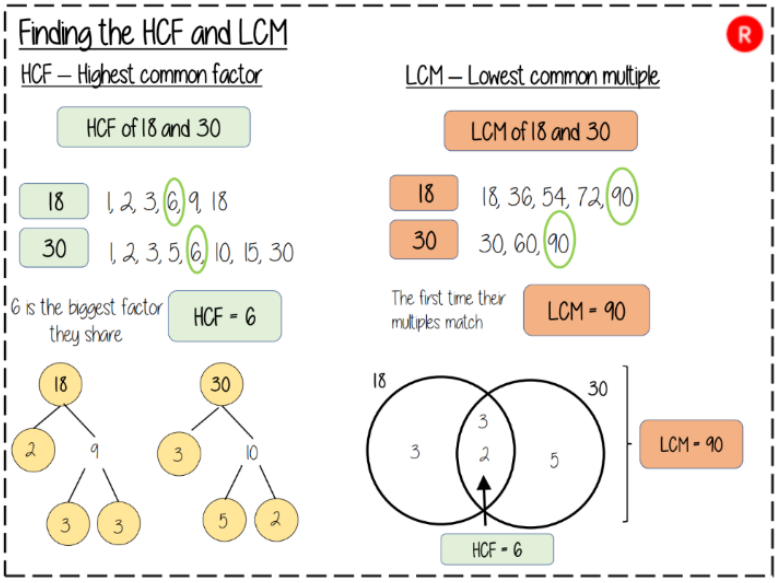
Any value within these limits would truncate to 6.4 to 1dp

Mathematic 10.13 Types of number & sequences…

Key words	
Factor	numbers we multiply together to make another number
Multiple	the result of multiplying a number by an integer
HCF	highest common factor. The biggest factor that numbers share
LCM	lowest common multiple. The first multiple numbers share
Arithmetic	a sequence where the difference between the terms is constant
Geometric	a sequence where each term is found by multiplying the previous one by a fixed nonzero number
Sequence	items or numbers put in a pre-decided order

Sparx codes for this topic	
U211, U236	Multiple, factors & primes
U739	Product of prime factors
U529, U751, U250	Finding HCF & LCM
U213, U498, U958, U206	Arithmetic/geometric sequences
U680, U978, U206	Other sequences
U498, U530	Finding the nth term

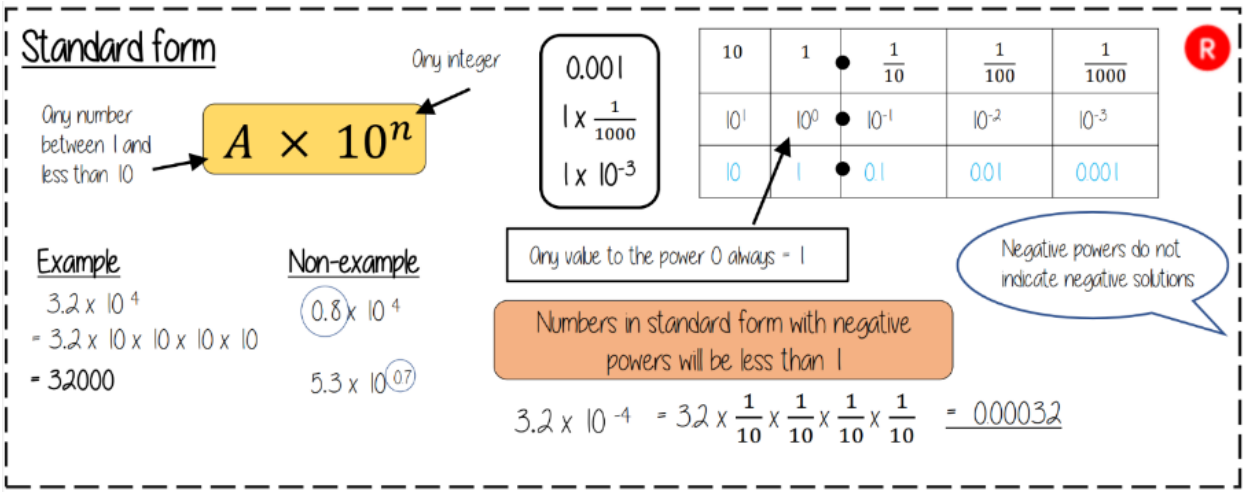




Mathematics 10.14 Indices & roots…….

Key words	
Standard (index) Form	a system of writing very big or very small numbers
Commutative	an operation is commutative if changing the order does not change the result
Base	The number that gets multiplied by a power
Power	The exponent - or the number that tells you how many times to use the number in multiplication
Exponent	The power - or the number that tells you how many times to use the number in multiplication
Indices	The power or the exponent
Negative	a value below zero
Coefficient	The number used to multiply a variable

Sparx codes for this topic	
U851	Powers and roots
U330, U534, U161	Standard form
U985, U694	Zero & negative indices
U235	Powers of powers
U330, U290, U264	Standard form calculations
U985, U772, U662	Further indices revision



Personal Development

Belonging & Community KS4

Values	Values are ideas about what's right or wrong and about what's important in life. Someone's values might influence their actions, like their decisions or how they act towards another person.
Stereotype	An assumption about what someone will be like (e.g. their personal qualities or attributes) based on a group they belong to.
Prejudice	An unfair and unreasonable opinion or feeling about a person or group of people, especially when formed without experience, thought or knowledge.
Bias	Biases are feelings in favour of or against a person, group, or idea, based on someone's experiences, opinions or beliefs.
Confirmational bias	Seeking or only paying attention to information or opinions that agree with a person's existing beliefs and attitudes.
Implicit bias	When feelings and stereotypes affect someone's beliefs about something. They may be unaware that this is affecting their thinking.
Explicit bias	A biased belief about something that a person is aware of. A person might make conscious decisions based on these attitudes.
Protected characteristics	Attributes about a person that are protected by law through the Equality Act 2010, including age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex, and sexual orientation.
Discrimination	When someone is treated differently to others because they belong to a particular group or have a particular characteristic. Can be based on stereotypes or prejudice.
Propaganda	Information, especially of a biased or misleading nature, used to promote a political point.
Echo chamber	A typically online platform where beliefs and views are repeatedly reinforced and amplified without challenge.
Radicalisation	A process by which a person comes to support terrorism and/or extremist ideologies.
Extremism	Vocal or active opposition to commonly held values, particularly British values such as democracy and the rule of law.
Terrorism	The unlawful use of violence or threat of violence and intimidation to bring about political, religious, or ideological change.

Why do people become violent extremists?

There is a difference between radicalisation which challenges the status quo, and radicalisation leading to violence. Many people may have radical views, but most are not interested in turning to violence to bring about societal disruption and change. It is worth remembering that many figures throughout history were once considered extremists (slavery abolitionists, campaigners for women's suffrage), only to have their views become mainstream societal values later6.

Many young people, especially those with additional vulnerabilities or isolated from their peers or family, seek clarity of purpose. Once they find what they believe is that purpose, the internet gives them access to a vast support network that confirms, rather than challenges, their new-found worldview and organisations who will happily recruit them for their own agenda.

Those who encourage or get others to commit acts of violent extremism target young people with greater vulnerability, who they lead to believe that violence can earn respect, riches or glory. For someone young people, radicalisation offers them 'justification' or 'permission' to indulge in violent

behaviour that excites them. Experiences of trauma, social isolation and criminal activity can increase a young person's vulnerabilities, and they may experience pull factors for violent extremism similar to those experienced in gang culture.

Misconceptions around faith justification for extremism

Although there is often a faith justification for terrorist attacks, often it is those who are less knowledgeable or recent converts to a faith who get involved in terrorist activities. They are more vulnerable to being led by a seemingly more knowledgeable faith leader, even where extreme views shared and actions promoted by this leader are not representative of the majority views of the faith. Being a member of a faith community is actually often a protective factor against radicalisation. There have been terrorists and extremists from all backgrounds, races and faiths over the years. These include paramilitaries in Northern Ireland, such as the Provisional IRA and Ulster Defence Association, and in mainland Britain, such as the National Front, British National Party and English Defence League. Extremist acts related to incel culture have also received media attention recently7.

Support services

- Young Minds www.youngminds.org.uk/young-person or text YM to 85258
- Childline www.childline.org.uk or call 0800 1111
- Victim Support has a service for children and young people called You & Co: www.victimsupport.org.uk/children-and-young-people

Careers & Work Experience – KS4

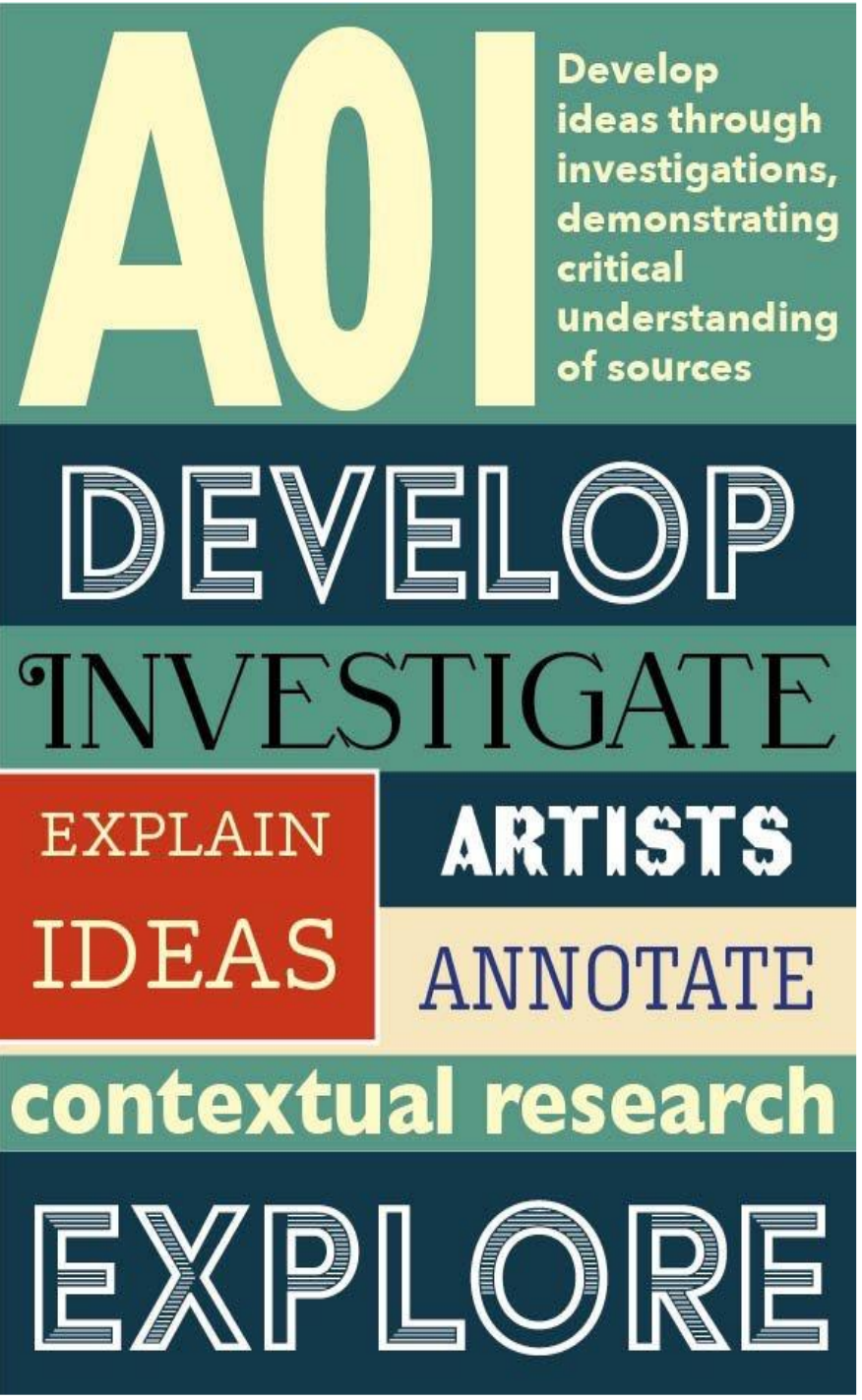
Level 1 and Level 2 qualifications	Level 1 qualifications include GCSE grades 3-1 or D-G, and Level 1 BTEC Tech Awards. Level 2 qualifications include GCSE grades 9-4 or A*-C, Level 2 BTEC Tech Awards and BTEC First Awards. Level 1 and 2 qualifications also include Level 1 and 2 awards, certificates, diplomas, essential or functional skills, English for Speakers of Other Languages (ESOL), National Vocational Qualifications (NVQs), music grades 1-3 (Level 1), and 4-5 (Level 2), as well as intermediate apprenticeships at Level 2.
Level 3 qualifications	These include A levels, AS levels, T Levels, IB diploma, BTEC Nationals, access to higher education diplomas, and advanced apprenticeships, as well as Level 3 awards, certificates, diplomas, ESOL and NVQs. They also include music grades 6-8.
Level 4 qualifications	These include higher apprenticeships (also available up to Level 7) and higher technical qualifications, including higher national certificates, and Level 4 awards, certificates, diplomas, and NVQs.
Level 5 qualifications	These include foundation degrees, higher apprenticeships, and higher technical qualifications including higher national diplomas, and Level 5 awards, certificates, diplomas, and NVQs.
Level 6 qualifications	These include degree apprenticeships (also available at Level 7), undergraduate degrees, graduate certificates or diplomas, as well as Level 6 awards, certificates, diplomas, and NVQs.
Level 7 and Level 8 qualifications	Level 7 qualifications include postgraduate certificates, diplomas, Master's degrees and degree apprenticeships, and Level 7 awards, certificates, diplomas, and NVQs.

Personal Development

	Level 8 qualifications include respective level awards, certificates and diplomas, as well as doctorate degrees.
Vocational qualification	These qualifications, including BTEC qualifications and NVQs, focus on a particular job, industry, or sector, such as applied science, business, health and social care, or hospitality, and can be taken at Levels 1-7.
Subject-based qualification	These qualifications focus on a particular subject, and include GCSEs, AS and A level qualifications.
Part-time employee	Usually, someone who works less than 35 hours in one week. A part-time worker aged 18 or over is entitled to the same work-based rights as a full-time employee, although how these are applied can differ to a full-time employee. Unless a child has a performance license, the minimum working age is 13, when a young person aged 13-16 may only work part-time and for certain hours in and outside of term time. The hours they may work will change depending on their age.
Full-time employee	Usually, someone who works 35 hours or more in one week. A young person can work full-time, up to 40 hours in a week, once they reach the school-leaving age. In England, they must still be in education or training until they are 18.
Zero-hours contract	These are contracts which do not give employees a set number of hours to work each week. Employees are entitled to receive the National Minimum Wage, as well as statutory annual leave.
Gig economy	Work provided through digital platforms which pair up a person providing a service with a customer on a short-term basis, where payment is given for each task completed.
Employment rights	A person with an employment contract is entitled to certain rights, which include the National Minimum Wage, statutory paid holiday, rest breaks, maximum working hours (apart from in certain jobs, or if they have agreed to opt out), maternity, paternity, adoption, and parent pay and leave, and protection from unfair treatment.

Support/advice about navigating work, study and career choices:

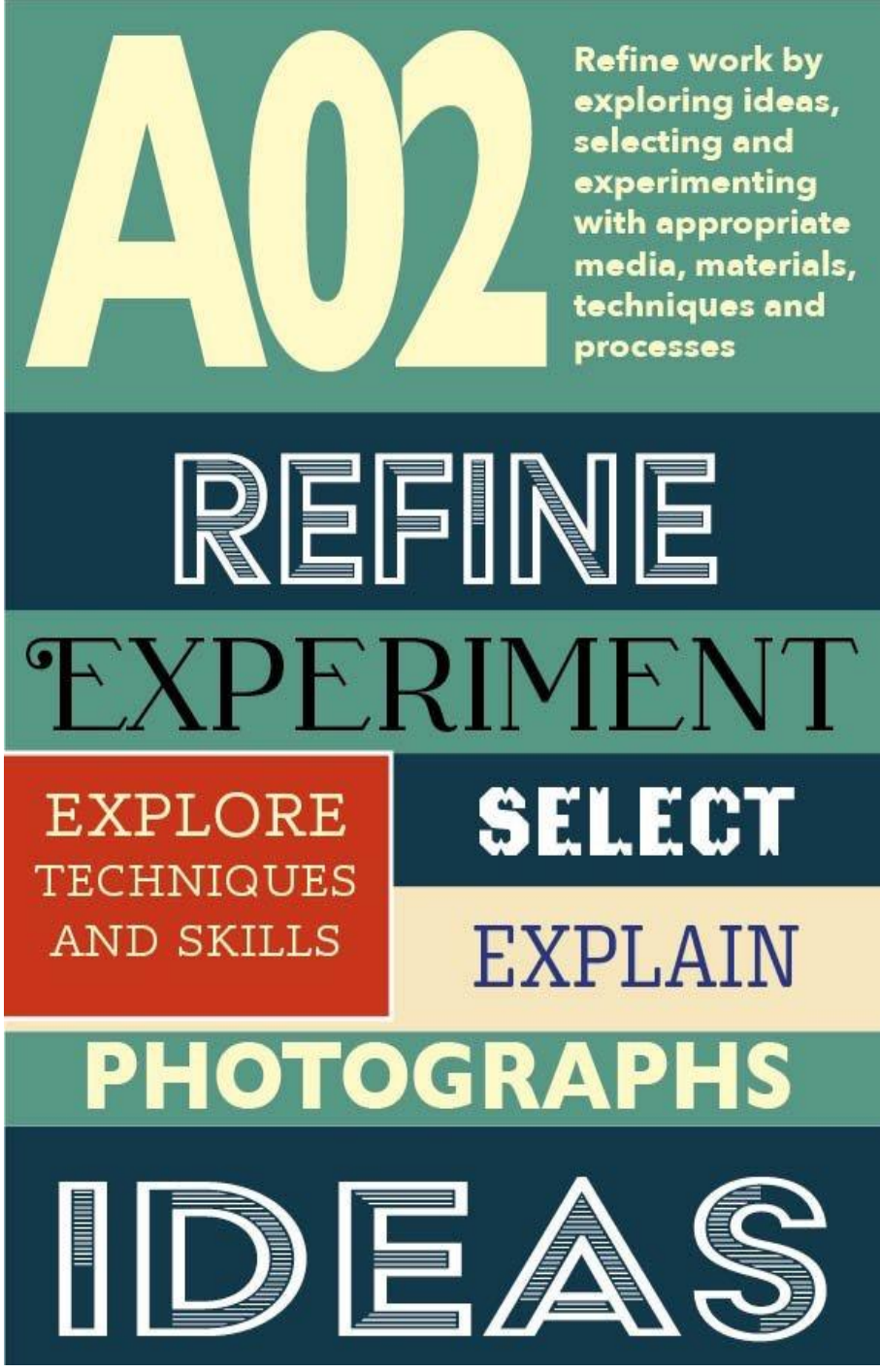
- Wadham School careers adviser
- Childline www.childline.org.uk 0800 1111
- National Careers Service nationalcareers.service.gov.uk/contact-us 0800 100 900
- Skills for Life www.skillsforcareers.education.gov.uk/pages/young-people
- Apprenticeships.gov.uk
- UCAS – making choices about higher education
- Disability Rights UK – advice for disabled students, apprentices and trainees www.disabilityrightuk.org/disabled-students-helpline 0330 995 0414



Photography Assessment Objectives

You need to show you have covered each one.

Assessment Objectives



A03

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

RECORD

INTENTIONS

LINK

IDEAS

OBSERVATION

PLANNING

PRIMARY RESEARCH

RELEVANT

Photography Assessment Objectives

You need to show you have covered each one.

Assessment

Objectives

A04

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

RESPONSE

MEANINGFUL

VISUAL LANGUAGE

DEMONSTRATE

UNDERSTANDING

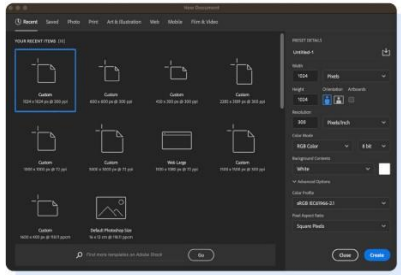
MAKE CONNECTIONS

CONCLUSION

Photoshop Knowledge Organiser

Opening a file...

Open Adobe Creative Cloud and open Photoshop. Go to File >New
A box will appear. Choose a Name for your work, go to print and then choose a Preset to select your size of your canvas. Don't forget, 300 dpi (dots per inch).



Saving your work

Saving in Photoshop format **(.psd)** will retain layers, type, and other editable Photoshopproperties. It's best to save your image in PSD format while you're still working on it.
Select: File > Save
Saving in **JPEG (.jpg)** format will save as a standard image file that can be shared, opened by other programs due to its smaller file size. Saving your design as a JPEG (.jpg) will flatten layers.
Select: File > Save As then select 'JPEG' from the format drop down box.
When you're finished editing, save a copy in both of these formats.

REMEMBER! Click on 'This PC' and scroll down until you see your named server. Save in Graphics folder.

Photoshop toolbar

- Move & selection tools.
- Magic wand tool
- Crop & slice tools
- Measurement tool
- Retouching & painting tools
- Drawing & type tools
- Navigation tools
- Edit the toolbar
- Line & fill colour selector
- Quick mask tool
- Change screen mode

- Pointer V
- Rectangular Marquee Tool M
- Lasso Tool L
- Magic Wand Tool W
- Crop Tool C
- Frame Tool K
- Eyedropper Tool I
- Spot Healing Brush V
- Brush Tool B
- Clone Tool S
- Eraser Tool E
- History Brush Tool Y
- Paint Bucket Tool G
- Blur Tool
- Dodge Tool O
- Pen Tool P
- Type Tool T
- Path Selection A
- Rectangle Tool U
- Pan Tool H
- Zoom Tool Z

The toolbar's hidden tools

Each tool in the toolbar is represented by an icon, and there are many more tools available than what we see.

To view the additional tools, click and hold on the icon. Or right-click (Win) / Control-click (Mac) on the icon. A fly-out menu will open listing the other tools that are available.

Keyboard Shortcuts

Ctrl T Free Transform	Ctrl C Copy
Ctrl + Zoom in	Ctrl V Paste
Ctrl - Zoom out	Ctrl O Open
Ctrl A Select All	Ctrl N New file
Ctrl D Deselect	Ctrl J New layer

Made a mistake?

To undo the last thing you did, CTRL+Z

To redo the last thing you did, choose SHIFT CTRL+Z

Transform

The Free Transform command (Ctrl T) lets you apply transformations in one continuous operation.

- Move
- Scale
- Rotate
- Skew/distort
- Perspective
- Warp

Photography

GCSE PE

1.1.d. Respiratory System Key Terms		
1	**Aerobic capacity**	The maximum amount of oxygen your body can take in and use, measured with the V02 max test
2	**Aerobic Exercise/ Activity**	When oxygen is used for the duration of exercise to make energy, usually at moderate intensity at a continuous rate.
3	**Alveoli**	Small air sacks in the lungs which are the site of gas exchange.
4	**Anaerobic Exercise/ Activity**	'Without oxygen'. High intensity exercise for short periods of time where oxygen is <u>not</u> predominantly used to produce energy
5	**Breathing rate**	Number of breaths taken per minute
6	**Gas exchange**	The movement of O2 and CO2 between the alveoli and capillaries and the working muscles and capillaries.
7	**Minute ventilation**	(minute volume) Then volume of gas inhaled OR exhaled from the lungs in 1 minute
8	**Mitochondria**	the place in each muscle cell where energy is produced
9	**Respiratory Muscles**	Muscles which help air move in and out of the lungs (diaphragm and intercostals)
10	**Respiration system**	gets oxygen into the body and removes carbon dioxide. It's made up of the mouth/nose – bronchi- bronchioles and alveoli
11	**Tidal volume**	The amount of air breathed in or out in one breath. Measured in ml
12	**Trachea (windpipe)**	The pipe which connects the nose/mouth to the bronchi

1.2.c. Preventing Injury in Physical Activity and Training		
1	**Cool Down**	Low intensity exercise and stretching after strenuous exercise to slowly decrease, breathing rate and heart rate and muscle temperature to resting levels
2	**Hazards**	something which presents a risk that could cause and injury
3	**Personal Protective Equipment (PPE)**	All equipment/clothing which is intended to be worn/held to reduce the chance of injury
4	**Risk**	The chance that someone will be harmed by a hazard
5	**Risk Assessment**	When you measure the risk of something happening, anticipate what the consequences could be and plan actions to prevent it
6	**Warm Up**	Physical activity to prepare the body physically and mentally for exercise to prevent injury

1.2.a. Components of Fitness Key Terms

Agility the ability to change the direction of the body at speed, whilst maintaining control

Balance the ability to stay upright or stay in control of the body movement

Cardiovascular Endurance (Stamina) The ability to continue exercising whilst getting energy for muscular movement from the aerobic energy system

Coordination The ability to use two or more body parts together to complete a skill under control, smoothly and efficiently

Fitness The ability to meet the demands of your environment. It can be tested and improved.

Flexibility The range of movement at a joint

Muscular endurance the ability to repeatedly use your muscle and body without tiring

Power A type of fitness. The ability to exert maximal force in as shortest time possible

Reaction Time The ability to respond quickly to a stimulus

Speed The ability move part or the whole body quickly

Strength The maximum force a muscle or group of muscles can exert against a resistance

Religion & Philosophy GCSE 10. 3 Islam Beliefs—CORE KNOWLEDGE

Topic 1: Nature of God	
Tawhid	Oneness of God
Shirk	Unforgivable Sin, worshipping other than Allah
Adalat	Divine Justice (*fairness*)
Transcendence	Beyond universe and understanding
Immanence	Throughout the universe (knowable, close)
Beneficence	Goodness (Allah's will)
Mercy	Compassion & Forgiveness
99 names of Allah	Describe Allah's nature: Beneficent, Merciful, The Great Forgiver, The Mighty One

Topic 2: Risalah	
Risalah	Prophethood—Messengers of God
Revelation	God's method of communication
Ibrahim	Restored worship of Allah alone, Rebuilt Kaba
Adam	First Man and prophet, built the Kaba
Muhammed (pbuh)	'Seal' of the Prophets - Man of integrity Restored worship of one true God
Isa (Jesus)	Born of a virgin & performed miracles

Topic 3: Malaikah	
Malaikah:	**Angels:** Beings of light with wings **Sunni:** no Free Will **Shia:** limited Free-will
Jibriel: (Gabriel)	**Angel**: Revealed the Qur'an to Muha.
Israfil: (Raphael)	**Angel**: Trumpeter to mark judgement day
Mika'ail	**Angel**: Nourishes. Protects places of worship

Topic 4: Akhirah	
Akhirah	'Afterlife'
Jannah	'Paradise' ("Garden of pleasure")
Jahannam	'Hell' ("Blazing Fire")
Barzakh	State of waiting until the day of judgement
Al Qadr	Belief in Predestination
Free Will	Ability to make choices for ourselves
"Insha'Allah"	*If God Wills it:* Emphasises everything is part of God's plan
Predestination	Allah has planned & knows all that will happened
Preserved Tablet:	Everything is already written in stone before time

Topic 5: Foundations of the Faith	
Sunni	Large denomination - 6 articles of faith Abu Bakr was the rightful Caliph
Six Articles	Tawhid, Malaikah, Risalah, Kutub, Al-Qadr, Akhira
Abu-Bakr	Muhammed's nephew, voted to lead by other Muslims

Shia	Smaller denomination (10%) 5 roots Ali was the rightful Caliph and first Imam
5 Roots	Tawhid, Adalat, Risalah, Imamate, Resurrection
Imamate	12 Leaders of Islam - Spiritual successors to Muhammed. First was Ali.
Ali	Successor to Muhammed and first Iman, chosen by Muhammed

Religion & Philosophy GCSE 10. 4 Islam PRACTICES and Islam EXTENSION

Topic 1: Five Pillars	
Shahadah:	Declaration of Faith
Salah	5 x daily prayer
Wu'du	Ceremonial cleansing before prayer
Ra'ka	Set movements before prayer
Zakat	Obligatory giving of %2.5 of wealth
Sawm	Fasting during the month of Ramadan
Ramadan	Month of Fasting
Hajj	Pilgrimage to Mecca – once in a Muslim's life
Pilgrimage	Sacred journey to a special place of religious interest
Mecca	Holy City in Saudi Arabia – Location of Ka'ba
Ka'ba	Building dedicated to Allah. Built by Adam, Rebuilt by Ibrahim and then Mohammed. Touch the Black Stone

Topic 2: Festivals	
Eid-ul-Fitr	Breaking of Fast: Feast at the end of Ramadan. Morning Prayers, Gifts and time with family
Eid-ul-Adha	Festival of Sacrifice: Remembers Abrahams willingness to sacrifice Isaac. Lamb is Sacrificed & shared
Ashura	Shia: Commemorates martyrdom of Hussain: Procession, Songs & Self Flagellation
Night of Power	The Qur'an revealed by Jibriil to Mohammed, in a cave. Celebrated towards the end of Ramadan

Topic 3: Jihad	
Jihad	'struggle'
Greater Jihad	Daily struggle to be a good Muslim
Lesser Jihad	Physical struggle in defence of Islam. Cannot force religion, or target civillians

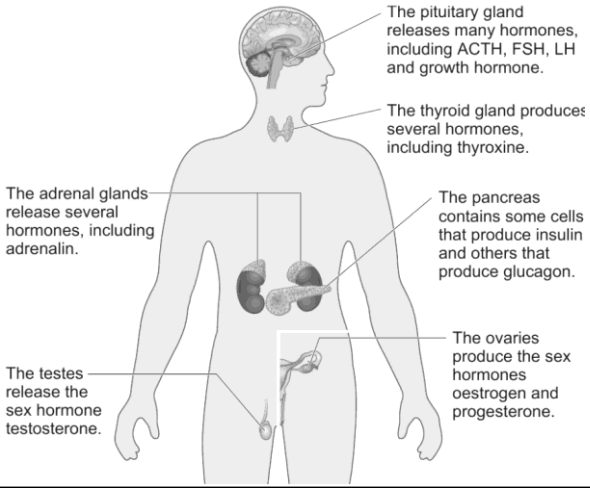
Topic 4: 10 Obligatory Acts	
10 obligatory Acts (Shia)	Salah - Sawm -Zakah -Khums -Hajj -Jihad -Amr-bil-Ma'ruf -Nahi Anil Munkar -Tawalla - -Tabarra
Amr-bil-Ma'ruf	Encouraging good actions and moral behaviour.
Nahi Anil Munkar	Discouraging and preventing evil or sinful actions.
Tawalla	Expressing love & loyalty towards the Prophet & his family.
Tabarra	Disassociating from enemies of the Prophet & his family
Khums	Tax of 20% for Muslim leaders and the needy

KEY CONCEPTS	
Niyah	Intention - Done with the correct heart and mindset
Jummah	Communal Friday Prayers—led my Iman
Halal	'Permissible' acceptable actions, behaviours & items
Haram	'Forbidden' unacceptable actions, behaviours & items
Mosque	Islamic place of worship
Shariah	'Straight path' Law of Islam based on Qur'an
Ummah	Worldwide Muslim Community

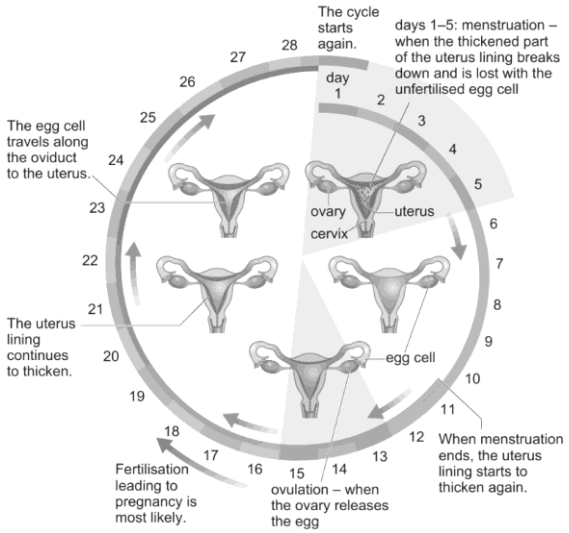
EXTENSION:	
Kutub:	Sacred Texts of the Prophets
Injil:	'Gospel' Story of Jesus & morality
Zabur:	'Pslams' Davids songs of worship
Shaihfah:	'Scrolls' Abrahams Revelation
Tawat:	'Torah' Law of Moses
Sadakah:	Voluntary giving beyond Zakat
Ihram:	State of purity, entered into as part of Hajj
Reversion:	Becoming a Muslim, returning to their 'original state'
Jamarat	Pillars—Used to symbolise stoning of the de
Arafat	Mountain of Mohammeds last sermon— Symbolises forgiveness of Sins an Allah's mercy

Science

B7 – Animal Co-ordination and control



Hormones are chemical messengers
They are produced by endocrine glands and travel through the blood to the target organs.



B one menstrual cycle

<u>The menstrual cycle</u> is a cycle of changes in the female reproductive system. It is controlled by the hormones oestrogen and progesterone. (Higher students: also need to know about FSH and LH).

Method and success rate (% of pregnancies prevented)	How it prevents fertilisation
male condom (98% success rate)	placed over erect penis, prevents sperm entering the vagina
diaphragm or cap (92–96% success rate)	placed over the cervix (entrance to the uterus), prevents sperm in the vagina entering the uterus
hormone pill or implant placed under the skin (>99% success rate)	release hormones to prevent ovulation and thickens mucus at the cervix, making it difficult for sperm cells to pass through

Contraception is used to prevent pregnancy.
Hormonal methods are more effective than barrier methods, but they don't protect against STIs.

Insulin and glucagon are hormones that control blood glucose levels.
Insulin is produced in the pancreas and works on the liver and muscles.

<u>Controlling blood glucose</u>

After eating, carbohydrates are digested and glucose is absorbed from the small intestine into the bloodstream, causing blood glucose levels to rise.
The pancreas detects the increase in blood glucose. In response, it releases the hormone insulin.
Insulin travels in the blood to target organs such as the liver, muscles and other body cells.
Insulin causes cells to take in glucose from the blood.

In the liver and muscles, glucose is converted to glycogen for storage.

Because cells remove glucose from the bloodstream, blood glucose concentration falls back to normal.
As levels fall, the pancreas releases less insulin, and when blood glucose reaches a normal level, insulin release stops.

Comparing type 1 and type 2 diabetes

Cause	The pancreas **produces little or no insulin** because insulin-producing cells are destroyed.	The body's cells **stop responding to insulin** (insulin resistance) and/or the pancreas doesn't make enough insulin.
Typical Age	Usually begins in **childhood or teenage years**, but can occur at any age.	Usually develops in **adulthood**, often linked to lifestyle factors, but increasingly seen in younger people.
Treatment	**Insulin injections** for life; careful monitoring of blood glucose.	**Lifestyle changes** (healthy diet, exercise), medication to improve insulin response; sometimes insulin.
Other Notes	Cannot be prevented.	Often linked to obesity and lack of exercise; sometimes preventable.

Science

B7 – Animal Co-ordination and control – Higher only

Hormonal control of metabolic rate

Metabolic rate the rate at which energy stored in food is transferred by reactions in your body.
Two hormones that are important for controlling metabolic rate are adrenalin and thyroxine.

Thyroxine – this is an example of negative feedback

- **Low thyroxine levels** in the bloodstream stimulate the hypothalamus to **release** *TRH* and this causes the pituitary to **release** *TSH* so the thyroid releases more thyroxine. So blood levels return to normal.
- **Normal thyroxine levels** in the bloodstream **inhibit TRH** release from the hypothalamus and the production of **TSH** by the pituitary, so normal blood levels are maintained.

Adrenaline

- Adrenaline is produced by the adrenal glands in times of fear or stress. It prepares the body for 'flight or fight'. Adrenaline is not controlled by negative feedback.

When adrenaline is released into the bloodstream it creates multiple effects:

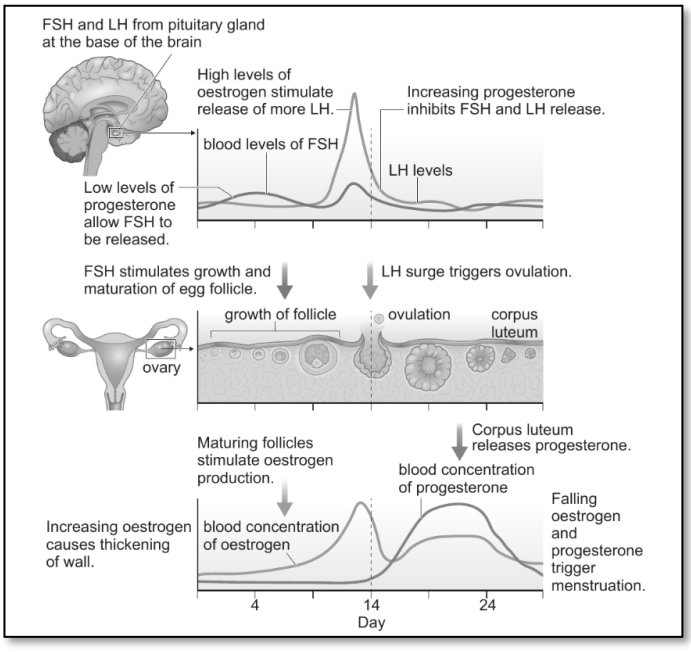
1. increases breathing rate, heart rate (therefore blood flow) and blood pressure
2. conversion of glycogen to glucose in liver cells, increasing blood glucose

These effects result in more glucose being delivered to the muscles and more energy being released by respiration in the muscles.

Hormones and the menstrual cycle

FSH and LH are important hormones in the control of the menstrual cycle.

· **FSH** from the pituitary makes a follicle in the ovary develop.
· The developing follicle produces **oestrogen**, which repairs and thickens the uterus lining and **inhibits FSH**.
· High oestrogen levels trigger a surge in **LH**, causing **ovulation** (egg release around day 14).
· The empty follicle becomes the **corpus luteum**, which produces **oestrogen and progesterone**. These **inhibit FSH and LH** (negative feedback).
· **Progesterone** maintains the thick uterus lining.
· If no fertilisation occurs, the corpus luteum breaks down, progesterone drops, and the uterus lining sheds — this is **menstruation**.



Treating infertility

Assisted Reproductive Technology (ART) uses hormones and medical procedures to help people conceive.

Fertility drugs, such as **clomifene**, stimulate ovulation by increasing **LH** levels, helping women who do not ovulate regularly. Other fertility drugs contain **FSH** and **LH** to help eggs mature.

IVF is used when sperm quality is low or oviducts are blocked: the mother is given FSH and LH to mature several eggs, the eggs are collected and fertilised with sperm in a lab, and one or two resulting embryos are placed into the uterus.

These treatments increase the chance of pregnancy but also raise the likelihood of multiple births, which carry higher health risks

Animal coordination, control and homeostasis – SEPARATE BIOLOGY only

Thermoregulation is the process by which the body maintains its core temperature (around 37°C) so that enzymes and metabolic processes function properly. It is controlled by the **hypothalamus**.

When body temperature rises above 37°C

- Vasodilation: Blood vessels near the skin widen, increasing blood flow to the surface so heat can be lost by radiation.
- Sweating: Sweat glands produce sweat, which evaporates and cools the body.

When body temperature falls below 37°C:

- Vasoconstriction: Blood vessels near the skin narrow, reducing heat loss.
- Shivering: Muscles contract rapidly, generating heat through respiration.
- Hair erector muscles contract: Traps a layer of insulating air.

This is a negative feedback system.

Osmoregulation controls water balance in the body to keep blood concentration stable.

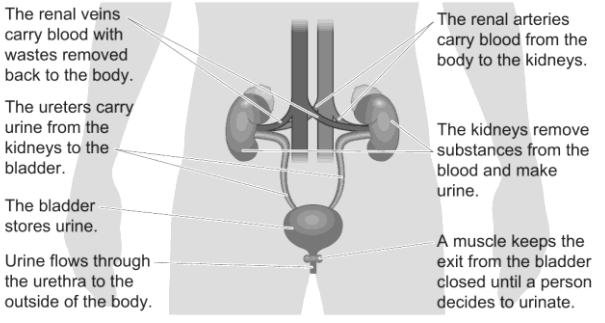
•**Kidneys** filter blood and adjust water reabsorption.

•If blood is **too concentrated**: more water reabsorbed → urine is small and concentrated.

•If blood is **too dilute**: less water reabsorbed → urine is large and dilute.

•Controlled by **ADH** from the pituitary gland.

•Kidney failure disrupts this process; dialysis or transplant restores balance.



B structure of the human urinary system

Kidneys filter blood in nephrons.

Selective reabsorption occurs in tubules:

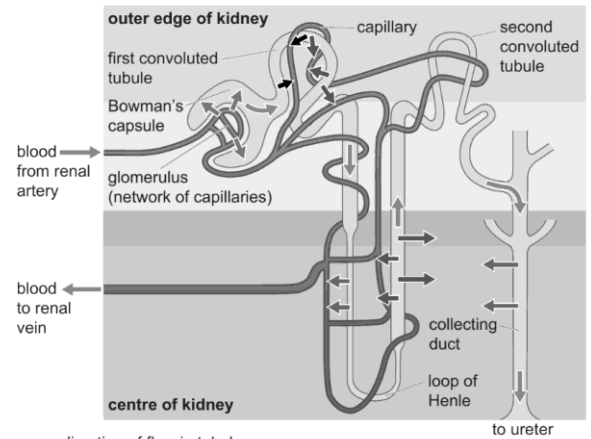
- Water and useful substances are reabsorbed into the blood.
- Waste and excess water form urine.

Amount of water reabsorbed depends on body's needs.

ADH (antidiuretic hormone) is released by the pituitary gland when blood water level is low.

ADH makes kidney tubules more permeable, so more water is reabsorbed.

Less ADH → tubules less permeable → more water lost in urine.



C the structure of a nephron

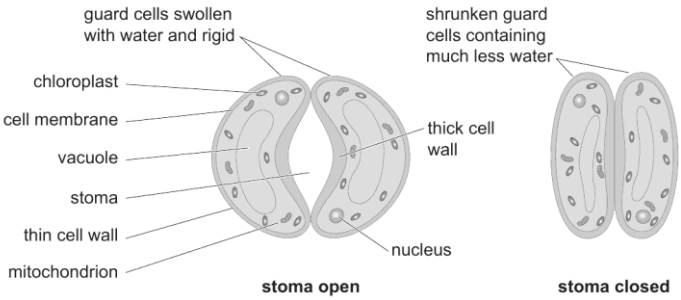
B6 – Plant structures and their functions

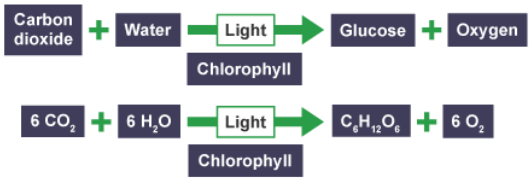
Photosynthesis

This is a series of chemical reactions catalysed by enzymes. It is how plants make glucose (food) using the energy from the sun.

It happens in chloroplasts and uses the green pigment chlorophyll.

The glucose is used to make starch, and this can be broken down and used to make sucrose (another sugar).



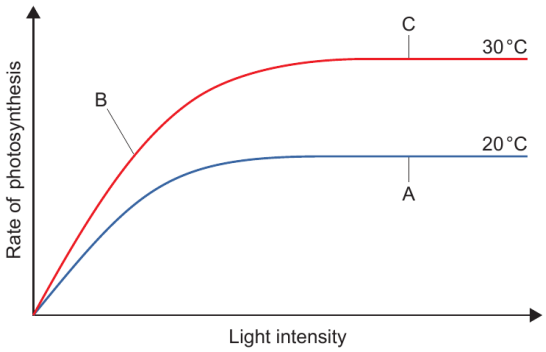


Adaptations of leaves for photosynthesis

Broad and flat (large surface area),
Palisade cells have lots of chloroplasts,
Gas exchange occurs through stomata.
Stomata are opened and closed by guard cells.

Factors that affect photosynthesis

- Temperature
- Carbon dioxide concentration
- Light intensity



HIGHER ONLY inverse square law

We use this to calculate the light intensity when we change the distance. There is an inverse relationship between distance and light intensity - as the distance increases, light intensity decreases. This is because as the distance away from a light source increases, light energy becomes spread over a wider area.

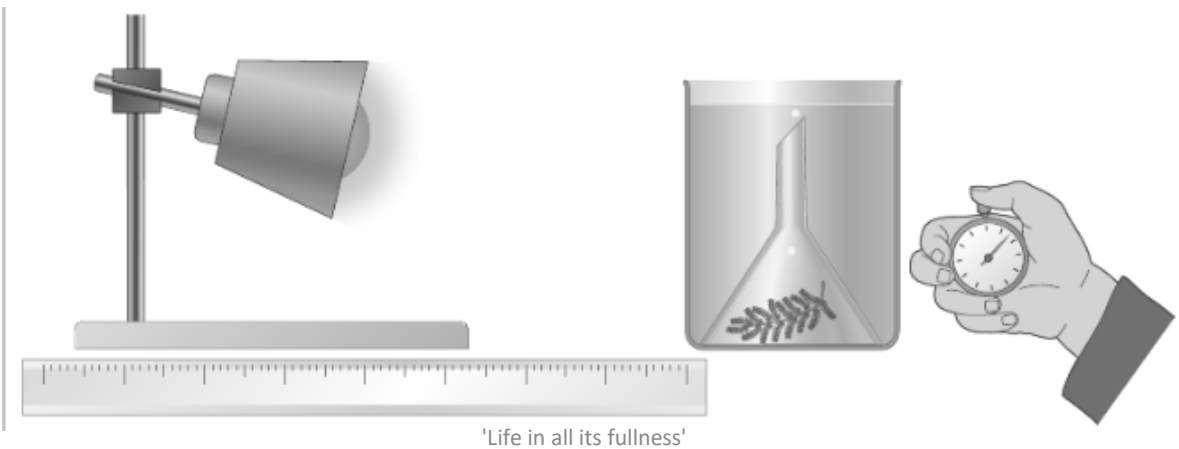
Use this formula where
I is light intensity
and d is distance.

$$I_{new} = \frac{I_{orig} \times d^2_{orig}}{d^2_{new}}$$

Core practical – investigating the effect of light intensity on photosynthesis.

Method one (pond weed) A lamp with an LED bulb is set up at different distances from the pond weed in a beaker of water, sodium hydrogen carbonate ($NaHCO_3$) is added to the water to supply the reactant carbon dioxide, the bubbles of oxygen per minute can be counted at different distances.

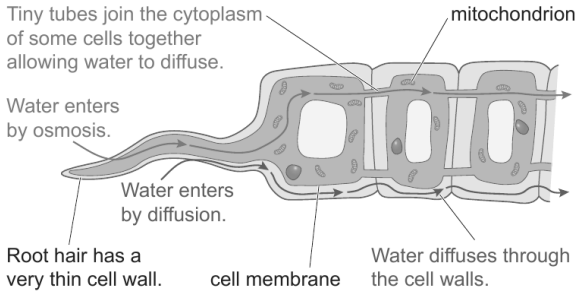
Method two (algae balls). Alage balls are placed in indicator solution at different distances from the lamp, the change in pH per hour tells you the rate of photosynthesis.



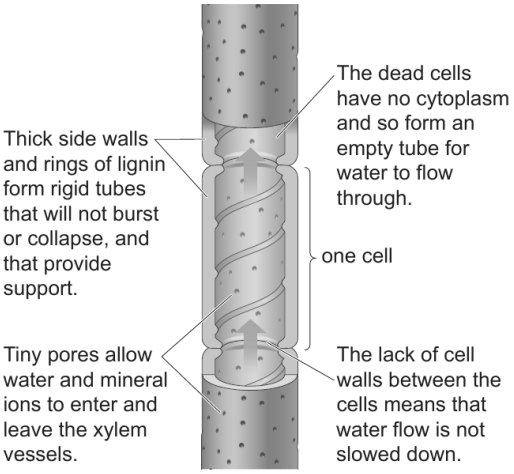
Absorbing water and mineral ions

This happens in root hair cells

- Specialised plant cells on roots that **absorb water and minerals** from soil.
- Have a **large surface area** due to long, thin extensions → increases uptake.
- **Thin cell wall** → short diffusion distance.
- **Many mitochondria** → provide energy for *active transport* of minerals.
- Water moves in by **osmosis**; mineral ions often move by **active transport**.

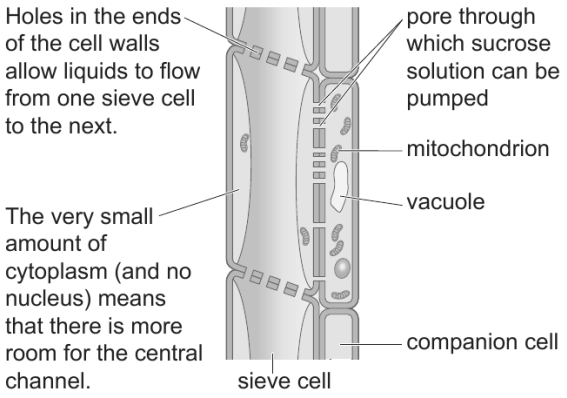


Transpiration – water moves through the plant by transpiration. This happens in xylem tissues.



C xylem adaptations

Translocation – sucrose (sugar) moves through the plant by translocation. This happens in phloem tissues.



D phloem adaptations

SEPARATE ONLY B6 – Plant structures and their functions

Plant adaptations

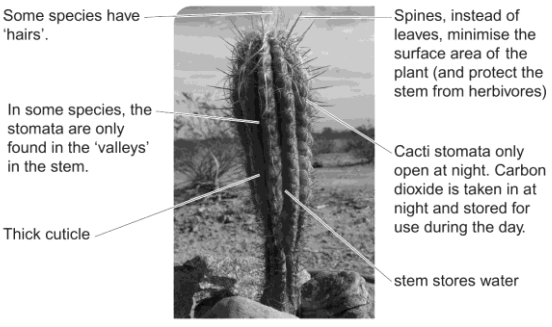
In addition to the adaptations on the previous page, leaves also have a waxy cuticle to prevent water loss and a layer of epidermal cells to protect the leaf.

Plants are also adapted for their habitats e.g.

Deciduous trees lose their leaves in winter to prevent water loss.

Conifers have needle shaped leaves with a small surface aera and a waxy coating to prevent water loss and stomata in small pits to reduce water loss by diffusion.

Cacti have many adaptations for desert life.



D Cacti are adapted to dry environments.

Plant Hormones

Auxins are plant hormones (e.g., IAA) made in tips of shoots and roots. They diffuse downwards and sideways through tissues. Auxin causes cells in stems to grow more, but cells in roots to grow less. Uneven auxin distribution → uneven growth, causing bending.

Phototropism

Shoots (Positive Phototropism)

- Shoots grow towards light.
- More auxin collects on the shaded side.
- Shaded cells elongate more → shoot bends towards light.

Roots (Negative Phototropism)

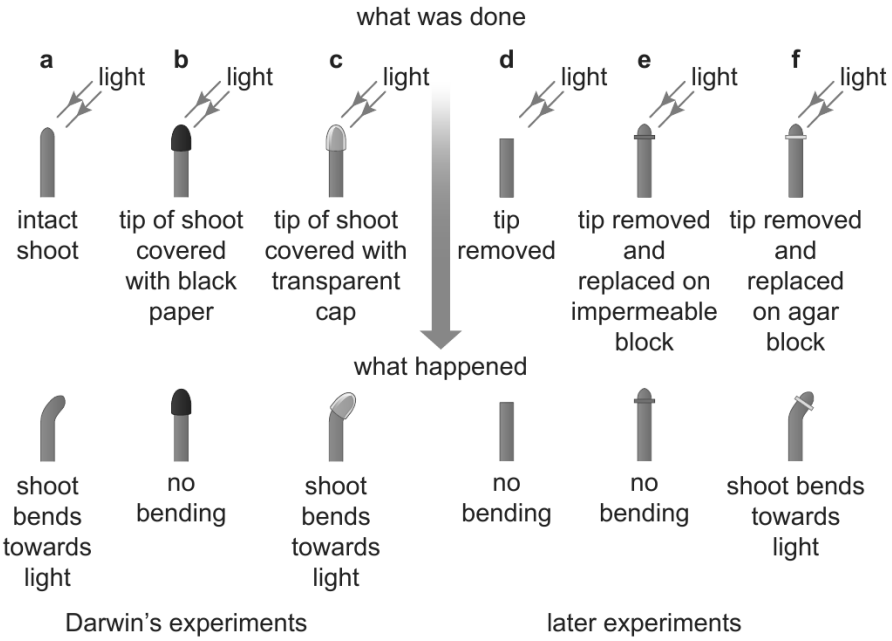
- Roots grow away from light.
- Shaded side gets more auxin, but auxin inhibits growth in roots.
- Shaded side grows less → root bends away from light.

Shoots (Negative Gravitropism)

- Shoots grow upwards, against gravity.
- When horizontal, more auxin gathers on the lower side.
- In stems, auxin stimulates growth, so lower side grows more → shoot bends upwards.

Roots (Positive Gravitropism)

- Roots grow downwards, with gravity.
- When horizontal, more auxin gathers on the lower side.
- In roots, auxin inhibits growth, so lower side grows less → root bends downwards.



Uses of plant hormones (Higher only)

Plant hormones have several key uses: auxins stimulate cell elongation and are used as selective weed killers (causing broad leaved weeds to grow too fast and die) and in rooting powders to help cuttings form roots; gibberellins trigger seed germination, promote flowering, and increase fruit size, especially in commercial crops like seedless grapes; and ethene is used in the food industry to control fruit ripening, speeding up ripening during storage and transport so fruit such as bananas can be picked unripe and ripened later.

C9 calculations involving masses

Masses and empirical formulae

- The **empirical** formula is the simplest whole number ratio of atoms or ions of each element in a substance.
- The **molecular** formula represents the actual number of atoms of each element in one molecule.
- For example, ethene:
  Molecular formula = C_2H_6
  Empirical formula = CH_3

Conservation of mass

Law of conservation of mass: When a solid is dissolved in a solvent the mass of the solution is equal to the mass of the solid + the mass of the solvent. In a reaction, the mass of the reactants is equal to the mass of the products.

Concentration = $\frac{\text{mass of solute in g}}{\text{volume of solution in dm}^3}$

One dm^3 = 1 litre

You can use the relative masses and the balanced symbol equation to calculate the mass of the reactant or product.

Finding the empirical formula from data:

Write the element symbols						
Write the masses						
Write the A_r values						
Divide masses by A_r						
Divide by the smallest number						
Write the empirical formula						

Worked example

Calculate the mass of chlorine needed to make 53.4 g of aluminium chloride.

Write the balanced equation	$2Al + 3Cl_2 \rightarrow 2AlCl_3$
Calculate relative formula masses of the substances needed	$M_r\ Cl_2 = 2 \times 35.5 = 71$ $M_r\ AlCl_3 = 27 + (3 \times 35.5) = 133.5$

Calculate ratio of masses (multiply M_r values by the balancing numbers shown in the equation).

$3Cl_2$ makes $2AlCl_3$

so $3 \times 71 = 213$ g Cl_2 makes $2 \times 133.5 = 267$ g $AlCl_3$

Work out the mass for 1 g of reactant or product. (Here we want 1 g of the product because that's the mass we know already.)

÷ 267: $\frac{213}{267}$ g Cl_2 makes $\frac{267}{267}$ g $AlCl_3$ ÷ 267

× 53.4: 0.798 g Cl_2 makes 1 g $AlCl_3$ × 53.4

Scale up or down (*from* 1 g *to* the mass you are given): 42.6 g Cl_2 makes 53.4 g $AlCl_3$

Moles and mole calculations – Higher only

A mole (mol) is a unit for counting particles.
One mole = 6.02×10^{23}. This is Avogadro's constant.

Number of moles of a substance = $\frac{\text{mass of a substance (g)}}{A_r \text{ or } M_r}$

In a reaction a reactant may be added in **excess** and not all used up. The one that is all used up is the **limiting reactant.**

If you know the mass of each substance in a reaction you can calculate the number of moles of each and so work out the rations for the balanced equation. The ratio of the moles is called the **stoichiometry** of the reaction.

C10 electrolysis

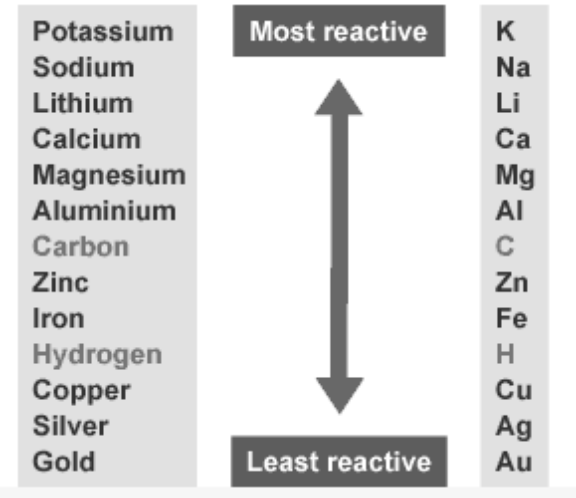
What is electrolysis?

An ionic solution with freely moving ions is called an **electrolyte.**

Electrolysis uses an electric current to decompose (breakdown) an ionic solution.

Cations are positive ions and are attracted to the negative cathode.

Anions are negative ions and are attracted to the positive anode.



Core practical – you can also do this using graphite electrodes.

Method

Using copper electrodes

Wear eye protection.

A Select two clean pieces of copper foil. Label one 'anode' and the other 'cathode'. Measure and record the masses of the two electrodes.

B Set up an electrolysis circuit as shown in diagram B.

C Turn on the power and adjust the variable resistor to give a current of about 0.2 A. Record the current and adjust the variable resistor to keep it constant. Leave the power on for 20 minutes.

D Turn off the power and remove the electrodes from the beaker. Gently wash the electrodes with distilled water then dip them into propanone. Lift the electrodes out and gently shake off the propanone. Allow the remainder of the propanone to evaporate.

E Measure and record the masses of the dry electrodes.

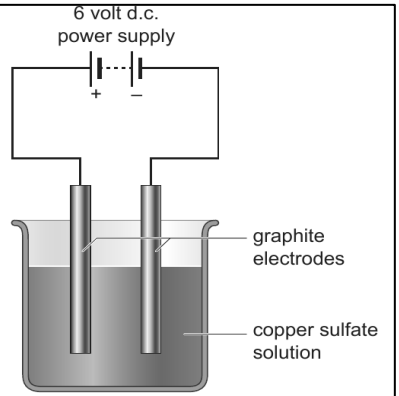
F Repeat the experiment using currents of 0.3 A, 0.4 A and 0.5 A.

Electrolysis of a dissolved ionic compound.

At the **Cathode.** If the metal ion is less reactive than hydrogen, the metal is deposited.

If the metal ion is more reactive than hydrogen, hydrogen gas is produced.

At the anode: If halide ions (Cl^-, Br^-, I^-) are present, the corresponding halogen (Cl_2, Br_2, I_2) is produced. Otherwise, oxygen gas is produced from hydroxide ions (OH^-).



C electrolysis circuit for using graphite electrodes

OIL RIG - **O**xidation **I**s **L**oss of electrons, **R**eduction **I**s **G**ain of electrons.

Oxidation and reduction – higher only

Oxidation = **loss of electrons**
Reduction = **gain of electrons**
Cathode (negative electrode): Reduction occurs (ions gain electrons).
Anode (positive electrode): Oxidation occurs (ions lose electrons).

Half equations:
At the Cathode (Reduction):
General rule: Positive ions gain electrons.
Example:

$$Na^+ + e^- \rightarrow Na$$

At the Anode (Oxidation):
General rule: Negative ions lose electrons.
Example:

$$2Cl^- \rightarrow Cl_2 + 2e^-$$

C11 Obtaining and using metals

Reactivity

The reactivity series lists the metals in order of reactivity and allows us to predict how metals will react.

A more reactive metal will **displace** a less reactive metal.

(Higher only) We can write half equations for displacement reactions.

For example:

$Zn + Cu^{2+} \rightarrow Cu + Zn^{2+}$

$Zn \rightarrow Zn^{2+} + 2e^-$

$Cu^{2+} + 2e^- \rightarrow Cu$

Metal	Reaction with water	Reaction with dilute acid	Tendency of metal atoms to form cations
potassium	react with cold water to form hydrogen and a metal hydroxide	react violently	increasing ability of metal atoms to form positive ions
sodium			
calcium		react to form hydrogen and a salt solution	
magnesium	react very slowly, if at all, with cold water but react with steam to form hydrogen and a metal oxide		
aluminium			
zinc			
iron			
copper	do not react with cold water or steam	do not react	
silver			
gold			

B the reactivity series for some metals

Metal	Method of extraction
potassium	electrolysis of a molten compound
sodium	
calcium	
magnesium	
aluminium	
(carbon)	
zinc	heat an ore with carbon
iron	
copper	
silver	found as the uncombined element
gold	

Ores An ore is a rock that contains enough of a metal to make it financially worth extracting it.

- Very unreactive metals (e.g., gold, platinum) are found naturally in their **native state**.
- More reactive metals occur as **compounds in rocks**, and obtaining them is called **extraction**.
- **Iron** is extracted from iron oxide using **carbon**, because carbon is more reactive than iron.
- **Copper** can be extracted from malachite. The malachite is heated to form copper oxide, which is then heated with carbon to produce copper.
- Metals **more reactive than carbon** must be extracted by **electrolysis**. It would be expensive to extract all metals this way.
- **Aluminium** is extracted from aluminium oxide (from the ore **bauxite**) by electrolysis.

HIGHER ONLY – biological methods of extraction.

Process	Advantages	Disadvantages
both bioleaching and phytoextraction	no harmful gases (e.g. sulfur dioxide) are produced causes less damage to the landscape than mining conserves supplies of higher grade ores	very slow
bioleaching	does not require high temperatures	toxic substances and sulfuric acid can be produced by the process, and damage the environment
phytoextraction	can extract metals from contaminated soils	more expensive than mining some ores growing plants is dependent on weather conditions

Oxidation and reduction

Oxidation is the gain of oxygen by a substance. Reduction is the loss of oxygen from a substance. Oxidation and reduction always occur together. If one substance is oxidised, another will be reduced. Reactions in which oxidation and reduction occur are called redox reactions.

Recycling metals

Recycling metals saves natural resources, reduces mining, cuts pollution, uses less energy, and reduces landfill waste.

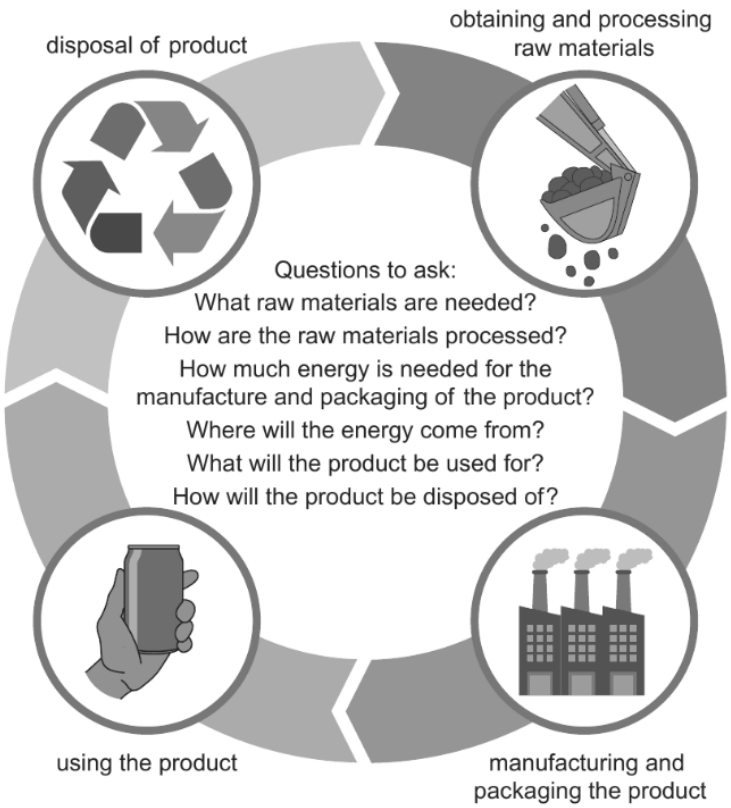
Life cycle assessments

A method used to **judge the environmental impact of a product** at every stage of its life.

It looks at:

- **Raw materials** – how they are obtained.
- **Manufacturing** – energy used and pollution produced.
- **Use of the product** – how it affects the environment while being used.
- **Disposal** – what happens when the product is thrown away and how much waste it produces.

Overall, an LCA helps compare how environmentally friendly different products are.



C stages in an LCA

C12 Dynamic equilibrium

- Dynamic equilibrium: forward and backward reactions occur at the same rate in a closed system; amounts stay constant.
- Reversible reactions use ⇌.
- Equilibrium forms when forward reaction slows and backward reaction speeds up until rates match.
- Open systems can't reach equilibrium.
- Example of a reversible reaction:
- $NH_4Cl(s) \rightleftharpoons NH_3(g) + HCl(g)$.
- Equilibrium position changes with temperature, pressure and concentration.
- Haber process makes ammonia:
- $N_2 + 3H_2 \rightleftharpoons 2NH_3$, using high pressure, moderate temperature and iron catalyst.

Higher only – changing the equilibrium

Change by . . .	Equilibrium position shifts . . .
increasing temperature	in the **endothermic** direction (transferring energy from the surroundings, cooling them down)
decreasing temperature	in the **exothermic** direction (transferring energy to the surroundings, heating them up)
increasing gas pressure	in the direction that forms fewer gas molecules (as this reduces pressure)
decreasing gas pressure	in the direction that forms more gas molecules (as this increases pressure)
increasing a concentration	in the direction that uses up the substance that has been added
decreasing a concentration	in the direction that forms more of the substance that has been removed

SEPARATE ONLY – SC15 dynamic equilibria and calculations involving volumes of gases.

Fertilisers These provide plants with mineral ions. N, P and K are important but must be presented as soluble compounds so that they can be absorbed by the root hair cells.

Ammonium nitrate and ammonium sulphate are examples of nitrogenous fertilisers. They provide pants with nitrogen.

ammonia + nitric acid → ammonium nitrate

$NH_3(aq) + HNO_3(aq) \rightarrow NH_4NO_3(aq)$

ammonia + oxygen → nitric acid + water

$NH_3(g) + 2O_2(g) \rightarrow HNO_3(aq) + H_2O(l)$

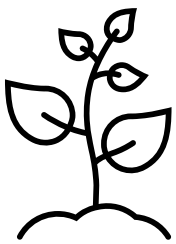
	Laboratory preparation	Industrial production
scale of production	small scale	large scale
starting materials	ammonia solution and dilute sulfuric acid	raw materials for making ammonia and sulfuric acid
stages	titration (see *SC8 Acids and Alkalis*), then crystallisation	several stages
type of process	batch	continuous

Ammonia is manufactured in the **Haber process**:

1. nitrogen and hydrogen are pumped through pipes
2. a compressor increases the gas *pressure* to 200 *atmospheres*
3. the pressurised gases are heated to 450°C and passed through a reaction chamber containing an iron *catalyst* to speed up the reaction
4. the reaction mixture is cooled so that ammonia *liquefies* and can be removed
5. unreacted nitrogen and hydrogen are *recycled*

Nitrogen + hydrogen ⇌ ammonia

$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$



Factors affecting equilibria – Higher only

Change in conditions	Position of equilibrium	Time taken to reach equilibrium
Temperature increased	Moves in the direction of the endothermic reaction	Decreases
Pressure increased in a reaction involving gases	Moves towards the side with fewer molecules of reacting gas	Decreases
Concentration of a reacting substance increased	Moves away from the reacting substance in the balanced equation	Decreases
Catalyst added	No change	Decreases

SEPARATE CHEMISTRY ONLY – SC14 quantitative analysis

Yields

The yield is the amount of a product formed in a reaction.

The theoretical yield is calculated from the balanced symbol equation.

The actual yield is usually lower because the reaction may be incomplete, some products may be lost or other reactions may be taking place.

% yield = actual yield x100%
theoretical yield

Worked example W1

Calculate the theoretical yield of hydrogen from 36 g of water.

	$2H_2O$	→	$2H_2$	$+ O_2$
Calculate relative formula masses and multiply by the balancing number	$2 \times (1 + 1 + 16) = 36$		$2 \times (1 + 1) = 4$	
Add the unit symbols	36 g		4 g	

So the theoretical yield of hydrogen is 4 g.

Atom economy is the percentage, by mass, of reactants that are converted into useful products.

$$\text{atom economy} = \frac{\text{relative formula mass } (M_r) \text{ of the useful product}}{\text{sum of relative formula masses of all the reactants}} \times 100\%$$

Reaction pathways (HIGHER ONLY)

There is often more than one reaction pathway to produce a substance on a large scale.

A reaction my have a high percentage yield but low atom economy. This means that the by-products formed are not useful.

Atom economy can be improved by finding used for these by-products.

Factors that affect the choice of a reaction pathway include: energy consumption, rate of reaction, raw materials, conditions needed to produce a high yield if the rection goes to equilibrium.

Concentration – HIGHER ONLY

When calculating concentrations check the units carefully and make sure that you know you should be answering in moles or grams.

1 dm^3 is equivalent to 1 litre or 1000 cm^3.

$$\text{concentration in g dm}^{-3} = \frac{\text{mass of solute in g}}{\text{volume of solution in dm}^3}$$

$$\text{concentration in mol dm}^{-3} = \frac{\text{number of moles of solute}}{\text{volume of solution in dm}^3}$$

$$\text{concentration in mol dm}^{-3} = \frac{\text{concentration in g dm}^{-3}}{\text{relative formula mass of solute}}$$

Method

Wear eye protection. Avoid skin contact with the liquids.

A Rinse a burette with hydrochloric acid, then fill the burette with the acid, making sure the jet below the tap is also full.

B Record the initial volume of acid in the burette.

C Rinse a pipette with sodium hydroxide solution, then fill the pipette to the 25.0 cm^3 mark and empty the solution into a conical flask.

D Add a few drops of methyl orange indicator to the flask and place the flask on a white tile under the burette.

E Add the acid to the sodium hydroxide solution while swirling the flask.

F When the indicator starts to change colour, rinse the tip of the burette and the sides of the flask with a small amount of distilled water from a wash bottle to ensure that all the acid is in the mixture, then add the acid drop by drop until the end-point is reached.

G Record the final volume of acid in the burette.

H Repeat the experiment, apart from the initial rinsing of the burette and pipette, until concordant results are obtained.

Titrations

Titrations are used to find the exact volume of one solution that reacts with a fixed volume of another solution.

We can sue this to calculate the concentration of one solution is we know the concentration of the other.

Higher and foundation students need to know the method for this core practical.

Higher students must know how to carry out the calculations.

Science

Higher only Calculating a concentration from a titration -worked example

Worked example

In a titration, 25.00 cm^3 of 0.100 mol dm^{-3} sodium hydroxide solution is exactly neutralised by 20.00 cm^3 of a dilute solution of hydrochloric acid. Calculate the concentration of the hydrochloric acid solution.

Step 1: Calculate the amount of sodium hydroxide in moles

Volume of sodium hydroxide solution = 25.0 ÷ 1000 = 0.0250 dm^3

Concentration in mol dm^{-3} = **amount of solute in mol/ volume in dm^3**

Amount of solute in mol = concentration in mol dm^{-3} × volume in dm^3

Amount of sodium hydroxide = 0.100 × 0.0250= 0.00250 mol

Step 2: Find the amount of hydrochloric acid in moles

The *balanced equation* is: NaOH(aq) + HCl(aq) → NaCl(aq) + H_2O(l)

So the *mole ratio* NaOH:HCl is 1:1

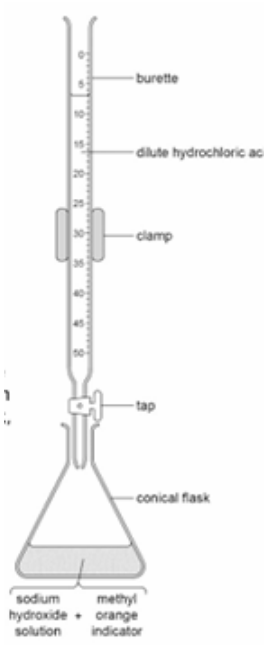
Therefore 0.00250 mol of NaOH reacts with 0.00250 mol of HCl

Step 3: Calculate the concentration of hydrochloric acid

Volume of hydrochloric acid = 20.00 ÷ 1000 = 0.0200 dm^3

Concentration in mol dm^{-3} = **amount of solute in mol/ volume in dm^3**

Concentration in mol dm-3 = 0.00250/0.0200 = 0.125 mol dm-3



Higher only - Molar volume of gases

Avogadro's law states that equal volumes of gases at the same temperature and pressure contain the same number of molecules, which allows gas volumes in reactions to be compared directly using their mole ratios.

Molar gas volume is the volume occupied by one mole of gas, which is 24 dm^3 (24 000 cm^3) at room temperature and pressure; this means you can calculate gas volumes using:
volume = moles × molar gas volume, and moles = volume ÷ molar gas volume.

$$\text{amount of gas (mol)} = \frac{\text{volume of gas}}{\text{molar volume}}$$

Higher only - Calculating a volume from a mass

Worked example: 4.6 g of sodium reacts completely with excess water:

2Na(s) + $2H_2O$(l) → 2NaOH(aq) + H_2(g)

Calculate the volume of hydrogen produced. (A_r of Na = 23, molar volume = 24 dm^3)

Step 1 - Calculate the amount of sodium

Amount in mol = mass in g/ Ar

Amount in mol = 4.6/23

Amount of sodium = 0.20 mol

Step 2 - Find the amount of hydrogen

From the *balanced equation*, the *mole ratio* Na:H_2 is 2:1

Therefore 0.20 mol of Na produces = 0.10 mol of H_2

Step 3 - Calculate the volume of hydrogen

Volume = amount in mol × molar volume

Volume = 0.10 × 24 = 2.4 dm^3

SEPARATE ONLY SC16 Chemical cells and fuel cells

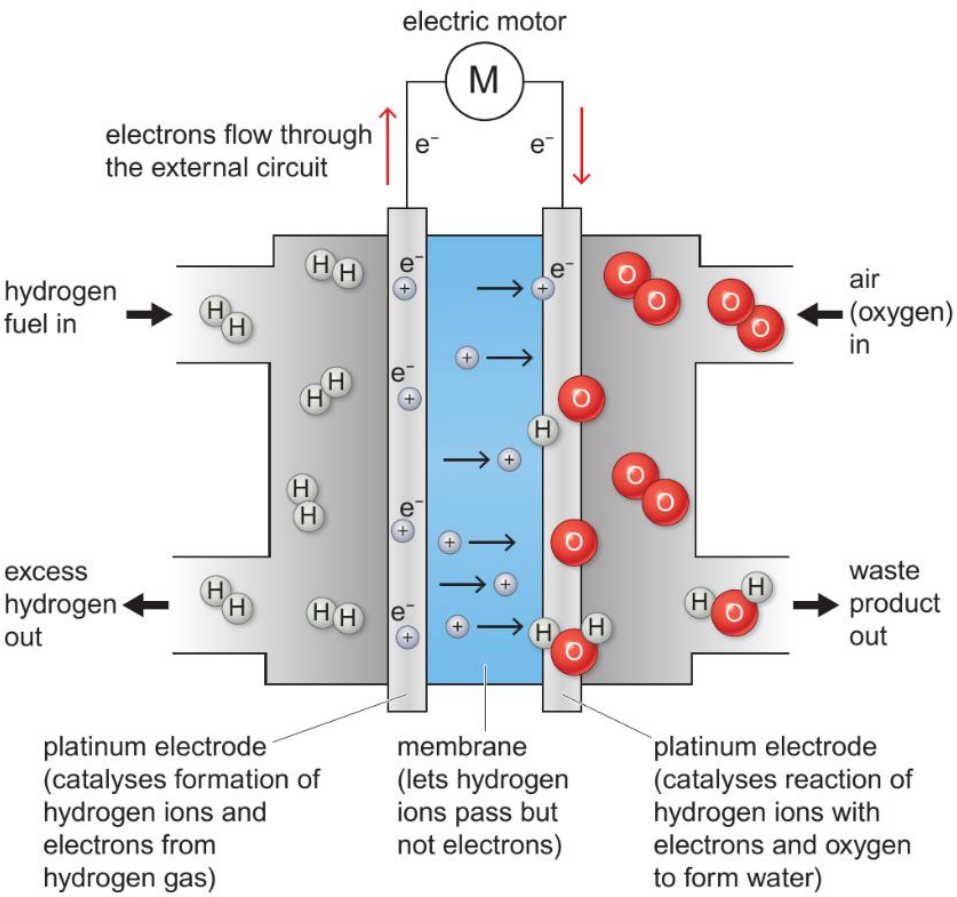
Chemical cells include batteries used in torches and mobile phones.
Chemical cells produce a voltage until one of the reactants is used up. When this happens, we say the battery 'goes flat'.

Fuel cells work in a different way to chemical cells. Fuel cells produce a voltage continuously, as long as they are supplied with:

- a fuel & oxygen (from the air)

So they can not "go flat".

Hydrogen-oxygen fuel cells
In a hydrogen-oxygen fuel cell, hydrogen and oxygen are used to produce a voltage.
Water is the only product.
Hydrogen + oxygen → water
$2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$

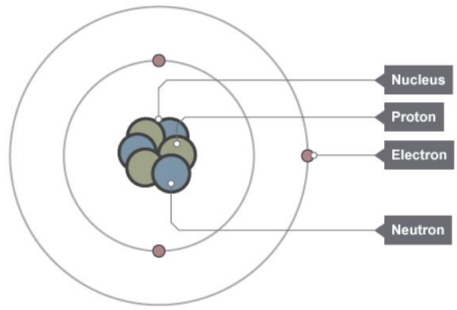


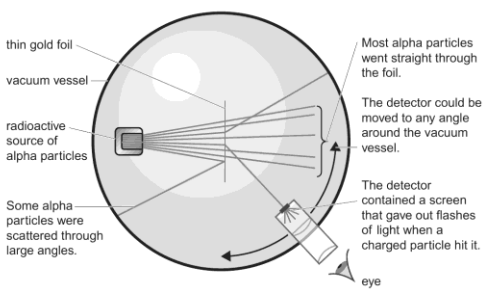
A hydrogen/ oxygen fuel cell.

P6 Radioactivity

Atoms are very small, they have a radius of around 1×10^{-10} metres.

- The modern view of the atom is of a positively-charged nucleus containing **protons** (charge +1, mass 1) and **neutrons** (no charge, mass 1) with smaller **electrons** (charge -1, mass negligible) orbiting outside the nucleus.
- Isotopes of an atom have the same atomic (proton) number but different mass numbers because they have a different number of neutrons.





C the design of one of Rutherford's experiments

Developing the model

J J Thomson discovered the electron in 1897 and proposed that the atom looked like a plum pudding.

Ernest Rutherford, 1905, directed a beam of alpha particles at a very thin gold leaf suspended in a vacuum. Most went straight through but some bounced back. He discovered the nucleus.

Niels Bohr, 1913, suggested that the electrons orbited the nucleus in different energy levels (shells).

James Chadwick discovered the neutron in 1932.

Types of radioactive decay An unstable nucleus can decay by emitting one or more of the following:

Alpha particle: If the nucleus is unstably large, it will emit a 'package' of two protons and two neutrons called an alpha particle. An alpha particle is also a helium-4 nucleus, written as $^{4}_{2}He$.

Beta minus decay: If the nucleus has too many neutrons, a neutron will turn into a proton and emit a fast-moving electron, from the nucleus, called a beta minus (β-) particle. A beta particle has a relative mass of zero, and a charge of -1.

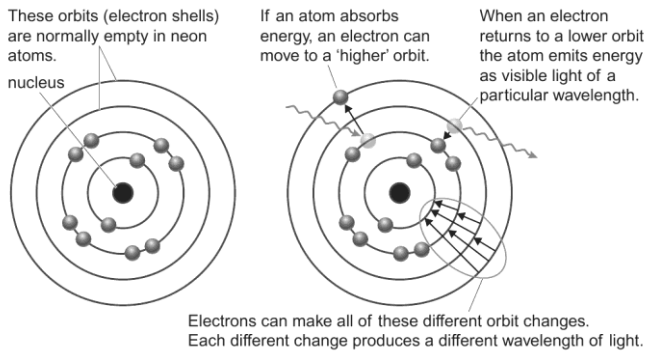
Positron (ß+) emission: If the nucleus has too few neutrons, a proton will turn into a neutron and emit a fast-moving positron, called a beta plus (β+) particle. Its mass number is zero, but a +1 relative charge.

Gamma ray: A re-arrangement of the particles in a nucleus can move the nucleus to a lower energy state. The difference in energy is emitted as a very high frequency electromagnetic wave called a gamma ray.

Neutron emission Occasionally it is possible for a neutron to be emitted by radioactive decay.

Electrons and orbits

Bohr proposed electrons orbit in fixed energy levels, explaining flame colours and energy patterns.
Electrons absorb energy, move to higher levels, then fall back, releasing light of specific frequencies.



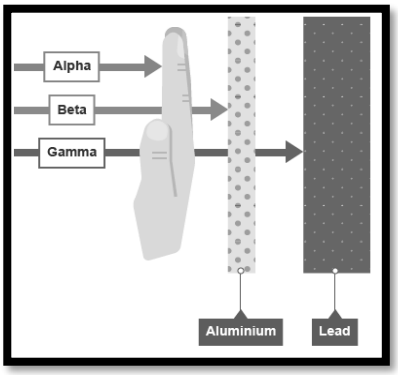
B electronic configuration and energy level changes for neon

Background radiation is the low-level radiation we are constantly exposed to from natural and artificial sources.

- Natural: cosmic rays, rocks (radon gas), soil, food, and even our bodies.
- Artificial: medical treatments, nuclear industry, and fallout from weapons testing.

Measurement: Geiger–Müller tubes detect radiation by counting particles per second.

Science



Particle	Symbol	
alpha	α	$^{4}_{2}He$
beta	β^-	$^{0}_{-1}e$
positron	β^+	$^{0}_{+1}e$
neutron		n

D symbols used in nuclear equations

Nuclear equations: A nucleus changes into a new element by emitting nuclear radiations; these changes are described using nuclear equations.

Alpha decay $^{219}_{86}Rn \rightarrow ^{215}_{84}Po + ^{4}_{2}He$

Beta decay

$^{14}_{6}C \rightarrow ^{14}_{7}N + ^{0}_{-1}e$

Dangers of radiation

Tissue damage. & damage to DNA.
Irradiation = exposure to alpha, beta or gamma radiation.
Contamination = particles of radioactive material on your skin or body.
Safety precautions are radiation detection badges, masks, & safety suits.

Radioactivity and half lives

The activity of a radioactive substance is measured in Becquerel (Bq). One Becquerel is equal to one nuclear decay per second. Half-life is the time it takes for half of the unstable nuclei in a sample to decay . it cannot be predicted when a particular nucleus will decay but half-life enables the activity of a very large number of nuclei to be predicted during the decay process .

P6 Radioactivity – separate only

Uses of Radioactivity
Sterilisation Irradiating food (e.g., fruit) with gamma rays to kill microorganisms and prevent spoilage. Sterilising surgical instruments without heat.
Detecting faults: Gamma sources used to find cracks in pipelines or structural materials.
Checking thickness: Beta radiation monitors thickness of paper, foil, or metal sheets.
Smoke Alarms Alpha particles from americium-241 detect smoke by disrupting ionised air in the sensor.
Cancer treatment Gamma rays (gamma knife) target and kill tumours deep inside the body.
Internal radiotherapy using isotopes like iodine-131 placed inside or near tumours.
Diagnosis with gamma rays
Radioactive tracers (e.g., technetium-99m, iodine-123) used to image organs and detect conditions.
Diagnosis with positrons (PET scans):Positron-emitting tracers show metabolic activity and help identify cancer cells.

Nuclear Fission: Splitting a large nucleus (e.g., uranium-235) into smaller nuclei.
A neutron hits the nucleus → it becomes unstable → splits into two daughter nuclei + 2–3 neutrons. Released neutrons cause further fission → chain reaction. Energy: Most energy carried by fast neutrons; used to heat water and drive turbines in reactors. Fuel rods (uranium/plutonium), moderator (slows neutrons), control rods (absorb neutrons), coolant, and concrete shielding. Uses: Power stations, but produces long-lived radioactive waste. Risk: Uncontrolled reaction = atomic bomb.

Nuclear Fusion Joining two light nuclei (e.g., hydrogen isotopes) to form a heavier nucleus (helium). Occurs in stars under extreme temperature and pressure. Mass is lost and converted to energy ($E = mc^2$).Challenge: Requires 100–200 million °C on Earth to overcome electrostatic repulsion. Achieved experimentally (e.g., JET near Oxford) but not yet economically viable. Huge energy output, minimal radioactive waste.

P7 Energy – forces doing work

Energy, power and work

Energy is what is needed to make things happen or change
Power is the rate at which energy is transferred each second, measured in watts (W).
Watts (W) represent how much energy is transferred per second (1 watt = 1 joule per second).
Work done is the amount of energy transferred when a force moves something over a distance.

$$\underset{\text{(J)}}{\text{work done}} = \underset{\text{(N)}}{\text{force}} \times \underset{\text{(m)}}{\text{distance moved in the direction of the force}}$$

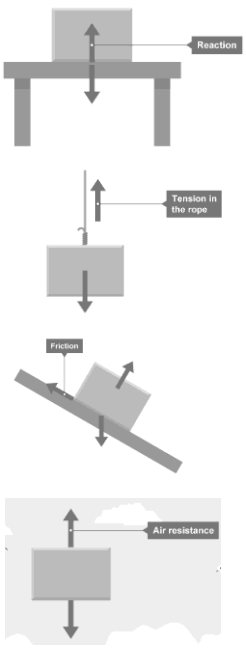
$$\text{power (W)} = \frac{\text{work done (J)}}{\text{time taken (s)}}$$

P8 Forces and their effects

Objects affecting each other - contact forces

Contact forces are forces that act between two objects that are physically touching each other.

Type of Contact Force	What It Means
Normal contact force	A reaction force that acts **perpendicular (normal)** to a surface when an object rests on it.
Tension	A pulling force that acts when an object is **stretched** by a rope, string or cable.
Friction	A force that **opposes motion** when two surfaces slide past each other.
Air resistance	A force that acts against an object moving through the air.

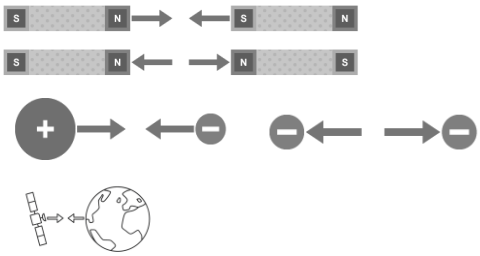


When a contact force acts between two objects, both objects experience the same size force, but in opposite directions. This is Newton's Third Law of Motion.

Objects affecting each other - non contact forces

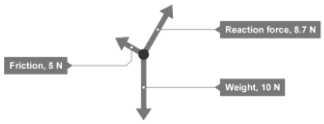
Contact forces are forces that act between two objects that are not physically touching each other.

Type of Force	What It Acts On
Magnetic force	Magnetic materials in a **magnetic field**
Electrostatic force	**Charged particles** in an electric field
Gravitational force	Any **mass** in a gravitational field



Vector diagrams (resolving forces and resultant forces) HIGHER ONLY

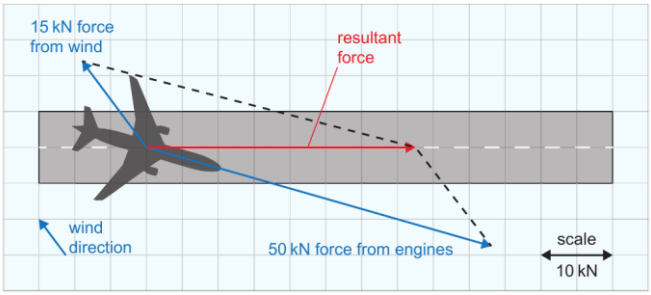
A free body diagram models the forces acting on an object. The object or 'body' is usually shown as a dot. The forces are shown arrows.



A vector diagram is a simple drawing that uses arrows to show forces (or other vector quantities). Each arrow has a direction (the way the arrow points)a magnitude (shown by the length of the arrow)Vector diagrams are used to show how different forces act on an object, and to help work out the resultant force or how forces balance.

How to draw a vector diagram

1. Start with a clear point or object
2. Draw each force as an arrow.
3. Label each arrow.
4. Use a ruler for accuracy
5. If the force acts at an angle draw the correct angle.
6. Once you have drawn the diagram you can use it to find the resultant force.

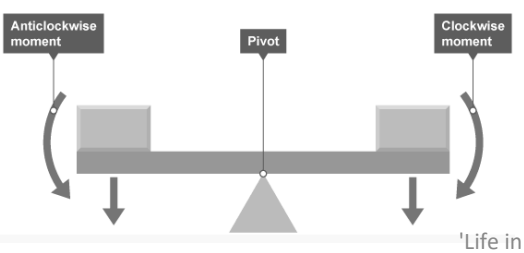


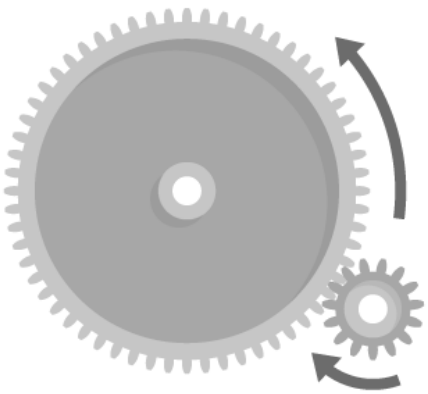
Rotational forces – SEPARATE ONLY

Word	Meaning
gears	Wheels with teeth that turn each other.
in equilibrium	When things are balanced and not changing.
lever	A bar that pivots to make lifting or moving easier.
moment	The turning effect of a force (force × distance from pivot).
newton metre (N m)	The unit used to measure a moment.
normal	At a right angle (90°) to something.

We can also work out moments with gears
If a larger gear is driven by a smaller gear, the large gear will rotate slowly but will have a greater moment. For example, a low gear on a bike or car.
If a smaller gear is driven by a larger gear, the smaller gear will rotate quickly but will have a smaller moment. For example, a high gear on a bike or car.

moment of a force (N m) = force (N) × distance normal (perpendicular) to the direction of the force (m)





Statistics
3b & 3c Standard deviation & box plots

H

- Weighted mean = $\frac{\Sigma(\text{value} \times \text{weight})}{\Sigma\text{weights}}$

Measures of dispersion

- An **interpercentile range** is the difference between two percentiles.
  An **interdecile range** is the difference between two deciles.
- The standard deviation is a measure of how much all the values deviate from the mean value, or how spread out they are.
- **Standard deviation** = $\sqrt{\frac{1}{n}\Sigma(x-\bar{x})^2}$ or $\sqrt{\frac{\Sigma x^2}{n} - \left(\frac{\Sigma x}{n}\right)^2}$
- The two formulae to calculate the **standard deviation for a frequency table or grouped data** are:
  - standard deviation = $\sqrt{\frac{\Sigma f(x-\bar{x})^2}{\Sigma f}}$ or $\sqrt{\frac{\Sigma f x^2}{\Sigma f} - \left(\frac{\Sigma fx}{\Sigma f}\right)^2}$

- Summary statistics summarise the data. The mean, median, mode, standard deviation, range and interquartile range are all summary statistics.
- A **box plot** represents the maximum and minimum values, the median and the upper and lower quartiles for a set of data.
- **Range** = largest value − smallest value.
- Interquartile range (IQR) = upper quartile − lower quartile.

Statistics
3c Skew & outliers

H

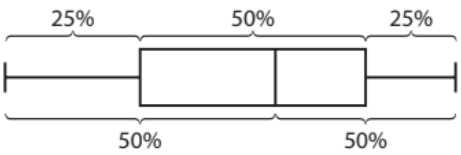
- An **outlier** is any value that is more than 1.5 times the interquartile range below the lower quartile or more than 1.5 times the interquartile range above the upper quartile.
  - Small outlier is less than LQ $-$ 1.5 $\times$ IQR
  - Large outlier is greater than UQ $+$ 1.5 $\times$ IQR
- Another definition of an outlier is a value more than 3 standard deviations from the mean.

Distributions

- A **distribution** can be **symmetrical**, or have **positive skew** or **negative skew**.
- For a set of data:
  - mean $>$ median $>$ mode could indicate positive skew
  - mode $>$ median $>$ mean could indicate negative skew.

H

- Skew $= \dfrac{3(\text{mean} - \text{median})}{\text{standard deviation}}$
- If a sample is representative of a population, you can use the mean, median, range and IQR of the sample to estimate these statistics for the population.
- In a distribution:
  - 50% of the data in a distribution is less than the median, and 50% is greater than the median.
  - 25% of the data is less than the lower quartile
  - 25% of the data is greater than the upper quartile
  - 50% of the data is between the lower and upper quartiles.



Statistics
7a Index numbers

Index numbers

- **Index numbers** compare the price of an item with a **base year price** – its price in another year. The base year price has index number 100.

$$\text{Index number} = \frac{\text{price}}{\text{base year price}} \times 100$$

RPI, CPI and GDP

- The **Retail Price Index (RPI)** shows the rate of change of prices in everyday life, such as mortgage payments, food, heating and petrol. The government uses the RPI to set the interest rate for student loans.
- The **Consumer Price Index (CPI)** also measures the rate of price changes in everyday life, but does not include mortgage payments. State benefits and pensions are updated each year in line with the CPI.
- The **Gross Domestic Product (GDP)** is the value of goods and services a country produces within a time period.

H

- **Weighted index number** $= \frac{\text{current weighted mean price}}{\text{base year weighted mean price}} \times 100$

Chain base index numbers

- **Chain base index numbers** compare prices from each year with the previous year.

$$\text{Chain base index number} = \frac{\text{price}}{\text{last year's price}} \times 100$$

- The RPI and CPI use chain base calculations to show annual or monthly percentage changes in price.

Rates of change

- The crude birth or death rate is the number of births or deaths per thousand of the population.

$$\text{Crude birth rate} = \frac{\text{number of births}}{\text{total population}} \times 1000$$

$$\text{Crude death rate} = \frac{\text{number of deaths}}{\text{total population}} \times 1000$$

H

- The **standard population** is a hypothetical population of 1000 people and is representative of the whole population.

$$\text{Standard population} = \frac{\text{number in age group}}{\text{total population}} \times 1000$$

Academic Vocabulary

Sequencing	Comparing
First (ly) Second (ly) Third (ly) Subsequently Finally In conclusion	Similarly Likewise Like In the same way Equally Akin to
Contrasting	**Qualifying**
Alternatively Conversely On the other hand In contrast Instead Besides	However Although But Except Notwithstanding Nonetheless
Supporting	**Emphasising**
Moreover Furthermore Also Additionally	Significantly Indeed Notably Significantly
Exemplification	**Time**
For example Such as Illustrated by For instance	Meanwhile Since Before After

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Projection

Project your voice so all that should hear can hear

Body Language

Use of gesture and position

Listen

Show you are actively listening

Good Talk

If you disagree, use respectful language

Eye Contact

Eye contact shows Belonging

SAYING OR STATING AN IDEA

I think ...

I strongly believe ...

It is my opinion that...

CLARIFYING OR CHECKING

Please could you clarify that?

Please could you explain what you mean?

SEEING THINGS FROM A DIFFERENT PERSPECTIVE OR VIEWPOINT

What if ...

Some people think ...

SUPPORTING OR AGREEING

I agree ...

I agree with Sarah because ...

CHALLENGING OR DISAGREEING

I have a different idea ...

I disagree ...

I would like to challenge something that Samia said ...

I would like to respectfully challenge ...

EXPANDING OR BUILDING ON

Adding to what Zack said ...

Building on what Ella said ...

I have been listening carefully, and I would like to add a new point ...

PARAPHRASING OR REWORDING

I think Mo is saying that ...

In other words, Matt is saying ...

THINKING ALOUD OR SHARING PARTIAL THINKING

Why is it that ...?

I am wondering if ...

I'm not certain but ...

I'm not completely sure but what I'm thinking is ...

JUSTIFYING OR GIVING REASONS

Because ...

If ... then ...

I know ... because ...

ASKING FOR THINKING TIME OR HELP

I'm not sure yet. Please can I have some time to think?

I'm a bit confused about ...

Please can I talk to a partner?

I'm stuck because ...

Please could you speak a bit louder?

Please could you repeat the question?

PASSING ON THE DIALOGUE

Ali, what do you think?

Ben, what do you think about what I said?

Jo, do you agree or disagree?

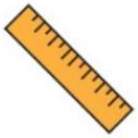
CONCLUDING OR END WORDS

My final thoughts are ...

There are lots of powerful arguments, but my own opinions is ...

For me, the strongest argument is ...

The Learning Eight

Pen (Blue or Black)		Ruler	
Pencil		Purple Pen	
Calculator		Knowledge Organiser	
Mini-Whiteboard		Whiteboard Pen