GCSE ART, CRAFT & DESIGN

Assessment Objectives

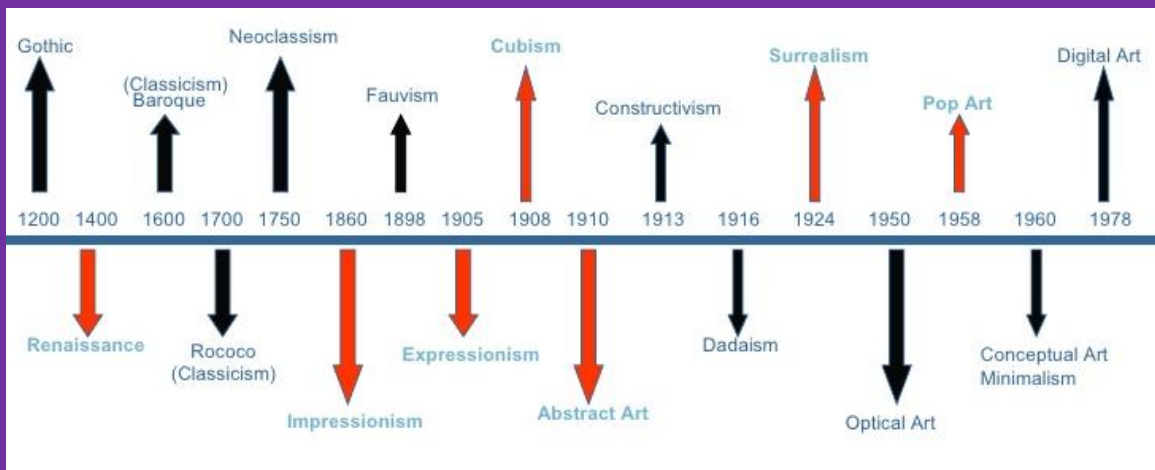|		
AO1 **Contextual understanding**		Understanding of historical and contemporary visual elements of Arts, Crafts and Design. Analyse and compare using the Formal Elements to demonstrate your understanding.
AO2 **Experiment**		Using a range of materials, techniques and processes to explore and develop ideas and intentions as your work progresses. This may be in both 2D and 3D.
AO3 **Recording Ideas**		Develop and record ideas through drawing and annotation towards a personalized outcome. Link all work to AO1 and AO2 as your project progresses.
AO4 **Presenting an Outcome**		Create and present a personalized outcome, realizing your intentions.
Coursework Portfolio		Worth 60% of your overall grade. Contains project work evidencing the four assessment objectives above.
Exam Portfolio		Worth 40% of your overall grade. Contains exam work evidencing the four assessment objectives above.

Key Terms

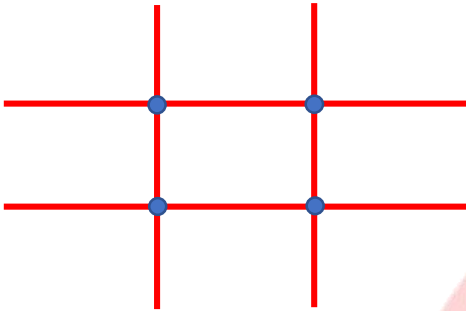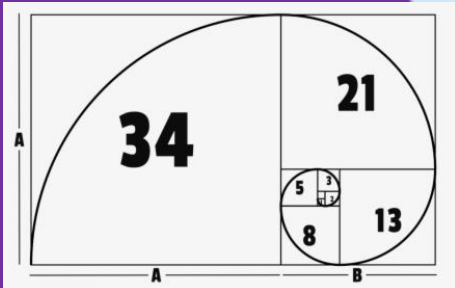|	
Abstract	Abstract art seeks to break away from traditional representation of physical objects. It explores the relationships of forms and colours
Aesthetics	Aesthetics is the branch of philosophy that is concerned with the nature of beauty and taste
Aperture	The opening through which light passes to expose sensitized material or a sensor.
Composition	Composition is the placement or arrangement of visual elements in a work of art.
Contemporary Art	Embraces late 20th century **contemporary art movements** in painting, sculpture and architecture, as well as new media such as installation art, (including sound), conceptualism and video art.
Contrast	Contrast is the scale of difference between dark and light areas in images.
Depth of Field	The distance in front of the point of focus and the distance beyond that is acceptably sharp.
Exposure	The amount of light that is allowed to reach the image sensor which is controlled by the shutter speed and aperture setting.
Form	Form is the aesthetics of recording in 2 and 3D
Line	Lines can be horizontal, vertical, or diagonal, straight or curved, thick or thin.
Macro Photography	Photography producing photographs of small items larger than life size
Modernism	Modernism is the term given to the succession of styles and movements in art and architecture which dominated Western culture from 19th Century up until the 1960's.
Photograph	A drawing with light
Primary source	Your own photographs/ drawings based on real objects
Sculpture	To make or represent (a form) by carving, casting, or other shaping techniques.
Secondary source	Images form the internet, books or magazines
Texture	Texture is the perceived surface quality of a work of art.
Tone	This could be a shade or how dark or light a colour appears

Timeline of Art Movements

GCSE PHOTOGRPAHY

Key Terms	
Angle	The position from one point to another
Aperture	Used to determine how much light passes into the camera
Balance	An equal or symmetrical composition
Composition	The layout of an image, or placement of objects within a frame.
Contrast	The difference in tones from the lightest tone to the darkest tone
Depth of Field	The focus of objects based on distance
Detail	The part of an image that might have otherwise gone unnoticed. Often fine or small elements within an image.
Exposure	The amount of light in a picture.
Focus	The definition (or lack of) in an image. What the camera is aiming for. What your eye is drawn towards.
Light	The illumination of scenes or objects to be photographed .
Negative Space	The space around the object.
Positive Space	The object that takes up physical space in the image
Rule of Thirds	a guideline that places the subject in the left or right third of an image, leaving the other two thirds more open. It divides a photo into nine equal parts, split by two equally spaced horizontal and vertical lines.
Saturation	The amount of colour in an image.
Shutter Speed	The length of time that the camera allows light into its lens.
Viewpoint	What the photographer sees from their position

[AO2] Writing Frame Design Ideas

EVALUATE
- "This idea is intended to focus on..."
- "By combining these ideas, I think the work will..."
- Will this work be successful in combining ideas from different artists?
- "I feel that this idea could be developed further by..."
- How could this idea be developed further?

IDENTIFY
- "I plan to produce..."
- "For this outcome I am going to....."
- What do you plan to do?
- "In this piece I will..."
- What is the work going to be?

DESCRIBE
- How will you produce the work?
- "I will use ideas found in the work of..."
- How will you use artist influence?
- "I will produce this outcome by..."

EXPLAIN
- "I feel that by doing this, the work will..."
- Why is this idea relevant?
- "By using this technique, the work will......"
- Why are you using these techniques?
- "I have chosen to combine these ideas because..."
- "By using [media] I will..."

Technical

Move Tool
Marquee Tool
Lasso Tool
Quick selection tool
Crop Tool
Eyedropper Tool
Healing Brush
Paintbrush
Stamp Tool
History Brush
Eraser
Paint Bucket Tool
Blur Tool
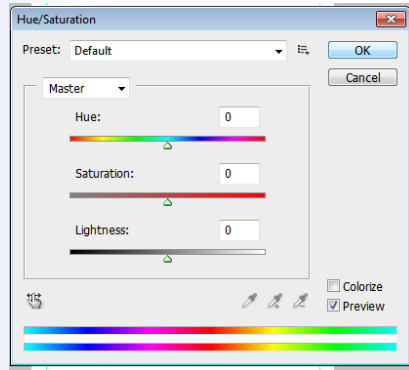Dodge Tool
Pen Tool
Text Tool
Path Selection Tool
Shape Tool

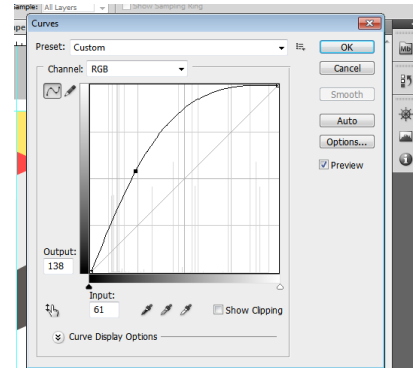**Create new layer**
Work on separate layers simultaneously
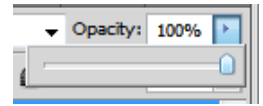
Change Opacity
Adjust how transparent your image is
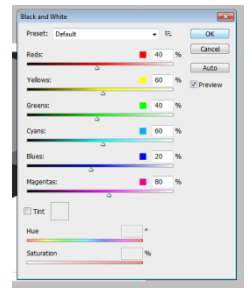
Hue/Saturation
Adjust the colours in your image

Curves
Adjust the tones in your image enhancing the light and dark areas and adding contrast and depth.

Ctrl + T = Free Transform
Ctrl + D = Deselect
Holding Shift ⇧ = Keep Proportions
Ctrl + + = Zoom in
Ctrl + - = Zoom out

Invert
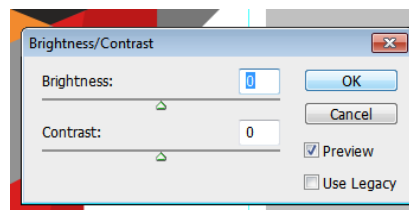Swap the colours in your image

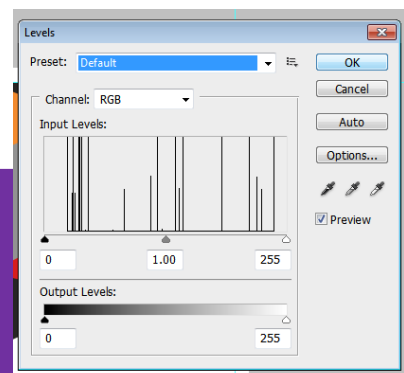**Black & White**
Remove all colour from your image

Image > Adjustments

Brightness & Contrast
Control how light your image is

Levels
Adjust your dark, medium and light tones separately

What is democracy

- A system of government by the whole population or all the eligible members of a state, typically through elected representatives.
- Direct democracy - a system of government where all citizens take part in decision making. A modern form of direct democracy is referendums.
- Representative democracy - a system of government where citizens are elected to represent others in an assembly.
- Liberal Democracy - a system of government based upon representative democracy and linked to the rights and freedoms for citizens. The UK is a liberal democracy. Liberal democracy became the predominant political system in the world. is characterised by fair, free, and competitive elections between multiple distinct political parties, a separation of powers into different branches of government, rule of law, and the protection of human rights for all.
- Values underpinning democracy: Rights, responsibilities, freedoms, the rule of law.
- Democracy in the UK is across multi-tiers of governance.

EU Parliament → Central Government UK — The Monarch / House of Lords / House of Commons → Devolved Parliaments — The Scottish Parliament / The Northern Ireland Assembly / The Welsh Assembly → Regional Governments → Local Authorities

There are 8 Regional Assemblies:
1. North East
2. North West
3. Yorkshire and Humber
4. East Midlands
5. West Midlands
6. South West
7. South East
8. Cornwall and Isles of Scilly
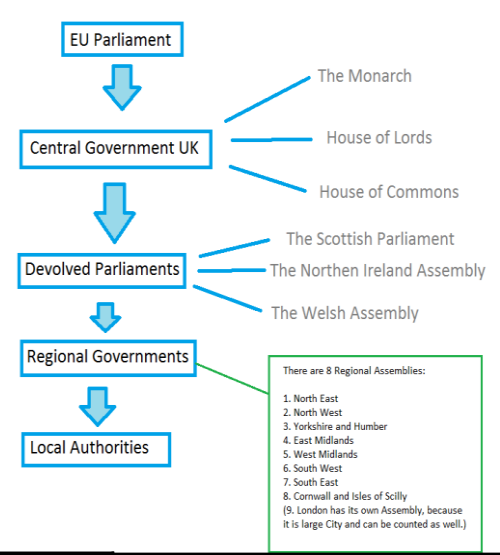(9. London has its own Assembly, because it is large City and can be counted as well.)

Constitutions

- A constitution is a set of rules that; Seek to establish the duties, powers and functions of the various institutions of government; regulate the relationship between and among the institutions; define the relationship between the state (government) and the individual (citizens); i.e. the extent of civil liberty.
- Without a constitution the government could simply do whatever it wants – oppressing minorities, violating freedom, tyrannising the mass of the people.
- The UK constitution is classified as unwritten and is a flexible document influenced by many documents. However the USA is a written constitution which clearly lays out the rights of citizens but it is not easy to change.

Main features of the UK Constitution:

Fusion of powers	Parliamentary Sovereignty
Flexible	Uncodified
Uncodified	Unitary

Key Words

Anarchy
Dictatorship
One-Party State
Theocracy
Liberal Democracy
Representative Democracy
Direct Democracy
Constitution
Bicameral
Civil Service
Legislature
Manifesto
The Monarchy
Prime Minister
Bicameral
Civil Service
Legislature
Manifesto
Cabinet
Devolution
West Lothian Question
Ultra Vires
General & Local Election
Apathy
Budget
Economy
Mixed, Market, and Command Economy

Central Government / Parliament

Three main parts: **House of Commons -** All of the MPs elected by UK citizens in the general election. Each represents their own constituency. H**ouse of Lords -** All of the Peers. They are unelected. They are nominated experts in their fields. The Prime Minister has a large say in who becomes a Peer. **The Monarch -** The King or Queen at the time. They've less power now but still have final sign-off on laws.

House of Commons:
- Make laws
- Examine the work of the Government by asking questions and having debates.
- Keep a check on government spending.
- Represent their constituencies and the interests of their people.

House of Lords:
- Check on the House of Commons and make sure laws are not rushed.
- Criticise the government if it thinks that it has become to powerful.
- Hold debates on important issues.

Who can stand?
All candidates must be 18yrs + and either: A British, Ireland or Commonwealth citizen and not be subject to any legal incapacity. You cannot stand if you: Are a member of the police or armed forces, judges or those politically employed outside of the UK; subject to bankruptcy restrictions; sentenced to a term of imprisonment of 3+ months, including a suspended sentence within the last 5 years; been disqualified for any reason under the Representation of People Act 1983

Devolution

Devolution is 'the transfer of central government powers to lower levels (e.g. Scottish Parliament), these powers being exercised with some degree of independence though with ultimate power remaining with central government (e.g. Westminster).
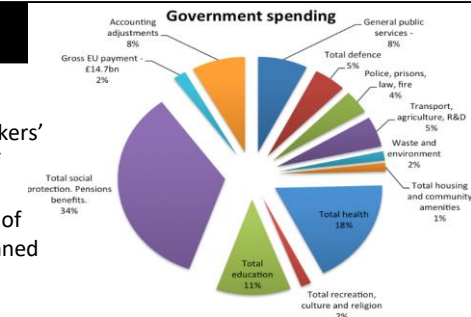
Devolved parliaments do not have a say over:
- ✓The Crown
- ✓Parliament
- ✓International relations
- ✓Defence
- ✓Immigration and Nationality
- ✓Taxation
- ✓National insurance
- ✓Elections
- ✓Currency
- ✓National security
- ✓Nuclear energy
- ✓Outer space

Tax

The government can either raise income through borrowing or forms of taxation - a mandatory or compulsory payment to the government from a workers' income, profits of a business, or added to the cost of some goods, services and transactions (VAT).
The UK economy is known as a mixed economy (mix of private and public sector services). Government planned spending is announced annually in the Autumn Statement delivered by the Chancellor.

Regional / Local Council

Responsible for well-being of citizens resident in the local area. They have to make sure that roads are safe to drive, develop plans such as leisure centres, inspect companies and make sure that environment is protected from excessive toxic waste, observe and monitor crime rate, building and renovating of schools, hospitals and other social care buildings to meet required standards set by the Central Government. Local authorities get a certain amount of budget from the Central government and they need to spend it wisely.

Government spending
- General public services - 8%
- Total defence 5%
- Police, prisons, law, fire 4%
- Transport, agriculture, R&D 5%
- Waste and environment 2%
- Total housing and community amenities 1%
- Total health 18%
- Total recreation, culture and religion 2%
- Total education 11%
- Total social protection. Pensions benefits. 34%
- Accounting adjustments 8%
- Gross EU payment - £14.7bn 2%

Method	Advantages
Campaigns (actions or events organised by an individual or group to achieve an aim)	• Reach new audiences, Can build relationships, Low cost tool • E.g. Hillsborough disaster - formed in response to the belief of a substantial number of people who were involved in the disaster, that after more than nine years and having many judicial decisions ruled against them, a fresh approach was needed in the fight to achieve proper Justice • E.g. Grenfell Tower - community-led coalition established to obtain justice for all the residents of Grenfell tower.
Using the media	• Reach a wider audience, Free coverage, Recruit more members, Enhance legitimacy in the eyes of the government • E.g. Fathers 4 Justice –group aims to gain public and parliamentary support for changes in UK legislation on fathers' rights. Use stunts and costumes. • E.g. Marcus Rashford – free school meals – interview with Boris Johnson • E.g. RSPCA – adverts, tv programmes
Social media	• News spreads quickly – viral • E.g. Surfer against Sewage - named and shamed individual companies whose waste they most frequently found
Open letters	• Good coverage – read by wider audience, Publicity
Trade Unions	• Protect workers' rights • Negotiate better pay and working conditions • Give general advice and support
Petitions (online e-petitions)	• Easy to start, Cheap, Effective in getting message across, Reach large numbers, Good track record • After 10,000 signatures, petitions get a response from the government. After 100,000 signatures, petitions are considered for debate in Parliament • E.g. Natasha's law – food allergen labelling
Lobbying (individual or group tries to persuade someone in parliament to support a policy or campaign)	• Raises awareness, Encourages leaders/government members to make changes to legislation, Put's pressure on the government
Demonstration (in support or against an action or policy)	• Public event – will gain attention • E.g., Parliament Square has hosted demonstrations for peace and equality, human rights and liberty, for and against Brexit, for and against fox hunting
Protest (against something)	• Can be personal or group, Voices heard, Gain media attention, Empower people – people join together • E.g. BLM, Insulate Britain – environmental activist group (traffic obstruction), Extinction Rebellion – environmental movement
Pressure groups (can be described as an organised group that seeks to influence government policy or legislation)	• Speak up for the public – allow minority groups to be heard, Some have huge memberships e.g. National Trust represents more than 2 million members - able to raise awareness of issues of importance to large numbers of people • Can act as expert advisors and have sound knowledge on their interests and causes in order to put their point across convincingly - therefore laws enacted as a result of pressure groups should benefit from a lot of expertise. E.g. Jamie Oliver is an expert on nutrition, able to advise on key foods that should and shouldn't be available to children at school
Boycotts (abstaining from a product)	• Well organised, Allows people to stand up for their beliefs in a peaceful way, Impact – economic consequences • E.g. Peta campaigned for a boycott of House of Fraser since 2020 over its sale of fur, 1955 bus boycott civil rights movement
Strikes	• Helps workers in negotiation, Immediate realisation of worker's demand, Protection for workers, Brings democracy • E.g. NHS and teachers with regard to pay and conditions
Use of a celebrity	• Increases awareness long term, Greater influence • E.g. Marcus Rashford – free school meals
Leafleting	• Cost effective, Easy to read, Visually pleasing
Voting	• Vote for politicians who are committed to address issues
Writing to MP	• Quick and easy, MP can represent you, Have to respond to communication
Volunteering	• Making a differences, Donations
Education	• Creates awareness, Helps to educate younger generation – their future, Helps to stand up against what is wrong

Active Citizenship – Knowledge organiser

GCSE CITIZENSHIP AQA

Citizenship action	Citizenship is all about joining in and being an active citizen.	Citizenship action could involve running a campaign, organising a protest, raising money for charity or educating about an issue.
Collaboration	Working together towards an outcome.	A campaign group should have a range of expertise. Groups should support each other and communicate well. It is useful to have a group leader to oversee the campaign.
Secondary research	Published research collected by other people.	This would likely be newspaper articles or research paper about your chosen citizenship action. Secondary research will provide you with statistics and data to inform your campaign.
Primary research	New research to answer a question(s)	This would likely be in the form of a questionnaire. This will allow you to find out what people in your target audience thought about your citizenship action.
Qualitative data	Deals with descriptions and cannot be counted.	This data will tell you what people think about a issue. These opinions will help you to adapt your citizenship action to make it more successful.
Quantitative data	Deals with information that can be counted or measured.	This data will give you statistics and figures about a issue. These figures will help you to be more persuasive in your citizenship campaign. If you are hoping to raise money, this will give an indication as to how much people are willing to spend.
Closed questions	Asking for short, factual answers.	A way to gather quantitative data.
Open questions	Asking people to express a point of view or give a longer answer.	• A way to gather qualitative data.
Negotiate	The process of discussing something with someone in order to reach an agreement.	If there is some acceptance of your plans for citizenship action but also some resistance, you may need to negotiate. This means you might compromise or change part of your plans to make them more agreeable.
Advocacy	Publically supporting an issue or proposal.	This would likely be in the form of a petition. It could also mean persuading people to take part in a fundraising event or attend a protest or march.
Lobbying	Trying to persuade a politician or the government to change the law or take a particular action.	To make this change happen, people will work together, collaboratively to meet their aims. Pressure groups do not wish to have power themselves; they simply wish to achieve a goal. An example of a pressure group is Jamie Oliver and his campaign to make school dinners healthier. Another example is Fathers for Justice.
Pressure group	Putting pressure on the government to do something/change something.	...a group of dads who campaigned for improved parental rights.

GCSE AQA CITIZENSHIP

EXAM BOARD CONTENT

Deciding the question or issue

Conduct primary research (surveys, observations and discussions)

Conduct secondary research (published sources of data, news reports, opinion polls or official reports from public bodies)

Research a variety of different viewpoints held by a variety of different people on your issue

Plan out your citizenship action, taking into account time and resources available.

Set goals for success and consider how these can be evaluated

Carry out an activity
Take informed action based on your research (this can take different forms e.g writing a letter, petitioning, using E-Media, volunteering, establishing a group to promote a change, etc.)

Assess the impact of the action

Evaluate the whole process

Your own investigation

Key things to know:
• How you decided on the issue of your investigation.
• Goals/aims
• Primary and secondary resources
• How this research helped you carry out the investigation
• How your group assisted you
• Ways you communicated your findings to your audience
• Discuss which part of your investigation process was the most difficult and explain
• Your findings
• Were outcomes achieved? How?
• Success of action
• Strengths and weaknesses of your action
• Ways you could have improved your investigation

Key design principles, good design & the function and aesthetics of design:

Emphasis:
- focal point of the design

Balance:
- arrangement of different elements:
  - symmetrical
  - asymmetrical

Contrast:
- the difference between 2 or more elements in a design

Harmony:
- how elements complement each other to form the design:
  - similar or related elements
  - dissimilar or unrelated elements

Repetition:
- recurrence of a design element

Texture:
- tactility
- visual representation

Proportion:
- relative size and scale of elements within a design

Scale:
- sizing of elements in a design

Movement:
- directs the eye of the viewer through different elements of the design

Space:
- the area around, within or between design elements

Good design:
Dieter Rams' 10 Principles of Good Design:
- is innovative
- makes a product useful
- is aesthetic
- makes a product understandable
- is unobtrusive
- is honest
- is long-lasting
- is thorough down to the last detail
- is environmentally friendly
- is as little design as possible

How good design influences everyday life:
- architecture
- fashion
- product design
- furniture
- sustainable design

Function:
- purpose for which a design is developed
- theory of form follows function

Aesthetics:
- theory of beauty and taste
- visual communication
- key factors:
  - balance
  - colour
  - movement
  - pattern
  - scale
  - shape
  - visual weight
- using aesthetics to complement designs' usability
- enhance functionality with attractive appearance

Key social factors, features and design practitioners of Key design movements from 1860 to the present day

Arts and Crafts (circa 1860 - 1915):
Key social factors:
- reaction to industrialisation
- aimed to improve the quality of design

Key features:
- emphasis on nature as a starting point for ideas
- often handmade, hand-crafted items which were labour intensive and expensive
- wide range of materials (wood, metal, textiles, glass and ceramics)

Key designers:
- William Morris
- Charles Voysey

Art Nouveau (circa 1880 – 1914):
Key social factors:
- desire to create 'new' or modern design for all social classes
- showcase art for everyday life

Key features:
- natural, organic shapes with floral and plant influences
- use of modern materials (iron, glass, ceramics) with wood
- asymmetrical or whiplash curved lines

Key designers:
- Louis Comfort Tiffany
- Charles Rennie Mackintosh

Art Deco (circa 1920 – 1940):
Key social factors:
- reaction to World War I
- Greek, Egyptian and Aztec influences

Key features:
- geometric, angular shapes, flowing circles and curves
- elegant, functional, and ultra-modern

Key designers:
- Eileen Gray
- René Lalique

Bauhaus (circa 1919 – 1933):
Key social factors:
- aesthetics of fine art applied to everyday items
- function over decoration

Key features:
- streamlined design with little or no embellishment or ornamentation
- mass production, use of industrial materials

Key designers:
- Marcel Breuer
- Marianne Brandt

Modernism (circa1914 – 1939):
Key social factors:
- social improvement through functionality and good design
- rapid development of cities and modern industrial societies

Key features:
- experimentation with new and old technologies
- adoption of technology in daily life

Key designers:

- Ludwig Mies van der Rohe
- Alvar Aalto

Memphis (circa 1981 – 1988):

Key social factors:
- Italian design group described as kitsch, garish and retro
- reaction to the design of the 1970s and dominated the 1980s

Key features:
- bold, colourful, unusual pieces
- block use of colour, white space
- distinctive black lines and repetitive geometric patterns

Key designers:
- Ettore Sottsass
- Nathalie Du Pasquier

Post-modernism (1945 – late 20th century):

Key social factors:
- a broad movement, celebrates the unconventional
- a pick-and-mix culture, no single definition of style

Key features:
- links to retro, techno punk and grunge
- ridicules convention

Key designers:
- Alberto Alessi
- Vivienne Westwood

Introduction to Arts and Crafts - 1860-1915

This movement is considered to be the earliest, possibly first, art and design movement developed in the British Isles. Its influences later spread to the rest of Europe and America. Arts and Crafts remains influential for present day designers, architects, and craftspeople, in terms of workmanship and the iconic design features.

Key social factors:
- The movement is seen as a reaction against industrialisation, mass production and the machine age. Some people felt that there was a decline in standards associated with machinery and factory production.
- Arts and crafts aimed to improve the quality of design and focus on craftsmanship.
- It was also influenced by the gothic revival architecture of Augustus Pugin and the politics and works of Karl Marx and John Ruskin.
- Social status: Artists and craftsmen were seen as equals, with neither superior to the other.

Key features:
- There was emphasis on nature as a starting point for ideas and colours.
- Stylised flowers and birds, allegories from the Bible and literature and Celtic motifs were used.
- Designs focussed on 'Aesthetics' qualities (well crafted, refined objects of beauty)
- Products were often handmade, hand-crafted items which were labour intensive and expensive.
- There was emphasis on nature as a starting point for ideas and colours.
- Stylised flowers and birds, allegories from the Bible and literature and Celtic motifs were used.
- Designs focussed on 'Aesthetics' qualities (well crafted, refined objects of beauty)
- Products were often handmade, hand-crafted items which were labour intensive and expensive.
- Sometimes the products intentionally featured evidence of the manual manufacture processes, for example hammer marks on beaten copper and silver, dovetail joints.
- A wide range of materials were used (wood, metal, textiles, glass and ceramics).
- Design outcomes ranged from wallpaper, jewellery, stained glass, furniture and fabric (upholstery).

Key designers:
- William Morris.
- Charles Voysey

Charles Voysey

Charles Francis Annesley Voysey (28 May 1857 – 12 February 1941) was an English architect and furniture and textile designer. Voysey's early work was as a designer of wallpapers, fabrics and furnishings in a Arts and Crafts style and he made important contribution to the Modern Style (British Art Nouveau style), and was recognized by the seminal *The Studio* magazine.[3] He is renowned as the architect of several country houses.

He was one of the first people to understand and appreciate the significance of industrial design. He has been considered one of the pioneers of Modern Architecture, a notion which he rejected. His English domestic architecture draws heavily on vernacular rather than academic tradition, influenced by the ideas of Herbert Tudor Buckland (1869–1951) and Augustus Pugin (1812–1852).

The Sanderson wallpaper factory (1901) in Chiswick, which he designed, is named Voysey House in his memory.

William Morris and his famous Textile Designs

(24 March 1834 – 3 October 1896) was a British textile designer, poet, artist, fantasy writer, and socialist activist associated with the British Arts and Crafts movement. He was a major contributor to the revival of traditional British textile arts and methods of production.

One of the 19th century's most famous names, William Morris, is still renowned today as the designer of patterns such as 'Willow Bough' and 'Strawberry Thief'.

Morris designed dozens of patterns for hand-produced embroidered, woven, and printed cloth, upholstery and wallpapers.

Like most of William Morris designs, this design is still in production as a wallpaper and fabric.

Strawberry Thief is one of William Morris's most popular repeating designs for textiles. Its subject is the thrushes that Morris found stealing fruit in the kitchen garden of his countryside home.

Search for this on the V&A museum's website to have a closer look at the design.

To print the pattern, Morris used the time-consuming process of indigo discharge method, combined with hand block printing.

For all the printed textiles, the design was traced onto a block of wood, and then the wood was sculpted so only the desired surface would touch the fabric.

One block was used for each colour of the final fabric.

The block was inked and then carefully placed onto the fabric.

The craftsman pounded it with a mallet to impress the colour, then lifted the block carefully, moved the fabric, re-inked the block, and printed the next section with the same colour.

When the first colour was finished, the finished fabric was set aside to dry. If more than one colour was used, once the fabric was dry, a block with the next colour would be inked and carefully impressed over the image left by the first.

The same process and the same blocks could be used for making both fabrics and wallpaper.
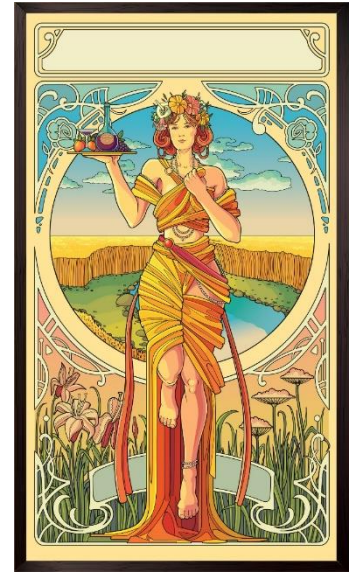
The more colours used made it extremely laborious and a long process, sometimes lasting several weeks, and the cost was higher than that of mechanical printing method.

Overview of Art Nouveau

- Art Nouveau was a design movement between **1880 – 1914**.

- It was inspired by **architecture**, **applied arts** and interior décor.

- Stemming from **London**, this was the first era that introduced **modern design for all social classes**.

- Art Nouveau was the first design era to design for **functional everyday life and made it available for all**.

Key social factors:

The Art Nouveau movement came from a desire to create 'new' or modern design for all social classes, showcasing art for everyday life.

Key Designers:

Louis Comfort **Tiffany**.
Charles Rennie **Mackintosh**

Key features:

- Natural, **organic** shapes with floral and plant influences.

- **Natural motifs** such as leaves, female figures, flowers were stylised in design.

- **Asymmetrical** or elongated curves and forms. There were lots of twists and curls to imitate plant life, sometimes known as "whiplash" curved lines.

Materials, techniques, and processes used:

- Use of modern materials (iron, glass, ceramics) with wood.

- Applicable to all design outcomes, ranging from wallpaper, jewellery, stained glass, ceramics, furniture, fabric (upholstery).

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Key points:

- **The post-modernism movement is a design movement between (1945–late 20th century).**

SIS Building, London

Key social factors:

- This is a broad movement which celebrates the unconventional.
- It is a pick-and-mix **culture, with no single definition of style.**
- **Post-modernism is designed to appeal to popular consumerism, fashion, youth culture and media.**

Key features:

- Mixed influences and inspiration taken from previous design movements, with links to retro, techno punk and grunge.
- The movement ridicules convention.

Scottish Parliament Building, Edinburgh

How the movement influenced other creative areas/disciplines:

- Music-video.
- Fashion.
- Sub youth cultures.
- Fashion/image.

Key Designers:

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Materials, techniques, and processes used:

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Overview of Art Nouveau

- Art Nouveau was a design movement between **1880 – 1914**.

- It was inspired by **architecture**, **applied arts** and interior décor.

- Stemming from **London**, this was the first era that introduced **modern design for all social classes**.

- Art Nouveau was the first design era to design for **functional everyday life and made it available for all**.

Key social factors:

The Art Nouveau movement came from a desire to create 'new' or modern design for all social classes, showcasing art for everyday life.

Key Designers:

Louis Comfort **Tiffany**.
Charles Rennie **Mackintosh**

Key features:

- Natural, **organic** shapes with floral and plant influences.

- **Natural motifs** such as leaves, female figures, flowers were stylised in design.

- **Asymmetrical** or elongated curves and forms. There were lots of twists and curls to imitate plant life, sometimes known as "whiplash" curved lines.

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KS4 Computer Science - 1.3 COMPUTER NETWORKS CONNECTIONS AND PROTOCOLS

NETWORKS

1	Local Area Network (LAN)	A LAN covers a small area located on a single site. For example a school or a business.
2	Wide Area Network (WAN)	A WAN connects LANs that are in different geographical locations. For example the internet.

HARDWARE

3	Wireless access points (WAP).	Uses a radio transceiver to allow wireless connections to a network.
4	Routers	Transmits data between networks. Used to connect the LAN to the internet.
5	Switches	Connect devices on a LAN. Switches receive data from one device and transmit this data to another device on the network.
6	Network Interface Controller (NIC)	An internal piece of hardware that allows devices to connect to the internet.
7	Transmission media	Carries data signals from one computer to another. Either wired or wireless.

FACTORS THAT AFFECT NETWORK PEFORMANCE

8	Bandwidth	The amount of data that can be transferred in a given time. The greater the bandwidth, the better.
9	Number of users	Available bandwidth is shared between users. Too many users may slow the network.
10	Wired vs wireless	Wired connections are faster and more reliable. Wireless can encounter interference e.g thick walls.
11	Other	Choice of hardware and choice of network topology (see below) can also affect network performance.

TOPOLOGIES

12	**Star network – all devices are connected to a central hub/switch.** Advantages: reliable- if one cable or device fails, the rest will still work. High performing as no data collisions can occur. Disadvantages: Expensive as uses a lot of cable and extra hardware is required. If hub or switch fails, all devices will lose connection.	
13	**Mesh network – each device is directly connected to all other devices.** Advantages: Data can be sent quickly as multiple routes to use. Can send and receive at the same time. New devices added easily. Disadvantages: Difficult to set up due to high number of connections. Need a lot of maintenance.	

KS4 Computer Science - 1.3 COMPUTER NETWORKS CONNECTIONS AND PROTOCOLS

CLIENT SERVER AND PEER TO PEER NETWORKS

| 1 | **Client server.** A network managed by a server. Computers are the clients. Pros - Files and software stored centrally so easier to keep track of and install updates. Easier to back up and manage security. Cons – expensive to set up. If server goes down, so do all devices. Can become overloaded if too many devices connect to it. |
| 2 | **Peer to peer.** All computers are equal – no computer has control over the network. Pros – easy to maintain and cheap to set up. No dependence on server. Cons - Files stored on individual devices so could be lost/duplicated. Updates and security installed individually. Backups take longer. Less reliable and slow. |

THE INTERNET

3	**DNS**	Domain Name Server. Used to match website addresses (bbc.co.uk) to IP addresses.
4	**Hosting**	When a business uses its servers to store files of another organisation (e.g Dropbox).
5	**The Cloud**	Technology that allows you to store files on remote servers.
6	**IP addressing** *(layer 2)*	IP addresses aren't linked to hardware. They are assigned before a device connects to the internet. Different IP address each time you connect.
7	**MAC addressing**	Each device has it's own unique binary identifier so they can be identified on the network.
8	**Wired connection**	More expensive to set up but faster speeds. E.g Ethernet.
9	**Wireless connection**	Cheaper but more likely to be unreliable. For example if obscured by thick walls etc. E.g WiFi, Bluetooth

COMMON PROTOCOLS

10	**TCP/IP** *(layer 3)*	Transmission Control Protocol/Internet Protocol. Sets the rules for how devices connect on the network.
11	**HTTP** *(layer 4)*	Hyper Text Transfer Protocol. Used by web browsers to access websites and communicate with web servers.
12	**HTTPS** *(layer 4)*	Hyper Text Transfer Protocol Secure. A secure version of HTTP. Encrypts information.
13	**FTP** *(layer 4)*	File Transfer Protocol. Used to access, edit and move files between devices on a network.
14	**POP**	Post Office Protocol. Used to retrieve emails from a server. The server holds the email until you **download** it.
15	**IMAP**	Internet Message Access Protocol. Used to retrieve emails from a server. Holds the email until you **delete** it.
16	**SMTP** *(layer 4)*	Simple Mail Transfer Protocol. Used to send emails.

LAYERS – a group of protocols with similar functions

17	**Layer 1** Link Layer	Link layer. Passes data over a physical network. Responsible for how bits are sent. E.g Ethernet.
18	**Layer 2** Internet Layer	Makes connections between networks, directing data packets and handling traffic. E.g IP.
19	**Layer 3** Transport Layer	Controls data flow by splitting data into packets and checking they are sent / delivered. E.g TCP.
20	**Layer 4** Application Layer	Turns data into websites and other applications and vice versa. E.g HTTP, FTP, SMTP.

KS4 Computer Science - 1.4 NETWORK SECURITY

NETWORK SECURITY THREATS

1	**Malware**	Malicious software installed without knowledge or consent.
2	**Phishing**	A fraudulent email sent from what looks like a real company that aims to get personal information.
3	**Social engineering**	Weak passwords, giving personal information over the phone or email (falling for phishing scams).
4	**Brute force**	Automated software used to generate multiple password guesses in order to gain access.
5	**Denial of service**	Hackers flood the network with useless traffic, making it slow or inaccessible.
6	**Data inception/ theft**	Hackers monitor data travelling on a network to intercept personal information.
7	**SQL injection**	Using SQL code in the login box to access users' personal information.

WHAT MALWARE DOES TO YOUR COMPUTER

9	**Scareware**	Tells the user their computer is infected so that they follow links and pay to 'fix it'
10	**Ransomware**	Encrypts (locks) files on computer. User must pay money to unlock the files.
11	**Spyware**	Secretly monitors users actions (e.g key presses).
12	**Rootkits**	Alter permissions – allowing hackers admin access to devices.
13	**Backdoors**	Creates holes in security ready for future attacks.

HOW TO PREVENT NETWORK SECURITY THREATS

14	**Good network policy**	Regularly test to find weaknesses in security, passwords, user access levels, use anti malware and firewalls and encrypt sensitive data.
15	**Penetration testing**	Companies employ specialists to try and hack the network to highlight weaknesses.
15	**Network forensics**	Used to find the cause of an attack on a network.
17	**Strong passwords**	To prevent unauthorised access. Passwords should be long, use a mix of numbers, letters and characters and should be changed regularly.
18	**User access levels**	Control which parts of the network different users can access.
19	**Anti malware/ firewall**	Designed to stop malware from damaging an organisations network. Firewalls block unauthorised access.
20	**Encryption**	Essential for sending data over a network. Only people with the correct key can access the data.
21	**Physical security**	Security guards/cameras to stop unauthorised access to buildings where secure data is kept.

Year 10, Component 1 Devising Theatre

Section 1 – What have I learnt?

How do I devise?

Use a range of dramatic devices:

- Mime
- Direct Address
- Narration
- Cross Cutting
- Flashbacks
- Slow motion
- Monologue
- Freeze frame/Still image
- Multi-roles
- Thought Tracking
- Choral speaking
- Symbolism

Section 2 – Incorporating Practitioner (A)

Brecht

Brecht was a theatre practitioner from Germany who created **epic theatre**. His techniques included:

- Direct Address
- Narration
- Multi-roles
- Ensemble
- Gestus
- Music and song
- Placards
- Episodic Structure
- Political message
- Unnamed characters
- Tickle and slap
- Speaking stage directions

He used the alienation technique to demonstrate to the audience that the actors were playing a role and that they were watching a production, it was <u>NOT REAL LIFE</u>.

Section 2 – Incorporating Practitioner (B)

Stanislavski

Stanislavski was a theatre practitioner from Russia. He believed that the audiences role was to look into the action on the stage through the fourth wall (which separated the audience and the actor). He wanted the actor to use both internal and external techniques to help tell the story.

<u>Internal Techniques:</u>

- The magic 'if'
- Emotional memory
- Feeling of truth
- Relaxation of muscle

<u>External Techniques:</u>

- Making the body expressive
- Accentuation
- Restraint and control
- Intonation and Pauses
- Tempo-rhythm and movement

Section 3 – Incorporating a Genre

Theatre in Education (TIE)	TIE starts with an educational topic or debate and develops a show around it. It first appeared as an art form in 1965 in Coventry. To fit this genre you must decide on the target audience, choose and research the topic, include audience participation, write the scene and evaluate the work.
Musical Theatre	Musical Theatre is a genre in which a story is being told through the three performing arts disciplines of acting, singing and dancing. There are three types of songs which are integral to the plot (action, character and production). Main characteristics of the style include; dialogue, song, dance, humour, monologue, pathos, anger/hate, love, chorus and plot.
Physical Theatre	Physical Theatre is a form of acting that tells a story through the use of movement, gesture and body language. There are many companies that practice this style of theatre including Frantic Assembly, DV8 and Kneehigh.

Devising Theatre

Practical - You will create a piece of drama using the stimulus provided by EDUQAS. This will be performed and recorded.

Supporting Evidence - A piece of coursework which is written along with the devising process.

Evaluation - An evaluation written in exam conditions after the performance.

Section 4 – How do I perform my scene?

Techniques to help you to give a better performance:
- Motivation
- Know your character
- Movement and space
- Don't fidget
- Variety
- Concentration and involvement
- Emphasis
- Use of voice
- Interaction
- Learn your lines
- Stay in role

Vocal Skills
Tone, expression, tempo, pitch, pace, projection, volume, pause, accent, emphasis, articulation, inflection, phrasing, subtext, emotional range.

Section 5 – Supporting Evidence

To produce an effective portfolio of supporting evidence you must focus on three stages which are significant to the development of the devised piece. Each stage should be approximately 250-300 words and could include any of these different elements:

Photographs	Mind maps	Sections of script	Questionnaires
Visual images	Ground plans	Newspaper articles	PowerPoint slides
Sketches	Written prose	Lyrics	Video clips

Section 6 – How do I evaluate my devised piece?

To write an effective evaluation it will be broken down into 3 parts:
1) Interpretation of character/role or realisation of design
2) Performance skills
3) Contribution

Refer to your original contribution to the effectiveness of the final performance. Remember to:
- Fulfil initial aims and objectives
- Give good examples
- Refer to the chosen stimulus, practitioner/genre
- Add as much detail as possible.
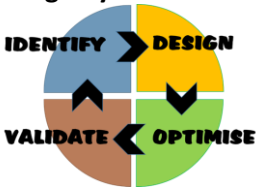
Keywords

Minimalistic	Drama with few props and little scenery or set.
Naturalistic	Imitating real life scenarios.
Non-naturalistic	The drama is presented in a way that does not require the audience to believe in the characters or what is happening.
Soundscape	A background sound that runs under a scene, to help establish a reality for the world of the play, and to immerse the audience in that world. It can be use to heighten emotional moods and to emphasise important occurrences.
Narration	A narrator is like a storyteller informing the audience about the plot. This means that it becomes non-naturalistic because the audience are aware throughout that a story is being told and the fourth wall is broken.
Multi-role	When an actor takes on more than one role in a production.
Symbolism	Use of symbolic pieces of scenery to represent more than their mere physical characteristics.

Engineering Design Level 1/2 – J822 (OCR)

1.1	1.1 The stages involved in design strategies
1.2	1.2 Stages of the iterative design process, and the activities carried out within each stage of this cyclic approach
1.2.2	1.2.2 Make and evaluate

Design Cycle Phases	**The design cycle:**
	Identify, Design, Optimize, Validate • **Identify** = conduct research to explore the design problem, create a design brief, and project planning. • **Design** = create a design specification (product success criteria) and then create solutions to answer the design brief and design specification. • **Optimize** = create models (prototypes) to test ideas and make improvements. • **Validate** = test and evaluate a prototype against the design brief and design specification. A designer or team or designers will go through the design cycle to complete a project. Designers may **repeat** the design cycle to create an **optimal solution** (best idea). James Dyson made over 5,127 prototypes (tests) over 15 years to perfect his first bagless vacuum cleaner. Each time he repeated the design cycle.
Design Cycle and Typical Activities	
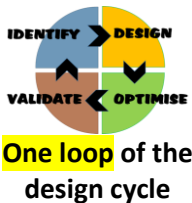
Designers will undertake the above activities throughout the design cycle.
If they repeat the design cycle some may not be repeated.
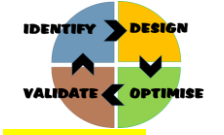
Identify	Identify = conduct research to explore the design problem, create a design brief, and project planning.
• **Brief**	A statement about the design problem suppplied by the client and developed by the designer.
• **Research**	Exploring the design problem. Finding solutions to the design problem.
• **Process Planning**	Project planning. Deciding what tasks need to be completed, who will undertake them and how long they should take. Gannt charts are genrally used. Budget should be considered in relation to both time and money.
Design	Design = create a design specification (product success criteria) and then create solutions to answer the design brief and design specification.
• **Specification**	A success criteria for a yet to be designed product.
• **Design**	Creating solutions to answer the clients brief and design specification.
• **Manufacturing Plan**	A step by step guide (plan) of how to manufacture the product or prototype.
Optimise	Optimize = create models (prototypes) to test ideas and make improvements.
• **Prototyping**	Manufacturing prototypes (models) to test design ideas. They can be either virtual (CAD) or physical. They could be the whole product or a scale model or

		even just a small section of the overall product (sub-assembly).
	• **Error Proofing**	Testing the product to make sure the user and or customer uses the product correctly, making alterations if needed e.g flatpack furniture – did the users construct it correctly in a focus group test? If not what needs to be changed to increase user satisfaction? To make sure the product is assembled and manufactured correctly and safely in the factory or production line. Do design changes need to be made to make sure staff maintain production quality, reduce manufacturing mistakes and decrease the risk of worker injury?
	Validate	Validate = test and evaluate a prototype against the design brief and design specification. A designer or team or designers will go through the design cycle to complete a project.
	• **Test**	Testing the prototype to identify potential issues.
	• **Evaluate**	Assess the test data and make a plan of action to correct design flaws.
Design Process Overview	Design problem ↓ Design brief ↓ Design ideas ↓ Development ↓ Working drawings ↓ Manufacture ↓ Evaluation	**Design Problem -** The client will provide the design team with a design problem (design brief). **Client =** company/person employing your design services The designer will interview the client and develop the client's basic design brief by conducting research: Examples of research to develop the clients design brief: • **Market Research –** may be conducted to find out what the competition is up to, identify strengths and weaknesses in the market place and to find out if the market place is too saturated (i.e. is there a need for the product). • **Existing product analysis –** designers will analyse the existing product range of the client or competing companies to identify strengths and weaknesses to identify design opportunities. • **Product disassembly –** designers may disassembly and analyses similar products to identify strengths and weaknesses either of the competition or the client's own product range. They may examine what manufacturing methods, materials, technologies, and components have been used. • **Customer survey –** the target market could be surveyed to identify if there is a need for the product or to see if the idea needs changing.
		Design Brief - A design brief is a statement about the design problem and the client's needs. The designer will interview the client and then conduct research to develop the clients design problem into a design brief. **It may contain specific information, such as:** • A statement about the design problem • Basic features and functions

		- Target market – age, gender, lifestyle of the user and customer. - Scale of production – how many products will be manufactured and over what time frame. - Branding – company identity – logos, company colours, fonts. - Budget – time and money – how much time and money the client can afford to spend on the project. Further research will be conducted and then analysed to create a success criterion for the product – **Design Specification.**
		Design ideas – the designer will create solutions to the design brief and design specification.
		Development – ideas are tested and developed to create an optimal (best) solution that answers the design brief and specification. This could be a range of sketches, models (prototypes), and CAD work.
		Working drawing – a detailed 2D drawing that gives manufactures the information they need to construct a prototype or final product. The following will be detailed: **sizes (dimensions), tolerances (acceptable manufacturing error of margin), materials, surface finish and manufacturing processes.**
		Evaluation – the success of the product is reviewed against the design brief and design specification by analysing test and feedback data. Modifications may be made.
Design Brief	**Design Brief** - A design brief is a statement about the design problem and the client's needs. See above what a design brief should contain.	
Design Specification	**Design Specification** – A success criteria for a yet to be designed product. - It is a statement about what the product should be or do often with a reason why. - A Design Specification should always be based on accurate research. - Design Specifications are often based on ACCESSFM (see table below) - The specification should be a mixture of **quantitative and qualitative** points. **Quantitative** = quantities, facts, figures, dimensions, weights "The product should weigh no more than 500 grams. This was the amount the user could carry with ease for 1 hour." **Qualitative** = statements, properties "The product should be light weight to make it easy to carry." - It is a very important planning document that allows the designer to evaluate and review designs, to make sure they have answered the original problem and the client's needs **(Design Brief).** - It allows large organisations to work efficiently (save time/money) and reduce design mistakes e.g. Dyson employs over 3,500 designers, engineers, and scientists in the development of new products. They need to know what each team should be doing or there would be chaos leading to product failure.	
ACCESSFM is a design tool used by designers to help analyse products and write specifications.	**Aesthetics**	- Appearance - size, shape, colour, texture of a product. Branding is also an important factor. - How will you make the product appealing to the target audience? How will you make the product easy to understand and use?
	Cost	What price should the product be? – link to materials, manufacturing, transport, retail (shop) price.

	Customer	• Target audience. Who is the customer (buyer)? Who is the user? • Target market – what is their gender, age range, lifestyle? • What do they want/need?
	Environment	• How will you make the product environmentally friendly? • How will you reduce the impact a product has on the environment? • Location – where will it be used? How will this affect its design? • Design for disassembly **(DFD)** – how can you make the product easier to service or repair?
	Size	• What size should the product be? - link to **anthropometric data** (sizes of the human body) and **ergonomics** (how to make products safer, easier, and more comfortable) and where it will be used **(location).** • Size of materials and components.
	Safety	• How will you make the product safe? • What are the safety requirements of the user and or customer? • Safety of the final user – link to materials, design features and ergonomics. • Manufacture **(DFMA – design for manufacturing assembly)** – how to make it safer and easier for workers on the production line?
	Function	• What does the product need to do? – this will be based on many factors.
	Materials Manufacture	• What type of material properties are required to answer the brief or specification? E.g. do they need to be lightweight, impact resistant or malleable (can be bent into shape without cracking). • Production and material costs – this is linked to the maximum price the product can be sold for whilst maintaining a healthy profit margin. • Scale of production (how many products should be made) – this lets you choose manufacturing methods and then suitable materials that are in budget.
Types of Research		• **Primary research –** first-hand information. **Surveys, questionnaires, interviews, focus groups, observations (photographs, videos), tests and experiments**. You have physically undertaken the research yourself and gathered the information/data first hand. This method will give you ==accurate high-quality information== but is more time consuming than secondary research and therefore more expensive to undertake. • **Secondary research –** second hand information. Someone else has created the information or data for you. Types include **internet research, books, magazines.** Secondary research is ==quicker than primary== but may not provide the exact information you need or ==may not be 100% accurate==.
Linear Design **One loop** of the design cycle		• <u>**A design strategy that completes the design cycle only once.**</u> • After each design phase is complete the designer moves onto the next without moving back. • Linear design is often used for simple products that require little testing or development work. • Linear design is often quicker and more cost effective (cheaper) than iterative design because of the lack of development. • Linear design is perfect for simple products and clients with limited budgets (time/money)

Iterative Design **Many loops** of the design cycle	• A design strategy that completes the design cycle multiple times to create the best solution. James Dyson completed over 5,000 cycles to create his first bagless vacuum cleaner. • Iterative design is often used for complex products that require lots of development work and testing. • Iterative design is more expensive than linear design because of increased development work. • Iterative design is perfect for complex products and clients with large budgets (time/money).
Inclusive Design	• Inclusive design is a design process where the needs of specific groups of people are considered who may be traditionally excluded. • A good example is a pedestrian crossing: the lowered/drop curb for wheelchair or pram users. The rumble/textured tiles for the blind with canes. Buzzer for blind people to tell them when to cross. Flashing light for the deaf. Lowered button for wheelchair users. • Inclusive design leads to a happier and more fulfilled society. • Inclusive design can add increased design complexity, increasing manufacturing costs and potentially the amount of space required for the product.
User Centred Design	• User centred design is a design process where the needs of the user are used to develop a product. • A product is tested and developed using the feedback of the user/s feedback. Focus groups and product testing are especially important. • It is a type of iterative design and requires lots of development and testing work. Therefore, it is time consuming and expensive to do.
Sustainable Design • Finite: will run out e.g., coal, oil, gas. Crude oil is used to produce most of the plastics we need. • Non-finite: will not run out – timber, paper, cotton, bamboo etc. • Renewable: can be replaced. • Biodegradable: can break down/rot naturally.	• Sustainable design is a design process that aims to make a product as **environmentally friendly** as possible by reducing the negative impact it has on the environment over its lifetime. • Designers should consider the complete lifecycle of a product from its manufacture, including material sourcing, transportation, use (energy usage) and end of life (can it be recycled with ease?). • Designers often apply the 6 Rs of sustainability to reduce the environmental impact of a new product: 1. **Recycle** – can the product be designed in a way to make it easier to take apart and recycle? Can the materials be recycled? 2. **Repair** – can the product be designed in a way that makes it easier to fix and extend its life? 3. **Reuse** – can the product be reused at the end of its life (extend its life)? 4. **Refuse** – should we refuse to use certain materials that are damaging to the environment? Are they difficult to recycle or damaging when they are refined or extracted? 5. **Rethink** – can we change the design to reduce its impact? 6. **Reduce** – can we reduce the number of materials and energy required to manufacture the product? Other factors environmental factors include: **CO2 Emissions** • Extraction of raw materials and manufacturing processes require energy. This energy normally causes some level of CO2 emissions. **Working conditions** • Fair trade and workers' rights and conditions is an important factor when thinking about sustainability. **Resource scarcity** • Scarce materials or materials that are difficult to obtain can cause sustainability issues. High demand for scarce materials causes environmental damage e.g. such as mining rare metals to produce mobile phones. **Transportation**

	• All manufacturers and retailers must transport goods and materials. Many modern corporations transport components over vast distances. Transportation can add to the CO_2 emissions of a product. **Harvesting and Deforestation** • Harvesting and deforestation can have a negative impact on wildlife. If replanting does not take place, then future harvests are affected. Deforestation can also cause flooding to occur. **Mining Raw Materials** • Mining for raw materials can have an impact on the environment. This should be considered when thinking about the sustainability of the product.	

Ergonomic design	• Ergonomic design is a design process that aims to make a product more comfortable, easier, and safer to use.
	• It is an iterative design process that requires a lot of development work.
	   • Ergonomic factors include:
	     • Size
	     • Shape
	     • Texture
	     • Weight
	     • Colour
		Designers apply **anthropometric data** (sizes of the human body) to create safe and comfortable products.

Physical and Virtual Prototypes

• **Prototype =** test, model.

Designers create prototypes to test design ideas. Models are tested against the design brief and specification to make sure the needs and expectations of the client and product are met.

Physical models can be created to test part of a design or the whole. Test data is then analysed, and the idea developed after further research and design.
Physical scale models can also be produced to economically test ideas.

• Aesthetical prototype – test the appearance.
• Functional prototype – test its function.
• Electrical prototype – test electrical components, circuits, coding.

• **Virtual prototype** (computer based) – CAD simulation of design.
• **Physical protype** – real life model

Virtual prototype	Virtual prototype	Physical protype	Physical protype
Advantages	**Disadvantages**	**Advantages**	**Disadvantages**
Cheaper than a physical model.	Test data may be inaccurate, compared to a physical model.	A real sense of the product can be achieved. Missing elements from virtual model/testing can be identified.	Expensive – requires highly skilled people to make.
Quicker to create than a physical model.	Virtual models do not give a true/real sense of the product being designed and developed.	More accurate testing data can be gathered from a physical model rather than the predictions of a virtual model.	Time consuming – delays development time.

CAD	**Computer aided design**
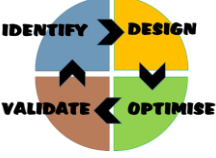
Designers use CAD programs to create accurate 2D and 3D models with speed. Models can be edited quickly and tested virtually (simulations). Online CAD packages **(cloud-based computing)** now allow designers to work on CAD models together at the same time over the internet to speed up the design process.

Advantages	Disadvantages
Changes (edits/modifications) can be made quickly compared to traditional hand drawn techniques.	Expensive to set up.
Ideas can be tested virtually to reduce prototyping costs and reduce design time and material wastage.	Expensive to train staff.
Accurate – compared to hand drawings.	Data can become corrupted, and work lost.
Improved communication - designers can work together on the same CAD drawing to reduce design time.	CAD drawings can be copied, and ideas stolen.

Computer aided manufacture **(CAM)** – CAD drawings can be used to control items of CAM machinery e.g., laser cutters and 3d printers.
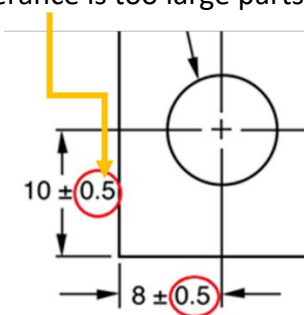
2.1	Types of Criteria Included in a Design Specification
2.2	How Manufacturing Consideration Affect Design
2.3	Influences on Engineering Product Design

Design Cycle/Process Recap	
Design Cycle and phases:	
Recap of keywords:	
Client	• Company or person employing your design/engineering services.
User	• The user of the product.
Customer	• The person buying the product.
New keywords:	**2.1 Types of Criteria Included in a Design Specification**
Needs	• Critical aspects of a product that must be included to make sure it answers the needs of the client, user, or customer.
Wants	• Desirable aspects of a product **that are not critical.** They could be left out if there isn't enough budget for them to be included.
Qualitative criteria	• Factual and measurable criteria/data e.g. sizes, weights, cost. This should be generated from analysed data. "The handle should be no wider than 35mm to make sure the average adult hand can comfortably grip the bar."
Quantitative	• Non-factual and non-numerical criteria. They are descriptive statements e.g., "The product should light weight"
Situation	• Situation is the location of where the product will be used e.g. the bathroom or garage. It can be more specific such as the garage work bench drawer.
Context	• The reason behind the problem being solved. • Why is there a need for the product being designed?
2.1	**Types of Criteria Included in a Design Specification**
Design Specification **ACCESSFM criteria**	**Design Specification** – a success criteria for a yet to be designed product or service. It is a set of criteria about what the product should do or be. Specification points should always be backed by solid research. It is a very important planning document that allows the designer to evaluate and review designs to make sure the needs of the client, user, customer, and product have been met. Design specifications within larger organisations such as Apple, allow teams to work independently with precision and confidence, reducing collective mistakes. This in turn saves time and money during the design and development of a new product. <table><tr><td>**Aesthetics**</td><td>• Appearance - Size, shape, colour, texture of a product. How will you make the product appealing to the user and customer? What do they expect the product to look like? What surface finish will be used and why? • How will you incorporate the clients branding? – company logo, colours, style etc.</td></tr></table>

			• Aesthetics also plays an important part in ergonomics. How can colour be used to make the product safer and easier to use?
			• Fashion and trends – are they relevant to the product you are creating if so, what are they?
			    • *"The product should be a gender-neutral colour to increase sales".*
			    • *"The logo should be displayed on top of the product to be visible when it is placed on the floor"*

	Cost		• What should the retail price be? This will be set by what the market is willing to pay. This will affect material, manufacturing, and transportation costs.
			• **Development costs** should also be factored in: what should be the maximum cost of the design project? This will be linked to your client's budget. Costs include:
			    ▪ Market research
			    ▪ Staffing
			    ▪ Prototyping
			    ▪ Testing
			    ▪ Manufacture setup
			• **Breakeven point** – how much would you need to charge to break even and start making a profit?

	Customer		• Who is the customer? • Who is the user? • **Demographic** - Target market – gender, age range, lifestyle, geography, buying habits. • What do they want/need? Surveys, questionnaires, focus groups can be used.

	Environment		• Situation (location): where will the product be used and how will this affect its design? Are there size restrictions? For example, will it go in a drawer or on a shelf?
			• How will you make the product environmentally friendly?
			    ▪ How could you make the product more sustainable? **Think about the 6 Rs of sustainability.**
			    ▪ How could you reduce the negative impact the product has on the environment?
			    ▪ Design for disassembly **(DFD)**. How can you make the product easier to repair or service?
			    ▪ Lifecycle of the product **(LCA).** How will you make the product easier to dispose of? How will the negative impact of the products manufacture be reduced? For example, energy usage during manufacture and waste.
			    ▪ Sourcing materials and components. **Supply chains** and the distance materials must travel should be considered to reduce the environmental impact of a product.

	Size		• What size should the product be? - link to **anthropometric data, ergonomics, and locational factors.** • Size of materials and components. Will you use standard components or material stock forms? If so, what are their sizes?

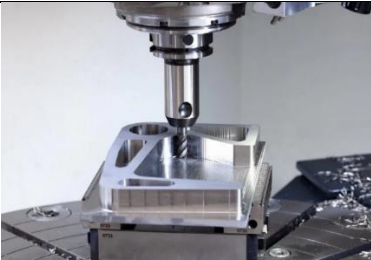|		
		• *"The handle should be no wider than 35mm so it can fit into the average adult hand making it easier to carry"*
	Safety	• How will you make the product safe? • What are the safety requirements of the user/customer? – link to materials, design features and ergonomics. • British Standards and Conformity European. Adherence to safety laws and regulations. What are the rules and regulations associated with the type of product you wish to manufacture? • Manufacturing safety - design for manufacturing assembly (DFMA). What requirements are needed to make it safer and easier for the workers to manufacture and assemble? • *"The product should have rounded edges and corners and used flame resistant materials to comply with British Standards rules and regulations."*

	Function	• What does the product need to do?
		• What features should the product have?
		• Are there any servicing, repair, or cleaning requirements for the product? How will they be added to the design?
		• What functions and features can be incorporated within the budget or cost constraints of the product?
		    • *"The product should be easy to stack and clean".*
		    • *"The product should use a display that can be seen with ease at 10 meters."*

	Materials/ Manufacture	• What material properties are required to answer the brief or specification? For example, does the product need to be lightweight or water resistant? • What scale of production should be used? This will determine suitable manufacturing methods and materials. • What materials are suitable for the budget/cost of the product? • What components will be used? • *"The product should be made from lightweight and impact resistant materials that should be suitable for mass production and injection moulding."*
Material Selection	The following factors play an important role in material selection: • **Scale of production** – this will affect the manufacturing techniques you will use, and in turn affect the materials you can use. • **Ease of manufacture**. • **Aesthetics** • **Material working properties** – how easy it is to form or shape. • **Mechanical properties** – how suitable is it for its intended function? • **Electrical properties** – does it need to be an insulator or conductor? • **Thermal properties** – does it need to transfer or trap heat? • **Cost** • **Sacristy** - how easy is it to get? • **Processing** - how easy is it to process the raw materials into a usable material? Energy and time. • **Stock form** – is the material available in the stock form you require for the manufacturing processes you wish to use in your design? • **Quantity** – can you get enough of the material for the production run?	

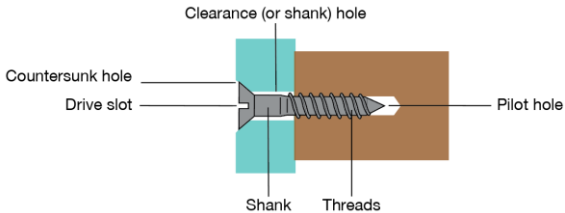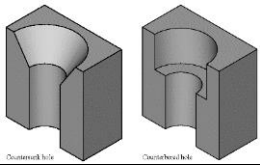|	• Environmental impact.
Material properties	The following factors are imortant criteria for selecting suitable materials: • Weight • Strength Reisstant to corrosion • Water reistance • Operating temperature • Fatigue – how many times can it operate before failure • Durability • Flamability **Tensile strength** Strength of a material when it is stretched or pulled. **Compressive strength** Strength of a material under load (when the load is 'compressing' the object). **Resistance to corrosion** Ability of a material to resist deterioration caused by reactions to its surrounding environment. **Composite materials** Materials made up of two or more different materials, combining their properties to create a new, improved product. **Low carbon steel** A low carbon ferrous material (contains iron) that consists of less than 0.3 per cent carbon; also known as mild steel. **Ductility** The ability of a material to be stretched under load without breaking. **Toughness** The ability of a material to resist impact or shock loads (such as press-forming a car body panel). **Malleability** The ability of a material to be shaped or deformed by compressive forces (such as hammering or pressing).
Manufacturing Tolerances	**A manufacturing tolerance is an acceptable range in manufacturing accuracy.** It is impossible to manufacture a part with 100% accuracy. Zero tolerance would mean a 100% failure rate during quality control (QC) – parts would not pass inspection. There would be a 100% wastage of parts. If the tolerance is too large parts would be unsafe. It is impossible for a machine to make a part with 100% accuracy. The +- symbol indicates the acceptable manufacturing size range e.g., 10mm +- 0.5mm = 9.5mm to 10.5mm to pass inspection. Designers must make sure parts fit together safely and with ease during assembly.
Bioplastics	Polymers (plastics) made from plant-based materials such as starch such as PLA. The materials are biodegradable (will rot down) and are non-finite.
Eco materials	Designers maximising the use of renewable and biodegradable materials in their designs such as timber or bamboo.
Recycled materials	Recycled materials are materials that have been extracted from a product at the end of its life and repurposed. It takes less energy to recycle a material than to create it from raw materials (extraction/refining/processing).
New and emerging materials	**Modern materials** — **Modern materials are generally created by the scientific world and are relatively new.** Graphene — A single layer of carbon atoms. It has excellent electrical conductivity, and weight for weight is 200 times stronger than steel. It is flexible and light weight and is often used as a coating or in lightweight and flexible circuits.

	Nanomaterials	Nanomaterials are used as coating on materials. They are very thin and are often used as antibacterial coatings.
	Titanium	A light weight, heat resistant material (compared to steel and aluminium) that is often used in fighter jets and some sports cars to save weight and fuel.
	Smart materials	**Materials that react to external stimulus – examples include light, heat, pressure/mechanical force, electric and magnetic fields**
	SMA	Shape memory alloys can return to their original shape if they are deformed by applying heat. Nitinol is a good example of an SMA and is often used in small quantities in products such as glass frames and spring mechanisms within fire sprinklers and car engines.
	Thermochromic pigments	Pigments that change colour with heat. Often used in flexible thermometers, battery indicators or colour changing paints.
	Photochromic dyes	Dyes or coatings that change colour with light. Often used in sunglasses.
	Composite materials	**Two or more materials bonded together (in a matrix) – the properties of each material are combined to create an enhanced material.**
	MDF	Wood fibres are bonded with a resin (glue) and compressed into a sheet. MDF comes in large sheets sizes, is easy to paint and doesn't warp (expand) like most natural timbers such as pine.
	Concrete	Sand, cement, and gravel are bonded together with steel reinforcing rods to create a material that can withstand both tension and compressive forces. The concrete can be poured and moulded to form structural elements in buildings.
	Carbon fibre	Carbon fibre is bonded with a resin (glue) and formed in a mould. It is cured in a vacuum bag that is heated in an autoclave (pressurised oven). Carbon fibre is light weight, rigid and very strong. Race cars and now modern aeroplanes are starting to us more and more carbon fibre to save weight and fuel.
	GRP – Glass reinforced plastic	Glass fibre matting bonded with resin (glue) and formed in a mould. GRP is a very strong material and less expensive than carbon fibre but not as light weight.
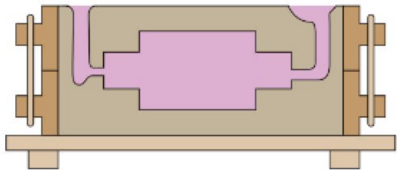
2.2	**How Manufacturing Consideration Affect Design**

Scales of Production

Scale of production	Typical products	Advantages/disadvantages
One-off	Unique or bespoke products. One-of-a-kind watch, building or	• Unique products are created – one-off a kind. • Custom • Tailor made. • Client design changes can be made with relative ease by the designer/maker compared to batch or mass production which have a high set up cost.

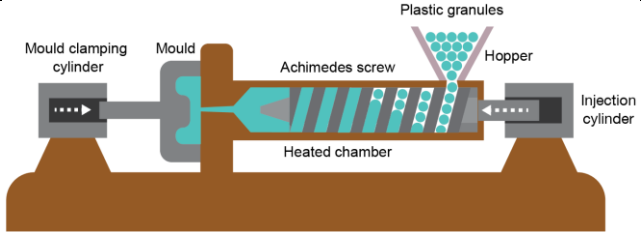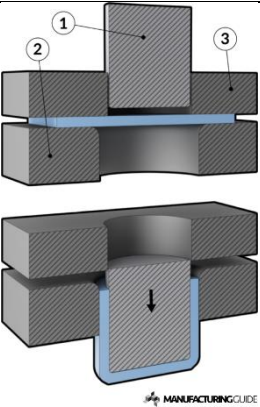|		piece of clothing such as a suit.	• One-off production uses a highly skilled work force which creates a high wage cost. This in turn will increase the price of the final product. • Generally, one off production has longer production times due to a lack of expensive tooling and machinery that is associated with other scales of production such as mass. • Low set up cost compared to batch and mass production. • Uses hand tools and basic machinery (compared to batch or mass)
	Batch	Furniture, newspapers, seasonal clothing	• Products are manufactured in batches (100's, 1000's or even more) in a specific time frame. Parts of the product are made in set quantities. Once each part/stage/process has been completed they move onto the next stage until the final product is complete. • Production may stop and start to suit demand. • Batch production has a higher set up cost compared to one-off production. Templates, manufacturing jigs and tooling need to be designed and set up. Set up costs are recouped over the larger number of products being made and lower wage costs due to the use of semi-skilled labour. • **Jig** = a device to make a job easier or safer to do. • Consistent high-quality products are made because of the investment in tooling, machinery, and jigs. Machines are less likely to make mistakes. • Investment in tooling and more advanced machinery means a semi-skilled work force can be used reducing wage costs. • Design changes are difficult to make. Tooling and machinery would need to be changed and paid for.
	Mass	Mobile phones, games consoles, toothbrushes	• Large production volumes – fast rate of production. • Efficient, overall lower production costs. • High quality consistent products produced. • Extremely high set up costs. Production lines, automation, tooling, and large-scale machinery need to be set up. Set up costs are recouped over the larger number of products being made. • Investment in tooling and more advanced machinery means a low-skilled work force can be used reducing wage costs.

			• Automation and investment in tooling/machinery reduces the work force and lowering manufacturing costs further. Automation and manufacturing jigs also mean that a semi-skilled or low-skilled work force can be used reducing salaries and training time. • Design changes are very difficult to make. Tooling, machinery, and production lines would need to be modified and paid for.	
Automation	Reducing human intervention in manufacturing using computer-controlled machinery.			
Stock forms	Most materials come in stock forms: • Granules • Ingots • Bar • Sheet • Tube The benefit of stock forms is that they come in set sizes or weights. This enables designers to make design decisions and in turn speed up the design process.			
CNC	Computer numerical control.			
CAD	Computer aided design.			
CAM	Computer aided manufacture.			
	Manufacturing can be split into the following categories: wasting (cutting), shaping, forming, joining, finishing and assembly			
Wasting	**Turning**		A lathe is used to make round metal objects. A sharp stationary tool removes material as the metal part rotates in the chuck of the lathe. **Knurling** = adding a textured diamond pattern to the part	
	Milling Most modern milling machines are CNC.		A miller can be used to create complex metal parts from blocks of metal or used to refine cast metal parts. The cutting tool rotates to shave away material. The machining is done in stages to create the desired shape, specification, and surface finish.	
	Cordless Drill The cordless drill is more portable and manoeuvrable than a pillar		**Pillar drill** Used to drill holes with accuracy.	

		drill but isn't as accurate.		A machine vice should be used to hold the workpiece.	
		Counter sink	**Twist drill bit**		**Stepped drill**
		Pilot hole Stops the materials from splitting and guides the screw/bolt. **Clearance hole** A hole slightly larger than the bolt or screw.			**Counter sunk hole.** V shaped hole (chamfered edge) that allows the screw/bolt head to sit flush (flat). **Counterbore** Flat shaped hole
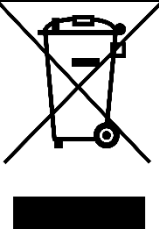
Shaping			
	Sand casting		1. Liquid molten metal is poured into a two-part mould made from sand. 2. The sand is often mixed with oil to help bind it together. Hot molten metal is poured down the sprue which connects to the mould. 3. The riser allows the expanded gases and excess metal to be released the other side. 4. When the part has cooled it will be machined. Casting
	Investment casting		1. Often referred to as the lost wax method of casting. 2. This process can create accurate complex metal parts. 3. Liquid wax is injection moulded and then joined to a feeder system made from wax. 4. The wax is coated in a ceramic slurry and fine ceramic particles. 5. Multiple coats are applied and then fired in a kiln to set the mould and burn the wax away. 6. Hot molten metal is then cast into the mould.

		[Investment casting using wax](#)
	Die casting.	1. Liquid molten metal is injected under pressure into a metal mould. 2. The moulded part is removed once cooled down and trimmed/machined. [Die casting](#)
	Injection moulding	• Complex plastic parts with internal structures can be created at speed using injection moulding. • The process is suitable for mass production. • Parts are accurate due to the low shrinkage rate. • The plastic requires very little finishing, reducing production costs. • Set up costs are high but recouped over time through large production volumes. • Hot liquid plastic is forced under pressure (injected) into a liquid cooled mould.
Additive manufacturing	Manufacturing methods that add material e.g., 3D printing, injection moulding, casting	
Subtractive manufacturing	Manufacturing methods that remove material e.g., milling, turning, laser cutter	
Forming	Shaping a material either through pressing, bending, or moulding. Examples:	
	Press Brake A press brake is used to fold sheet metal. It is often used to make metal casings after holes have been cut for fastenings and hardware. Steel panels are often laser, plasma or die cut and then shaped.	
	Deep Drawing Sheet metal is pressed/stretched into a shape. Often used for drinks cans, cylinders, sinks and saucepans. • A die is forced into a metal sheet using a hydraulic press. • The press applies tons of force to stretch the metal sheet.	

	• The die pushes the metal sheet into the mould and completes the forming process.	
	Stamping/Piercing A hydraulic press applies a large amount of force to a die to punch out shapes in sheet metal.	
Joining	**Design for manufacturing assembly (DFMA)**	Developing designs to make assembly safer and more efficient. Worker safety is paramount – e.g., sharp edges should be reduced, and hand sizes considered to allow workers access to assemble parts. If robotic manufacturing is being used designers should consider the limitations of the robot and simplify the design.
	Design for disassembly	Designing products so they can be cleaned, serviced, or repaired to extend their life.
	Standard components 	Components that are a standard size and are often manufactured by multiple suppliers. Examples include bolts, nuts, washers, rivets, screws. Using standard components speeds up the design process because sizes and specification are already known. They are often mass produced.
	Premanufactured components	Components or subassemblies manufactured separately, often made by external specialists, that are assembled on the production line into the final product.
	Subassemblies	Components assembled separately to form a unit which is then joined to the main assembly/product e.g., a car seat joining the interior of a car on the production line.
	Robotic manufacturing and assembly	Robots are often used on mass production lines. The aim is to reduce human error, improve efficiency and productivity and in turn reduce labour costs. The high set up costs are spread over the large number of products being manufactured. AI is now being incorporated to help machines make human like decisions to speed up quality control and complete basic problem-solving tasks.
	Temporary fixings **Mechanical fastenings**	Bolts, push fasteners and screws can be used to create temporary fixings that can be taken

		apart using basic tools. Temporary fixings are not as strong as permanent fixings but allow the user to take apart the product and repair it.
	Permanent fixing	Welding, soldering, brazing, adhesives (glues) are examples of permanent fixings. They are generally stronger than temporary fixings but cannot be taken apart.
Finishing	**Heat treating**	Metal parts can be heat treated to harden the surface of a material or to reduce the risk of the part cracking.
	Deburring	Burrs are sharp edges on machined or cast parts. They are removed using a deburring tool. A small amount of metal is shaved from the edge.
	Grinding/linishing	Surface welds and scratches can be removed using an abrasive wheel or belt.
Assembly	Joining parts together to create a more complex product.	
Production costs	- Production costs are affected by many factors: **materials, tooling, machinery, labour, overheads (heating, lighting, insurance, transport etc).** - Production costs must be factored into the overall cost of the final product. - Production costs are split across the predicted number of products that will be manufactured.	
Materials Selection	The following factors affect material selection: - Cost - Aesthetics - Mechanical properties - Electrical properties - Thermal conductivity - Scarcity – how rare a material is. - Processing – the energy and time required to turn the raw material into a usable form. - Ease of manufacture - Environmental impact	
2.3	**Influences on Engineering Product Design**	
Market Pull	Designers create products in response to the needs of the marketplace (surveys, questionnaires – market research). Market pull will generate predictable sales, but products are open to copyright issues from other companies.	
Technology Push	Revolutionary ideas (brand new) are pushed onto the marketplace. It could be a new material, manufacturing method or technology. Technology push requires lots of R&D (research and development) which is time consuming and costly. Generally, companies will patent new ideas and capture the market for at least 20 years or sell the manufacturing rights to other companies. Technology push can be risky but financially rewarding because companies cannot guarantee if consumers will adopt the new idea.	
Cultural and fashion trends	- Understanding the cultural needs of the intended marketplace is essential to make sure the product is a success and doesn't cause offense within the intended country or region. - Understanding fashion trends can increase sales by making the product more appealing to its target market.	
Safety Standards and Legislation	**Kitemark – British Standards**	**Conformity European**

	• The symbol signifies that the product has been tested and is safe to use.
	• Both organisiations are independent bodies free from bias.
	• The organisations set out the minium safety requirements that a product should meet. Companies must meet criteria if they wish to sell the product within the UK or European Union.
	• Now the UK has left the EU the UKCA (United Kingdom Conformity Assessment) has replaced it.
Legislation	Law
Standard	An agreed way of doing something
Prosecuted	Officially accused of breaking the law in court e.g., if a safety regulation has not been adhered to and the product causes an accident.
WEEE	 ==Waste electrical and electronic equipment directive== Legislation encouraging the recovery of electrical waste at specialist centres.
Right to Repair	EU and UK law requires companies to sell spare parts for ten years after its manufacture date and be designed in a way that it can be repaired by a non-specilaist technician.
Planned Obsolescence	• A product that is designed to last for a limited time. Products are designed to fail on purpose to either increase sales or for safety reasons. This can have a negative impact on the environment, wasting unnecessary materials and energy. • Some products are designed to fail of purpose for safety reasons such as food (sell by dates), smoke alarms and fire extinguishers. **Perceived Obsolescence** – marketing (advertising) that encourages users to upgrade to a newer model to increase sales.
Sustainable Design • Finite: will run out • Non-finite: will not run out – timber, paper, cotton, bamboo etc. • Renewable: the source material can be replaced	A design process that aims to make a product as **environmentally friendly** as possible by reducing the negative impact it has on the environment. Materials (source and type) and manufacturing methods should be chosen very carefully. Other factors that should be considered are material extraction/refining and transportation. 6 Rs of sustainability should be considered, to help reduce the environmental impact of a new product: 1. **Recycle** – can the product be designed in a way to make it easier to take apart and recycle? Can the materials be recycled? 2. **Repair** – can the product be designed in a way that makes it easier to fix and extend its life? 3. **Reuse** – can the product be reused at the end of its life (extend its life)?

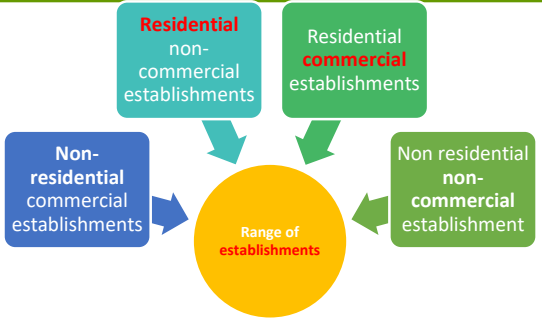|	
• Biodegradable: can break down/rot naturally	4. **Refuse** – should we refuse to use certain materials that are damaging to the environment? Are they difficult to recycle or damaging when they are refined or extracted? 5. **Rethink** – can we change the design to reduce its impact on the environment? 6. **Reduce** – can we reduce the amount, number of materials and energy required to manufacture the product?
Recycling	Products are processed and repurposed to create new materials or objects. | Advantages	Disadvantages
Raw materials are saved from going to landfill.	Collection and transportation cause pollution. Emissions are produced by lorries.
Less energy is used recycling materials compared to creating the material from resources either harvested or mined. It also avoids unnecessary transportation of raw materials from abroad.	Recycling plants require energy to process the waste materials. Energy that could have been created by burning fossil fuels in power stations. This in turn creates CO2 emissions increasing the greenhouse effect and adding to potential global warming.
Energy is saved not having to source raw materials.	Recycling is labour intensive. Not all materials can be separated and will ultimately be incinerated or end up in landfill.
Creates jobs.		
Upcycling	Finding creative uses for old products to prevent them going to landfill e.g., turning car tyres into play equipment.
Circular Economy	Designing products that avoid the use of finite resources and can be repurposed or recycled at the end of their life.
Linear Economy	Designing products that mainly use finite resources that are not repurposed or recycled at the end of the products life and end up as waste in landfill.

Paper 1 Q2: Language Subject Terminology

1. Word Classes

Noun	Identifies a person (girl), thing (wall), idea (luckiness) or state (anger).
Verb	Describes an action (jump), event (happen), situation (be) or change (evolve).
Adjective	Describes a noun (happy girl, grey wall).
Adverb	Gives information about a verb (jump quickly), adjective (very pretty) or adverb (very quickly).

2. Sentence Structures

Fragment	An incomplete sentence (no subject verb agreement). "Nothing." "Silence everywhere."
Simple	A sentence with one independent clause. "She went to the shop."
Compound	A sentence with multiple independent clauses. "She went to the shop and bought a banana"
Complex	A sentence with one independent clause and at least one dependent clause. "Sometimes, when she goes to the shop, she likes to buy a banana."

3. Language Techniques

Lexis	The vocabulary of a language.
Hyperbole	The use of extreme exaggeration.
Imagery	When the writer provides mental "pictures".
Irony	Like sarcasm, where the opposite is implied.
Juxtaposition	Two ideas together which contrast each other.
List (of three)	A number of connected items (three= effect).
Metaphor	Something is presented as something else.
Oxymoron	Contradictory terms together "bittersweet".
Pathos	Language used to appeal to the emotions.
Personification	Giving human traits to something non-human.
Repetition	When a word, phrase or idea is repeated.
Semantic Field	A set of words from a text related in meaning.
Simile	Something is presented as like something else.
Symbolism	An idea is reflected by an object/character etc.
Syntax	The way words and phrases are arranged.

4. This Quotation/ Reference…

Achieves	Advances	Affects
Allows	Alludes to	Builds
Concludes	Confirms	Conveys
Denotes	Develops	Demonstrates
Displays	Justifies	Exaggerates
Encourages	Enhances	Establishes
Exemplifies	Emphasises	Explores
Exposes	Forces	Generates
Highlights	Hints	Identifies
Ignites	Illustrates	Impacts
Implies	Identifies	Indicates
Initiates	Introduces	Involves
Justifies	Juxtaposes	Kindles
Launches	Leads to	Maintains
Manifests	Notifies	Offers
Portrays	Presents	Produces
Progresses	Promotes	Prompts
Provokes	Questions	Represents
Reveals	Reinforces	Signifies
Sparks	Suggests	Supports
Symbolises	Transforms	Triggers
Typifies	Upholds	Underscores
Validates	Verifies	Yields

5. Stock Phrases

Creates a picture of…

Paints an image of…

Reinforces the view that…

Emphasises the writer's point that…

Exemplifies the idea that…

Sophisticated Discourse Markers

Whilst	Although	Despite

Since

7. Cause and Effect Discourse Markers

Therefore	Thus	As a result

Consequently

Paper 1 Q3: Structural Subject Terminology

8. Types of Narrator

Limited 3rd person	External narrator with knowledge of one character's feelings (he).
Omniscient 3rd person	External narrator- knowledge of more than one character's feelings (he).
1st person	Told from a character's perspective (I).
2nd person	Directed to the reader (you).
Unreliable narrator	When the perspective offered makes us question the narrator's credibility.

9. Narrative Styles

Linear	Events are told chronologically.
Non-Linear	Events are not told chronologically.
Dual	Told from multiple perspectives.
Cyclical	Ends the same way it begins.

10. Explaining the Extract.

Focusing	Our attention is aimed somewhere.
Introducing	An idea or character is first shown.
Building	When an idea/tension is increased.
Developing	An earlier point is extended.
Changing	A shift is created for an event/idea.
Concluding	Ideas/ events are drawn to a close.

11. Structural Techniques

Atmosphere	The mode or tone set by the writer.
Climax	The most intense or decisive point.
Dialogue	The lines spoken by characters.
Exposition	The start where ideas are initiated.
Analepsis	(flashback) Presents past events.
Prolepsis	flashforward Present future events
Foreshadowing	Hints what is to come(can mislead).
Motif	A . Th recurring element in a story e
Resolution	answer or solution to conflict.
Setting	A geographical/historical moment.
Spotlight	Emphasis is placed on something.
Shift	A switch or change of focus.
Tension	The feeling of emotional strain.

Question 3: Language Subject Terminology

Word Classes

Noun	Identifies a person (girl), thing (wall), idea (luckiness) or state (anger).
Verb	Describes an action (jump), event (happen), situation (be) or change (evolve).
Adjective	Describes a noun (**happy** girl, **grey** wall).
Adverb	Gives information about a verb (jump **quickly**), adjective (**very** pretty) or adverb (**very quickly**).

Sentence Structures

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Compound	A sentence with multiple independent clauses. *"She went to the shop and bought a banana"*
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Simile	Something is presented as like something else.
Symbolism	An idea is reflected by an object/character etc.
Syntax	The way words and phrases are arranged.

This Quotation/ Reference…

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Allows	Alludes to	Builds
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Emphasises the writer's point that…

Exemplifies the idea that…

Sophisticated Discourse Markers

	Whilst	
Although	Despite	Since

Cause and Effect Discourse Markers

therefore	thus	As a result
	consequently	

Question 4: Viewpoints and perspectives

Key Words

Viewpoint	The views and ideas held by the writer.
Perspective	The particular attitude towards something (can shaped by time/place)
Attitude	The tone the writer adopts to emphasise or covey their ideas.
Methods	The ways in which the writer communicates their views and ideas.

The writer…

thinks	encourages	says	asks
feels	reacts	implores	reveals
believes	wants	would like	presents

Explaining the Source.

Focusing	Our attention is aimed somewhere
Introducing	An idea or character is first shown.
Building	When an idea/tension is increased.
Developing	An earlier point is extended.
Changing	A shift is created for an event/idea.
Concluding	Ideas/ events are drawn to a close.

Discourse markers to compare and contrast

Compare	**Contrast**
Similarly, …	On the other hand, …
In the same way, …	Whereas…
Equally, …	In contrast to this, …
Compared with …	Unlike…
As with	Alternatively, …

SQI

Statement	Answers the question
	A clear point made
Quotation(s)	Precise and embedded
	Might group quotations
Inference	What is suggested/implied

Year 10 English Language Paper 2

1. Types of **Provider**

Residential non-commercial establishments

Residential **commercial** establishments

Non-residential commercial establishments

Non residential **non-commercial** establishment

Range of **establishments**

Establishment	Service provided	Examples
Commercial residential	Accommodation, house keeping, food, beverages, conference or training facilities	Hotels, guest houses, campsites, bed and breakfasts, holiday parks, farmhouses
Commercial non-residential	Food and beverage to eat in or take away, areas to sit to eat and drink	Restaurants, cafes, tea rooms, coffee shops, fast food outlets, pubs and bars, street food and pop up restaurants, mobile vans
Non-commercial residential	Accommodation, food and beverages	Hospitals, care homes, prisons, armed forces, boarding schools, colleges, universities.
Non-commercial non-residential	Food and beverages	Canteens in offices, day-care centres, schools and nurseries, charity food suppliers, for example soup kitchen

2. **Suppliers**

Specialist markets

Equipment suppliers

Local supplier delivery

Suppliers to the hospitality and catering industry

Large wholesalers

Independent suppliers

Types of service

Food Service	Description
Formal food	Food is usually served to customers by waiting staff. • **Plate**: the meal is plated up and brought to the customers table by waiting staff • **Waiting service**: the food is served to the customers at the table by waiting staff • **Gueridon** [trolley or moveable service]: the customer's food is cooked at the table, usually for dramatic effect, for example flambéed. Steaks and crepes.
Street food	Ready-to-eat food or drink sold on the street or in a public place, such as a market or festival.
Self Service	Customers help themselves to food, for example a carvery, in a carvery the meal is on display and carved by a chef, and a customer can help themselves to vegetables, sauces and gravy.
Fast food	Food is made to order very quickly and can be taken away from the restaurant or stall to eat, seats and tables are often provided.
Cafeteria	Small and inexpensive restaurant or coffee bar, serving light meals and refreshments
Takeaway	Takeaway restaurants [[for example Chinese, Indian, pizza] take an order and deliver the food to the customer's home; customers can also order at the restaurant and then take the food away to eat it.

Food Service	Description
Buffet	A selection of dishes is laid out for customers to help themselves, different buffet styles include: • **Sit-down buffet**: once the customer has chosen their food from the buffet, they can sit down at a table to eat it • **Stand-up or fork buffet**: once the customer has chosen their food, they stand to eat it; this allows guests to circulate and meet other guests • **Finger buffet**: all the food is prepared to be eaten with fingers (without the need for a knife and fork); foods are normally bite-size and easy to eat.
Automatic vending	Drinks and snacks are stored in a machine with a glass front and items are selected by the customer; they are often coin operated and placed in establishments where it is may not always be possible to get access to food, for examples colleges and hospitals
Transport catering	A variety of food service options are available on trains, planes and ships.
Hotel	Provides overnight accommodation and food and drink options. Many hotels offer breakfast, evening meals, bar snacks, lunch, room service (food ordered and delivered to your room), budget hotels usually have a simpler offering
Bed and breakfast	Offers overnight accommodation and breakfast, often these are private family homes where rooms are made available to guests, breakfast is usually served in a dining room or the owners kitchen

Hospitality at non-catering venues
Contract Caterers
provide:
- food for functions such as weddings, banquets and parties in private houses.
- prepare and cook food and deliver it to the venue, or cook it on site.
- They may also provide staff to serve the food, if required.
- Complete catering solutions for works canteens etc

3. **Standards** and ratings

★ ONE STAR

★★ TWO STARS

★★★ THREE STARS

★★★★ FOUR STARS

★★★★★ FIVE STARS

Which

Hotel and Guest house standards
Hotels and guest houses are often given a star rating. Star ratings help customers to know what services and facilities they can expect at a hotel or guest house. The quality of the service provided is rated on a scale of one to five stars

3. Standards and ratings

Food **hygiene** standards
The Food standards agency runs a scheme with local authorities where they score businesses on a scale from zero to five to help customers make an informed choice about where to eat. The rating is usually displayed as a sticker in the window of the premises. The scores mean:

FOOD HYGIENE RATING 0
FOOD HYGIENE RATING 1
FOOD HYGIENE RATING 2
FOOD HYGIENE RATING 3
FOOD HYGIENE RATING 4
FOOD HYGIENE RATING 5

Restaurant standards

MICHELIN STAR

AA Rosettes 2015 Culinary Excellence

THE GOOD FOOD GUIDE WAITROSE & PARTNERS

The three main restaurant rating systems used in the UK are Michelin stars, AA Rosette Awards and The Good Food Guide reviews:
Michelin stars are a rating system used to grade restaurants for their quality:
One star is a very good restaurant
Two star is excellent cooking
Three stars is exceptional cuisine

AA Rosette Awards score restaurants from one (a god restaurant that stands out from the local competition) to five (cooking that compares with the best in the world)

The Good Food Guide gives restaurants a score from one (capable cooking but some inconsistencies) to ten (perfection)

Environmental standards

The Sustainable Restaurant Association awards restaurants a one-two-three star rating in environmental standards. To achieve this the restaurant has to complete an online survey about sourcing, society and the environment. It is then given an overall percentage for environmental standards:
One star: 50-59%
Two star: 60-69%
Three stars: more than 70%

OUR 14 KEY FOCUS AREAS
sourcing
Local & Seasonal | Ethical Meat & Dairy | Environmentally Positive Farming | Sustainable Fish | Fair Trade
society
Treating People Fairly | Healthy Eating | Community Engagement | Responsible Marketing
environment
Supply Chain | Waste Management | Workplace Resources | Energy Efficiency | Water Saving

AC 1.2 Job roles in the Hospitality and Catering industry

4. Job roles in the industry

Staff structure in a hotel

- **Hotel Manager**
  - **Bar**
    - Head bar person
    - Barmen/maids
  - **Restaurant**
    - Manager
    - Supervisors
    - Waiters
    - Wine waiter
  - **Housekeeping**
    - Housekeeper
    - Chambermaids
  - **Kitchen**
    - Head chef
    - Sous chef
    - Chefs de partie
    - Commis chef
    - Kitchen porter
  - **Front-of-house staff**
    - Receptionist
    - Porter /concierge
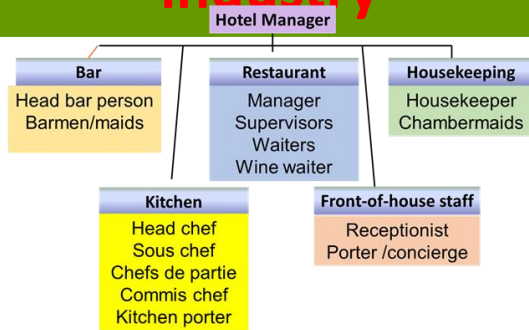
5. The Kitchen brigade- Back of House

- Head chef
  - Sous chef
    - Pastry chef
    - Larder chef
    - Sauce chef
    - Vegetable chef
    - Commis chef
    - Kitchen assistant
    - Stock controller
    - Kitchen porter
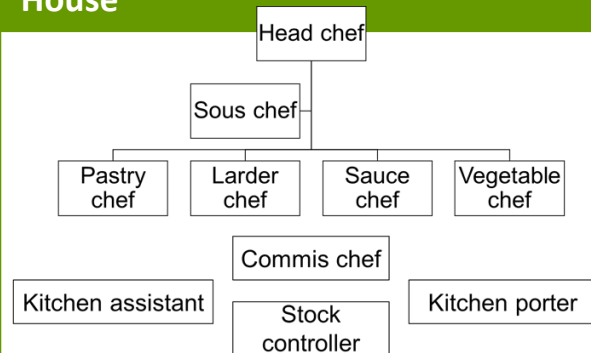
Most large establishments could have **chefs de partie** in the following areas:
- **Sauce chef**- Le Saucier
- **Pastry chef**- Le Patissier- baked goods and dessert
- **Fish chef**- Le Poisonnier
- **Vegetable chef**- L'entremetier
- **Soup chef**- Le Potager
- **Larder chef**- Le garde manger- cold starters and salads
- The **commis chef** or assistant chef is a chef in training
- The **kitchen porter** washes up and may do basic vegetable preparation
- The **stock controller** is in charge of all aspects of store keeping and stock control.

6. Front of House roles

Reception
Receptionist: meet customers and direct them to the correct person or place; they manage visitor lists and booking systems
Porter/ Concierge; assist hotel guests by making reservations, booking taxis and booking tickets for local attractions and events.

Restaurant and bar
Restaurant manager (Maître d'Hote): The restaurant manager is in overall charge of the restaurant,; they take bookings, relay information to the head chef, complete staff rotas, ensure the smooth running of the restaurant
Head waiter (ess): Second in charge of the restaurant,. Greets and seats customers, relays information to the staff, Deals with complaints and issues referred by the waiting staff.

Waiting staff Serve customers, clear and lay tables, check the customers are satisfied with the food and service. May give advice on choices from the menu and special order foods

Wine waiter- Le sommelier: Specialises in all areas of wine and matching food, advises customers on their choices of wine, Wine waiters serve the wine to the customer and can advise customers on their choices as well

Bar staff serve drinks and take food orders , wash up, clear tables, change barrels and fill shelves.

Baristas make and serve hot and cold beverages, in particular different types of coffee such as espresso, cappuccino and latte.

Unit 1 The Hospitality and Catering Industry
LO1 Understanding the environment in which hospitality and catering providers operate
AC 1.1 The structure of the hospitality and catering industry
wjec cbac

7. Average salaries in the hospitality and catering industry

Role	Average Salary
Hotel Management	£37,310
Head executive chef	£36,613
Pastry chef	£30,530
Housekeeper	£24,055
Receptionist	£21,596
Porter	£17,718
Waiting and bar staff	£16,735
Kitchen staff	£16,556

8. Training

Level	Types of training
Key stage 4 school courses	Level ½ Vocational award in Hospitality and Catering
Post 16-19	Colleges offer many courses for those leaving school after Year 11, for example: • Certificate in Hospitality and Catering Level 1 • Certificate in Introduction to Culinary Skills Level 1 • Diploma in Introduction to Professional Cookery Level 1 • Diploma in Hospitality and Catering Level 2 • Diploma in Professional Cookery Level 2
Universities	Universities offer degree, HND and HNC courses in subjects such as: • Catering • Hospitality • Culinary Arts • Hotel management • Food and beverage service
Apprenticeships	These provide both work experience and training
In-house training	On-the-job training provided by the organisation you work for

9. Personal attributes

- Patience
- Team player
- Self motivation
- Initiative
- Personal presentation
- Honesty

Job Role	Desirable Attributes
Waiter/waitress	Attentive listener, good memory, clear communicator, diplomatic, calm and assured, high level of focus and attention, multitasker, can work in a team, physical stamina, courteous and polite, hardworking.
Receptionist	Professional, positive attitude and behaviour, clear communicator, helpful, an work in a team, courteous and polite, can learn skills quickly, calm, composed, approachable.
Housekeeper	Physical stamina, tactful, diplomatic, calm, courteous and polite, good memory, can work in a team.
Head Chef	Organised, able to accept criticism, physical stamina, creative, attention to detail, can handle highly stressful situations, passion for food and cooking.
Commis chef	Attentive listener, clear communicator, can work in a team, passion for food and cooking, physical stamina, creative.

1.3 Working conditions across the hospitality and catering industry

1.3 Working conditions across the hospitality and catering industry
Employers want to employ most workers when they have busy times

Busy times of year:
- Christmas
- Tourist season
- School holidays
- Mothers day
- valentines

Days of the week:
- Friday
- Saturday
- Sunday
- Pay day

Time of day:
- Lunchtime
- Afternoon
- Dinner time
- (breakfast)

10. Working hours

- Hospitality and Catering jobs tend to be long hours, early starts for breakfast in a hotel to late nights for dinner in a restaurant.
- Staff will still get 2 days off a week but it will be quieter days instead of the weekend
- Shifts could be 6-3. 11-6. 3-11 or other hours.

- Monthly salaried staff may not have set hours eg Head Chef who might work from early morning to late night every day

11. The national Minimum Wage

New minimum wage rates
- 2019-20 (New rate)
- 2018-19

	2018-19	2019-20 (New rate)
25 and over	£8.21	£7.83
21–24	£7.70	£7.38
18–20	£6.15	£5.90
16–17	£4.35	£4.20
Apprentice	£3.90	£3.70

Source: Department for Work and Pensions

BBC

12. Contracts of employment

Full-time and part-time employees must have

1. a written statement of employment or **contract** setting out their duties, rights and responsibilities
2. the statutory minimum level of paid holiday 28 days for full time workers
3. a pay slip showing all deductions, eg National insurance, tax . Earning above £166 a week
4. the **statutory** minimum length of rest breaks- one 20 min break for 6 hrs worked
5. Statutory Sick Pay (SSP) £94.25 pw for 28 weeks (some may get full wages for a limited amount of time)
6. Maternity, paternity and adoption pay and leave-90% of earnings for 6 weeks then ££148.68 for next 33 weeks

Casual staff / Agency staff
- work for specific functions and can be employed through an agency.
- They do not have a contract or set hours of work.
- They are needed at busier times of the year e.g. at Christmas or for weddings, New years eve

Temporary staff
- Employed for a specific length of time such as the summer tourist season or the month of December.
- Temporary staff have the same rights as permanent staff for the duration of their contract.
- Temporary staff employed for longer than 2 years become permanent by law

Zero Hours Contract
This type of contract is between the employer and a worker, where the worker may sign an agreement to be available to work when they are needed, but no specific number of hours or times to start or end work are given. The employer is not required to offer the person any work and the worker is not required to accept the work.

13. Remuneration

Remuneration is a term used for the reward that people receive from working somewhere. It includes their basic pay, plus extra money t top u their income from:
- **Tips and gratuities-** money given to someone by a customer as a way of saying 'thank you' for good service
- **Service charge-** a percentage added to the customers bill to reward the employees who have provided the customer with a service
- **Bonus payments and rewards-** given by some employers as a way of rewarding hard work throughout the year and helping make the business successful.

It is quite common for all he tips, gratuities and service charges to be divided equally amongst all the workers in, e.g. restaurant. This is known as a tronc arrangement, and the person who works out and distributes the extra money is known as a 'troncmaster'.

14. Paid annual leave

- All workers are entitled to 28 days paid leave annually
- **no** legal right for employees to be given Bank and Public Holidays. Most hospitality staff would work these days

To calculate holiday entitlement,
Multiply the full-time entitlement (28 days) by the number of days worked and divide by the number of days full-time staff work
Entitlement for 3 days a week: 28 x 3/5 = 16.8 days

15. Compulsory Rest Breaks

Adult workers are entitled to 24 hours off in each 7 day period and young workers (15-18) are entitled to 2 days in 7.
Adult workers are entitled to at least 20 minutes uninterrupted rest if their working day is longer than 6 hours.
Young workers are entitled to 30 minutes rest if their working day is over 4.5 hours long.

1.4 Factors that affect the **success** of Hospitality and catering providers

16. Reasons for **failure**

1. **A saturated market** – there is a fine line between competition & too many for the number of customers
2. **General business incompetence** – 46% of business fail due to lack of business knowledge
3. Lack of **capital** – not enough money to get through the first few months
4. **Location –** either not enough people walk past (foot-fall) live & work nearby
5. **Quality of life** - most restaurateurs work 60 hours a week – not the glamorous life they thought
6. **Lack of industry experience** – most successful restaurateurs tend to have previous industry experience
7. **Failure to create a good enough brand –** They did not incorporate the 12 Ps of restaurant branding,(Place, Product, Price, People, Promotion, Promise, Principles, Props, Production, Performance, Positioning and Press)
8. **Name of the restaurant is too long-** A restaurant with a name that is brief, descriptive and attractive is more likely to succeed.
9. **Lack of differentiation** -the brand is not different enough
10. **Poor financial controls** – Main costs – labour and food exceeded 60% of sales

17. Factors affecting success
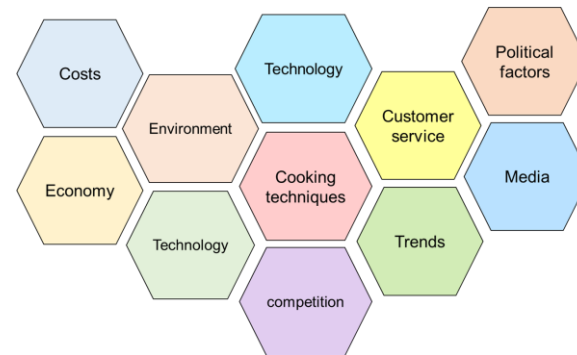
Costs - need to make a profit. Consider cost of everything you buy and selling price.
- Material - Anything involved in making product
- Labour - Costs of staff
- **Overheads** - Anything not connected with making products

Economy - when the economy slows down, business have lower sales as consumers eat out less because they have less disposable income
Environment – 3 R's, packaging, food waste, global warming, carbon footprint, clean eating
Technology - Using technology to improve service, delivery and stock control – touch screen customer ordering, EPOS systems, stock management, apps for delivery services
Emerging and innovative cooking techniques – sous vide, clean eating, steaming, new restaurants,
Customer demographics and lifestyle – delivery services Facebook Twitter
Customer service–customer satisfaction – free WiFi, order online
Competition - Low cost food (£1 menu, coffee McDs espresso v Starbucks)
Trends healthy food options, pop-up bars, cafes and restaurants, cronut, clean eating, low carb, good fats,
Political factors - Increasing regulations – from government due to health issues, Brexit, use of migrant labour, migrants – ethnic foods
Media - Strong global brand, Good community reputation – children's charities / Ronald McDonald House, celebrity chefs, celebrity endorsements, Masterchef,

18. Costs for an establishment
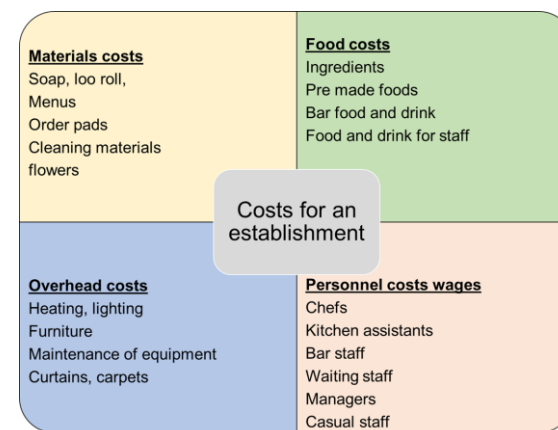
19. Costing a recipe

Costing recipes

In order to calculate selling price and profit for dishes you need to calculate the recipe cost

$$\text{Ingredient cost} = \frac{\text{Pack cost}}{\text{Pack weight}} \times \text{weight used}$$

Divide by the number of portions made for the portion cost

Selling price

$$\text{Selling price} = \frac{\text{Portion cost}}{30} \times 100$$

20. What is portion control?

- Portion control is the amount of each menu item that is served to the customer.
- It depends on the type of customer, the type of food served,
- some foods are served in very small portions due to the high cost of the item eg caviar is served by the teaspoon

LO3 Understand how hospitality and catering provision meets health and safety requirements

3.1 Personal safety responsibilities in the workplace

It is both the employer's and employee's responsibility to make sure they follow health and safety rules at work because:
- They help prevent accidents
- They ensure the business is a safe place to work
- They ensure food is safe to eat

Abbreviation	Full name
HASAWA	Health and safety at work act 1974
RIDDOR	Reporting of injuries diseases and dangerous occurrences regulations 2013
COSHH	Control of substances hazardous to health regulations 2002
PPER	Personal protective equipment at work regulations 1992 http://www.hse.gov.uk/pubns/indg174.pdf
MHR	Manual handling operations regulations 1993

HASAWA 1974

Employers must ensure that:
- Equipment is tested for safety and correctly maintained
- Chemicals are stored and used correctly by trained staff
- **Risk assessments** are completed
- A **health and safety policy statement** is given to employees
- Safety equipment and clothing are provided
- Health and safety training is given and updated regularly

Employees must ensure that they:
- Work in a safe way so they do not put others in danger
- Follow the health and safety rules set by the employer
- Wear safety clothing and equipment provided by the employer
- Report anything that poses a health and safety risk, or something that could be a risk.

Risk assessments : a way of identifying things that could cause harm to people in the workplace	**Health and safety policy statement :** a written statement by an employer of its commitment to health and safety for employees and the public

RIDDOR 2013

This regulation require employers to report certain workplace incidents to the Health and Safety Executive (HSE) such as:
- Death and serious injury (for example serious burns)
- Dangerous occurrences (for example near-miss events such as the collapse of equipment)
- Work-related diseases (for example occupational dermatitis)
- Flammable gas incidents (for example leaking gas)
- Dangerous gas fitting (for example faulty gas cooker)

Employers must also keep a record of any injury, disease or dangerous accident.
An employee must ensure that:
- They tell their line manager or union representative if they see any health and safety issue that concerns them
- Any injury at work are recorded in an accident book

If nothing is done about a health and safety concern that an employee has reported, it can be reported to the HSE.

Unit 1 The Hospitality and Catering Industry
LO1 Understanding the environment in which hospitality and catering providers operate
AC 1.1 The structure of the hospitality and catering industry

COSHH 2002

The control of Substances Hazardous to Health (COSHH Regulations covers substances that are hazardous to health, for example:
- Chemicals, for example cleaning materials
- Fumes, from machinery and cooking processes
- Dusts, for example from icing sugar and flour
- Vapours from cleaning chemicals, for example oven cleaner
- Gases from cookers

Any substances hazardous to health must be:
- Stored, handled and disposed of according to COSHH Regulations
- Identified on the package or container
- Shown in writing and given a risk rating
- Labelled as toxic, harmful, irritant, corrosive, explosive or oxidising.

An employer should ensure that employee use of and exposure to these substances is kept to a minimum.
An employee should ensure that they are trained in the use of these substances. They should take note of the intentional symbols that are used to identify the different types of substances and how they can cause harm

PPER

Personal Protective Equipment (PPE) is clothing or equipment designed to protect the wearer from injury. It is sometimes necessary when cleaning as the chemicals used in the workplace are often stronger that those we may use at home.
These regulations require employers to provide suitable high-quality protective clothing and equipment to employees who may be exposed to a risk to their health and safety while at work. This can include:
- **Gloves** to protect hands from cleaning materials and metallic-style gloves to be used when cutting meat
- **Goggles** to prevent eyes being splashed with chemicals
- **Facemasks** to prevent inhalation of any chemicals or powder
- **Long sleeves** to prevent contact with skin on arms
- Waterproof aprons to be worn on top of clothing

Signs to remind employees what PPE to wear and when should also be visible.
Employees are expected to attend training sessions on how to wear PPE and to wear it in the workplace as instructed by the employer

MHR

The manual Handling Operations Regulations protect employees from injury or accident when they are lifting or moving heavy or awkward shaped boxes. Items that are hot, frozen or sharp may also need to be carried in the hospitality industry-this is also covered by these regulations.
Employers must complete a risk assessment whenever items need to be moved, and provide adequate training.
Employees must be trained in correct manual handling techniques and lifting; moving equipment should be provided when appropriate.

Lifting

When handling boxes, cartons and trays, there is a correct way to lift:
- Always keep your back straight when lifting
- Bend your knees and use the strength in your arms
- Never reach forward
- Keep the item close to your body and make sure you hold the item firmly
- Use protective clothing if there are sharp edges to boxes or cartons
- Never attempt to carry items that are too heavy-always get help.
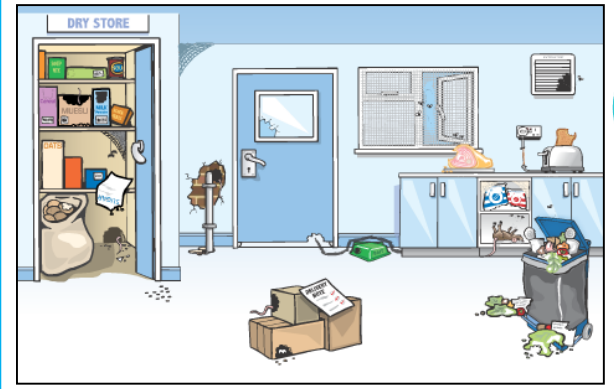
LO3 Understand how hospitality and catering provision meets health and safety requirements

3.2 Risks to personal safety in hospitality and catering

Can you spot the 17 hazards in the image below. Write them down in your book

Potential risks to employees, suppliers and customers

Risk to employees

Stress, fatigue, Using equipment, Trip hazards, Food and drink spillages, Using hazardous chemicals, Inadequate clothing worn, Using electrical appliances, Moving and lifting objects, Fire and explosion, Bullying and harassment, Injuries, Inadequate lighting, Inadequate ventilation, Inadequate signage, Theft, Assault ,Undesirable people on the premises

Risk to suppliers

Using equipment, Trip hazards, Food and rink spillages, Inadequate clothing worn, Moving and lifting objects, Fire and explosion, Injuries, Inadequate lighting, Inadequate signage

Risk to customers

Food poisoning, Food allergies, Trip hazards, Food and drink spillages, Fire and explosion, Theft, Assault, Undesirable people on premises.

Risks to health and personal safety

Risks to health and safety: Using equipment and electrical appliances, Inadequate flooring and trip hazards, Food poisoning and allergies, Using hazardous chemicals, Inadequate clothing worn, Lifting or moving objects, Fire or explosion, Injuries such as burns, scalds, cuts, muscle and back strain, Bullying, harassment, stress and fatigue, Inadequate ventilation causing dust and fumes, Inadequate signage and lighting

Risks to security

Security risks: Theft, Burglary, Robbery, Fraud, Assault, Vandalism, Arson, Undesirable people on the premises, Terrorist attack

Levels of risks

A risk assessment should be carried out to identify risks. It is a way of identifying things that could cause harm to people in the workplace. All workplaces must have the necessary risk assessments in place. In business there are five steps to risk assessment:
1. Identify the hazard
2. Decide who might be hard and how
3. Evaluate the risk and decide on **controls** (precautions)
4. Record the findings and implement them.
5. Review the assessment and update if necessary.

Calculating Risk

It is possible to calculate whether the level of **risk** is high, medium, or low. To do this, the **hazard** severity and the likelihood of it happening are given a score on a scale of one to five. They can then be multiplied together to give a level of risk. The overall aim is to reduce the risk to an acceptable level (as close to 1 as possible)

Scales used to calculate the level of risk:

Hazard severity	Likelihood of occurrence	Scale
Trivial	Remote(almost never)	1
Minor	Unlikely (occurs rarely)	2
Moderate	Possible (uncommon)	3
Serious	Likely (not frequent)	4
Fatal	Very likely (frequently)	5

Level of risk = hazard severity X likelihood of occurrence

Low risk 1-8	Medium risk 9-12	High risk 15-25
Continue to review regularly to ensure controls remain effective	Continue but implement additional controls where possible and monitor regularly	Stop the activity]Identify new controls Activity must not proceed until risks are reduced to a low or medium level

LO3 Understand how hospitality and catering provision meets health and safety requirements

3.3 Personal safety control measures for hospitality and catering provision

Control measures for employees

The control measures outlined in the table can be put in place to help protect employee's personal safety

Hazard	Control
Stress, fatigue	Employees need to be monitored closely and adequate rest breaks should be allocated
Using equipment	The instruction manual needs to be followed, with training given if needed
Trip hazards	Floors need to be clutter free; exits and entrances need to be clear
Food and rink spillages	Clear up spillages immediately and use warning signs
Using hazardous chemicals	Wear protective clothing where necessary; training should be given on use of chemical; chemicals should be stored correctly; COSHH regulations need to be followed
Inadequate clothing worn	The correct PPE should be worn at all times; wear aprons that are done up correctly; shoe laces should be tied up.
Using electrical appliances	The equipment should be maintained and cleaned regularly; training should be given if necessary; it should be given if necessary; it should be PAT tested regularly by a qualified electrician
Moving and lifting objects	Wear correct PPE; training on safe lifting techniques should be given

Control measures for employees cont.

Hazard	Control
Fire and explosion	Under the Fire Safety Order 2005, employers must ensure there is a low risk of fire and explosion by: • Having fire alarms and making sure they are tested regularly • Making sure escape routes are clear and adequately signed • Having suitable equipment such as fire extinguishers available
Bullying and harassment	Protocols and policies should be in place to ensure that this does not happen; there should be an open culture if anyone needs to report it.
Injuries	Kitchens and restaurants can be dangerous places- there should be a first aid kit and a trained first aider
Inadequate lighting	Lighting must be bright enough to work safely in; if a light is broken it should be fixed
Inadequate ventilation	Good ventilation is needed in a catering kitchen; this is normally provided by extractor fans, which remove steam, heat and smells; the kitchen may be hot so drinking water should be available
Inadequate signage	Signs need to be clear and visible; staff need to be made aware of what the signs mean
Theft	A secure area should be available for staff to leave personal belongings
Assault	Train staff on how to deal with aggressive customers and diffuse volatile situations
Undesirable people on premises	Have a security system to monitor who is entering the premises; any suspicious person should be reported; effective signage in and out procedures are required.

Control measures for customers

Hazard	Control
Food poisoning	Hazard Analysis and Critical Control Point (HACCP) systems put in place to ensure food prepared, cooked and served is safe to eat
Food allergies	Detailed information must be given to customers on any allergens in the dishes
Trip hazards	Make sure areas where customers go are well lit and that there are no trailing wires or clutter on the floor
Food and drink spillages	Spillages must be cleared up straight away and appropriate signage used
Fire and explosions	Emergency exits must be well lit and signposted; fire extinguishers should be in place and staff should be trained in how to use them
Assault	Staff should be ensure the safety of customers if another person is aggressive
Theft/fraud	Ensure that card transactions are done in front of the customer; provide a secure place for their belongings
Undesirable people on premises	Any suspicious person should be challenged and not allowed to mix with customers

Keywords

Extended reading

Exam question

Video links

Revision Techniques

What is Urbanisation?

This is an increase in the amount of people living in urban areas such as towns or cities. In 2007, the UN announced that for the first time, more than 50 % of the world's population live in urban areas.

Where is Urbanisation happening?

Urbanisation is happening all over the word but in LICs and NEEs rates are much faster than HICs. This is mostly because of the rapid economic growth they are experiencing.
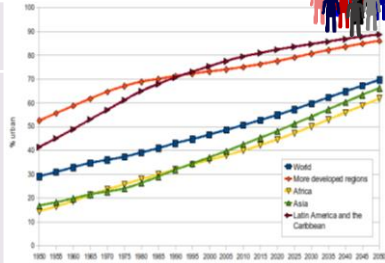
Causes of Urbanisation

Rural - urban migration (1) | **The movement of people from rural to urban areas.**

Push
- Natural disasters
- War and Conflict
- Mechanisation
- Drought
- Lack of employment

Pull
- More Jobs
- Better education & healthcare
- Increased quality of life.
- Following family members.

Natural Increase (2) | **When the birth rate exceeds the death rate.**

Increase in birth rate (BR)
- High percentage of population are child-bearing age which leads to high fertility rate.
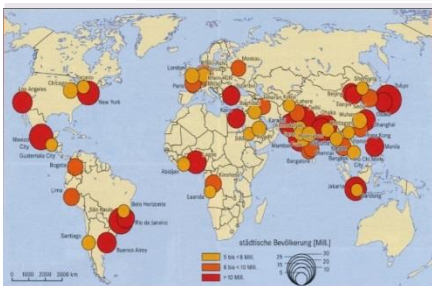- Lack of contraception or education about family planning.

Lower death rate (DR)
- Higher life expectancy due to better living conditions and diet.
- Improved medical facilities helps lower infant mortality rate.

Types of Cities

Megacity | An urban area with over **10 million people** living there.

More than two thirds of current megacities are located in either NEEs (Brazil) and LICs (Nigeria). The amount of megacities are predicted to increase from 28 to 41 by 2030.

Sustainable Urban Living

Sustainable urban living means being able to live in cities in ways that do not pollute the environment and using resources in ways that ensure future generations also can use then.

Water Conservation

This is about reducing the amount of water used.
- Collecting rainwater for gardens and flushing toilets.
- Installing water meters and toilets that flush less water.
- Educating people on using less water.

Energy Conservation

Using less fossil fuels can reduce the rate of climate change.
- Promoting renewable energy sources.
- Making homes more energy efficient.
- Encouraging people to use energy.

Creating Green Space

Creating green spaces in urban areas can improve places for people who want to live there.
- Provide natural cooler areas for people to relax in.
- Encourages people to exercise.
- Reduces the risk of flooding from surface runoff.

Waste Recycling

More recycling means fewer resources are used. Less waste reduces the amount that eventually goes to landfill.
- Collection of household waste.
- More local recycling facilities.
- Greater awareness of the benefits in recycling.

Y10 Geography

AQA

Urban Issues & Challenges

Sustainable Urban Living Example: Freiburg

Background & Location

Freiburg is in west Germany. The city has a population of about 220,000. In 1970 it set the goal of focusing on social, economic and environmental sustainability.

Sustainable Strategies
- The city's waste water allows for rainwater to be retained.
- The use of sustainable energy such as solar and wind is becoming more important.
- 40% of the city is forested with many open spaces for recreation, clean air and reducing flood risk.

Integrated Transport System

This is the linking of different forms of public and private transport within a city and the surrounding area.

Brownfield Site

Brownfield sites is an area of land or premises that has been previously used, but has subsequently become vacant, derelict or contaminated.

Traffic Management

Urban areas are busy places with many people travelling by different modes of transport. This has caused urban areas to experience different traffic congestion that can lead to various problems.

Environmental problems
- Traffic increases air pollution which releases greenhouse gases that is leading to climate change.

Economic problems
- Congestion can make people late for work and business deliveries take longer. This can cause companies to loose money.

Social Problems
- There is a greater risk of accidents and congestion is a cause of frustration. Traffic can also lead to health issues for pedestrians.

Congestion Solutions
- Widen roads to allow more traffic to flow easily.
- Build ring roads and bypasses to keep through traffic out of city centres.
- Introduce park and ride schemes to reduce car use.
- Encourage car-sharing schemes in work places.
- Have public transport, cycle lanes & cycle hire schemes.
- Having congestion charges discourages drivers from entering the busy city centres.

Traffic Management Example: Bristol

In 2012 Bristol was the most congested city in the UK. Now the city aims to develop it's integrated transport system to encourage more people to use the public transport. The city has also invested in cycle routes and hiring schemes.

Greenbelt Area

This is a zone of land surrounding a city where new building is strictly controlled to try to prevent cities growing too much and too fast.

Urban Regeneration

The investment in the revival of old, urban areas by either improving what is there or clearing it away and rebuilding.

Urban Change in a Major UK City: Bristol Case Study

Location and Background

Bristol is the largest city in the south west of England. It has a population of 440500. The population is expected to reach half a million by 2029.

City's Importance

- It holds a strategic position on the M4 corridor with easy access to London and rail and ferry services across Europe.
- Bristol airport links the city to major European centres and the USA.
- There has been a change in from the dependence of traditional industry like tobacco and paper, to the development of global industries such as finance and business, service, aerospace and defence
- There has been a high level of inward investment, including FDI (Foreign Direct Investment).
- Bristol University attracts students from all over the world.

Migration to Bristol

Between 1851 and 1891 Bristol's population doubled as people arrived looking for work. In recent years migration from abroad has accounted for about half of Bristol's population growth. This has included large numbers from EU countries, in particular Poland and Spain. Compared to elsewhere in the UK, a higher proportion of migrants coming to Bristol intend to stay permanently.

City's Opportunities

Social: Bristol's youthful population means there is a vibrant underground music scene. Bristol has two professional football teams and a rugby union team.

Economic: High-Tech industries have developed. There are 50 micro-electronic and silicon design businesses in Bristol.

Environmental: In 2015 Bristol became the first UK city to be awarded the status of European Green Capital.

City Challenges

Social: Inequalities: Filwood has more than a third of its population living in very low income households. Stoke Bishop on the other hand is home to many millionaires.

Economic: Changes in the economy and industry have led to challenges areas have become run down and high concentration of redundant buildings

Environmental: The amount of waste produced in Bristol is 23% lower than the UK average, however, the city still produces over half a million tonnes a year.

Temple Quarter Regeneration

Aims: The target is to create 4000 new jobs by 2020 and 17000 by 2037. There will be 240000m2 of new or refurbished buildings.

Main features: Bristol Arena that can house up to 12,000 spectators and Brunel's Engine Shed. A new 1.7million innovation centre, home to high-teach creative and low-carbon sector companies. This will add to Bristol's importance as a major UK high-tech centre.

Urban Change in a Major NEE City: RIO DE JANEIRO Case Study

Location and Background

Rio is a coastal city situated in the South East region of Brazil within the continent of South America. It is the second most populated city in the country (6.5 million) after Sao Paulo.

City's Importance

- Has the second largest GDP in Brazil It is headquarters to many of Brazil's main companies, particularly with Oil and Gas.
- Sugar Loaf mountain is one of the seven wonders of the world.
- One of the most visited places in the Southern Hemisphere.
- Hosted the 2014 World Cup and 2016 Summer Olympics.

Migration to Rio De Janeiro

The city began when Portuguese settlers with slaves arrived in 1502. Since then, Rio has become home to various ethnic groups.

However, more recently, millions of people have migrated from rural areas that have suffered from drought, lack of services and unemployment to Rio. People do this to search for a better quality of life.

This expanding population has resulted in the rapid urbanisation of Rio de Janeiro.

City's Opportunities

Social: Standards of living are gradually improving. The Rio Carnival is an important cultural event for traditional dancing and music.

Economic: Rio has one of the highest incomes per person in the country. The city has various types of employment including oil, retail and manufacturing.

Environmental: The hosting of the major sporting events encouraged more investment in sewage works and public transport systems.

City Challenges

Social: There is a severe shortage of housing, schools and healthcare centres available. Large scale social inequality, is creating tensions between the rich and poor.

Economic: The rise of informal jobs with low pay and no tax contributions. There is high employment in shanty towns called Favelas

Environmental: Shanty towns called Favelas are established around the city, typically on unfavourable land, such as hills.

Self-help schemes - Rocinha, Bairro Project

- The authorities have provided basic materials to improve peoples homes with safe electricity and sewage pipes.
- Government has demolished houses and created new estates.
- Community policing has been established, along with a tougher stance on gangs with military backed police.
- Greater investment in new road and rail network to reduce pollution and increase connections between rich and poor areas.

Relief of the UK

Relief of the UK can be divided into uplands and lowlands. Each have their own characteristics.
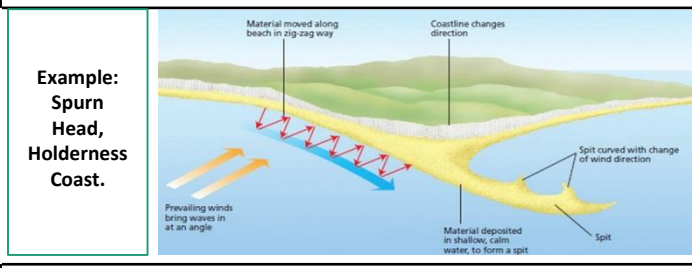
Key

Lowlands

Uplands

Areas +600m: Peaks and ridges cold, misty and snow common. i.e. Scotland

Areas -200m: Flat or rolling hills. Warmer weather. i.e. Fens

Types of Erosion

The break down and transport of rocks – smooth, round and sorted.

Attrition	Rocks that bash together to become smooth/smaller.
Solution	A chemical reaction that dissolves rocks.
Abrasion	Rocks hurled at the base of a cliff to break pieces apart.
Hydraulic Action	Water enters cracks in the cliff, air compresses, causing the crack to expand.

Types of Transportation

A natural process by which eroded material is carried/transported.

Solution	Minerals dissolve in water and are carried along.
Suspension	Sediment is carried along in the flow of the water.
Saltation	Pebbles that bounce along the sea/river bed.
Traction	Boulders that roll along a river/sea bed by the force of the flowing water.

Mass Movement

A large movement of soil and rock debris that moves down slopes in response to the pull of gravity in a vertical direction.

1	Rain saturates the permeable rock above the impermeable rock making it heavy.
2	Waves or a river will erode the base of the slope making it unstable.
3	Eventually the weight of the permeable rock above the impermeable rock weakens and collapses.
4	The debris at the base of the cliff is then removed and transported by waves or river.

Types of Weathering

Weathering is the breakdown of rocks where they are.

Carbonation	Breakdown of rock by changing its chemical composition.
Mechanical	Breakdown of rock without changing its chemical composition.
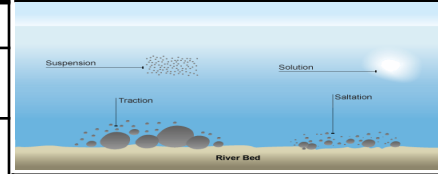
What is Deposition?

When the sea or river loses energy, it drops the sand, rock particles and pebbles it has been carrying. This is called deposition.

Formation of Coastal Spits - Deposition

Example: Spurn Head, Holderness Coast.

1) Swash moves up the beach at the angle of the prevailing wind.
2) Backwash moves down the beach at 90° to coastline, due to gravity.
3) Zigzag movement (Longshore Drift) transports material along beach.
4) Deposition causes beach to extend, until reaching a river estuary.
5) Change in prevailing wind direction forms a hook.
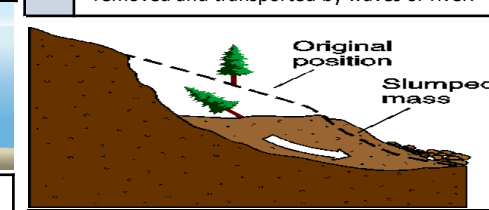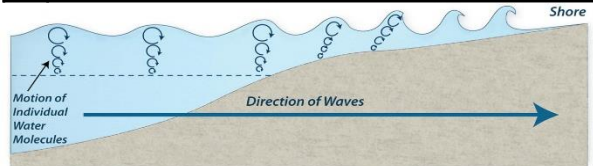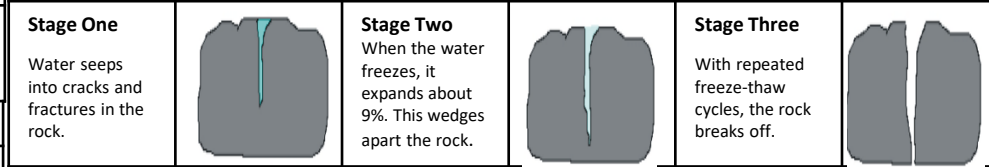6) Sheltered area behind spit encourages deposition, salt marsh forms.

Unit 1c
Physical Landscapes in the UK

AQA

Formation of Bays and Headlands

Bay — Soft rock

Hard rock

Headland

1) Waves attack the coastline.
2) Softer rock is eroded by the sea quicker forming a bay, calm area cases deposition.
3) More resistant rock is left jutting out into the sea. This is a headland and is now more vulnerable to erosion.

Formation of Coastal Stack

Example: Old Harry Rocks, Dorset

1) Hydraulic action widens cracks in the cliff face over time.
2) Abrasion forms a wave cut notch between HT and LT.
3) Further abrasion widens the wave cut notch to from a cave.
4) Caves from both sides of the headland break through to form an arch.
5) Weather above/erosion below –arch collapses leaving stack.
6) Further weathering and erosion eaves a stump.

How do waves form?

Waves are created by wind blowing over the surface of the sea. As the wind blows over the sea, friction is created - producing a swell in the water.

Why do waves break?

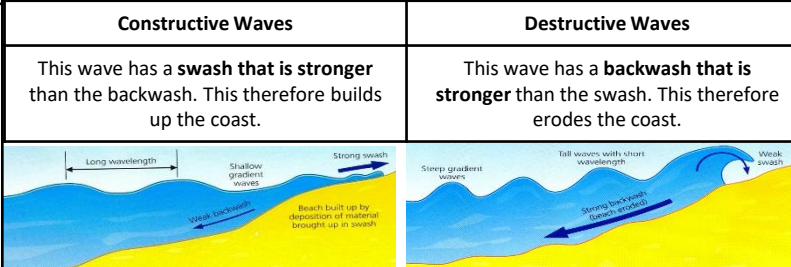|	
1	Waves start out at sea.
2	As waves approaches the shore, friction slows the base.
3	This causes the orbit to become elliptical.
4	Until the top of the wave breaks over.

Mechanical Weathering Example: Freeze-thaw weathering

Stage One — Water seeps into cracks and fractures in the rock.

Stage Two — When the water freezes, it expands about 9%. This wedges apart the rock.

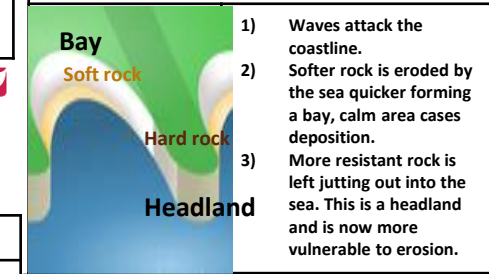**Stage Three** — With repeated freeze-thaw cycles, the rock breaks off.

Size of waves

- Fetch how far the wave has travelled
- Strength of the wind.
- How long the wind has been blowing for.

Types of Waves

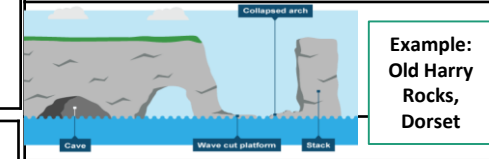### Constructive Waves

This wave has a **swash that is stronger** than the backwash. This therefore builds up the coast.

Destructive Waves

This wave has a **backwash that is stronger** than the swash. This therefore erodes the coast.

Coastal Defences

Hard Engineering Defences

Groynes	Wood barriers prevent longshore drift, so the beach can build up.	✓ ✗	**Beach still accessible.** **No deposition further down coast = erodes faster.**
Sea Walls	Concrete walls break up the energy of the wave . Has a lip to stop waves going over.	✓ ✓ ✗	**Long life span** **Protects from flooding** **Curved shape encourages erosion of beach deposits.**
Gabions or Rip Rap	Cages of rocks/boulders absorb the waves energy, protecting the cliff behind.	✓ ✓ ✗	**Cheap** **Local material can be used to look less strange.** **Will need replacing.**

Soft Engineering Defences

Beach Nourishment	Beaches built up with sand, so waves have to travel further before eroding cliffs.	✓ ✓ ✗ ✗	**Cheap** **Beach for tourists.** **Storms = need replacing.** **Offshore dredging damages seabed.**
Managed Retreat	Low value areas of the coast are left to flood & erode.	✓ ✓ ✗	**Reduce flood risk** **Creates wildlife habitats.** **Compensation for land.**

Case Study: Lyme Regis

Issues- Lyme Regis is a Jurassic Coastline(fossils) and a key tourist location in South of England.
Much of the town is built on unstable cliffs, with a rapidly eroding coastline dues to waves from SW. Many properties have been destroyed and seawall breached.

How the coastline is managed – The initial scheme was set up in the early 90's, and the works were completed in 2015.
Phase 1 – Completed 1995 (sea wall & promenade constructed) In winter 2003-04 an emergency project stabilised the cliffs.
Phase 2 – Costs of £22 million – new sea wall, promenade, creation of wide, shingle beach. Extension of rock armour.
Phase 3 – Plan not undertaken.
Phase 4 – 2013-15: Cost £20 million, involving the east coastline – 390m seawall constructed in front of old sea wall. Extensive nailing, piling and drainage applied to stabilise the cliffs.

Outcomes -
-+ outcomes: new beaches increased visitor numbers, new defences stood up to the recent storms and the harbour is now better protected for the fishermen.

-: Increased visitor numbers have led to conflicts due to increased congestion and litter, new sea wall interferes with coastal processes and stabilising cliffs may reveal fossils.

Precipitation	Moisture falling from clouds as rain, snow or hail.
Interception	Vegetation prevent water reaching the ground.
Surface Runoff	Water flowing over surface of the land into rivers
Infiltration	Water absorbed into the soil from the ground.
Transpiration	Water lost through leaves of plants.

Physical and Human Causes of Flooding.

Physical: Prolong & heavy rainfall Long periods of rain causes soil to become saturated leading runoff.	*Physical:* Geology Impermeable rocks causes surface runoff to increase river discharge.
Physical: Relief Steep-sided valleys channels water to flow quickly into rivers causing greater discharge.	*Human:* Land Use Tarmac and concrete are impermeable. This prevents infiltration & causes surface runoff.

Upper Course of a River

Near the source, the river flows over steep gradient from the hill/mountains. This gives the river a lot of energy, so it will erode the riverbed vertically to form narrow valleys.

Formation of a Waterfall

1) River flows over alternative types of rocks.
2) River erodes soft rock faster creating a step.
3) Further hydraulic action and abrasion form a plunge pool beneath.
4) Hard rock above is undercut leaving cap rock which collapses providing more material for erosion.
5) Waterfall retreats leaving steep sided gorge.

Middle Course of a River

Here the gradient get gentler, so the water has less energy and moves more slowly. The river will begin to erode laterally making the river wider.

Formation of Ox-bow Lakes

	Step 1		Step 2
	Erosion of outer bank forms river cliff. Deposition inner bank forms slip off slope.		Further hydraulic action and abrasion of outer banks, neck gets smaller.
	Step 3		**Step 4**
	Erosion breaks through neck, so river takes the fastest route, redirecting flow		Evaporation and deposition cuts off main channel leaving an oxbow lake.

Lower Course of a River

Near the river's mouth, the river widens further and becomes flatter. Material transported is deposited.

Formation of Floodplains and levees

When a river floods, fine silt/alluvium is deposited on the valley floor. Closer to the river's banks, the heavier materials build up to form natural levees.

✓ Nutrient rich soil makes it ideal for farming.
✓ Flat land for building houses.

River Management Schemes

Soft Engineering	Hard Engineering
Afforestation – plant trees to soak up rainwater, reduces flood risk. **Demountable Flood Barriers** put in place when warning raised. **Managed Flooding** – naturally let areas flood, protect settlements.	**Straightening Channel** – increases velocity to remove flood water. **Artificial Levees** – heightens river so flood water is contained. **Deepening or widening river** to increase capacity for a flood.

Hydrographs and River Discharge

River discharge is the volume of water that flows in a river. Hydrographs who discharge at a certain point in a river changes over time in relation to rainfall

1. **Peak discharge** is the discharge in a period of time.	
2. **Lag time** is the delay between peak rainfall and peak discharge.	
3. **Rising limb** is the increase in river discharge.	
4. **Falling limb** is the decrease in river discharge to normal level.	

Case Study: The River Tees

Location and Background
Located in the North of England and flows 137km from the Pennines to the North Sea at Red Car.

Geomorphic Processes
Upper – Features include V-Shaped valley, rapids and waterfalls. Highforce Waterfall drops 21m and is made from harder Whinstone and softer limestone rocks. Gradually a gorge has been formed.
Middle – Features include meanders and ox-bow lakes. The meander near Yarm encloses the town.
Lower – Greater lateral erosion creates features such as floodplains & levees. Mudflats at the river's estuary.

Management
-Towns such as Yarm and Middleborough are economically and socially important due to houses and jobs that are located there.
-Dams and reservoirs in the upper course, controls river's flow during high & low rainfall.
- Better flood warning systems, more flood zoning and river dredging reduces flooding.

RO33: Supporting individuals through life event (Live assessment/course work)

KEY TERMS

Topic 1: Life Stages and development

4-10 years: childhood

11-18 years: adolescence

19-45 years: young adult

46-65 years: middle adulthood

65+ years: older adult

Task 1: You will be set a task on growth and development trough a life stage, this can be any of the 5 studied set by the exam board.

Factors affecting growth and development across life stages
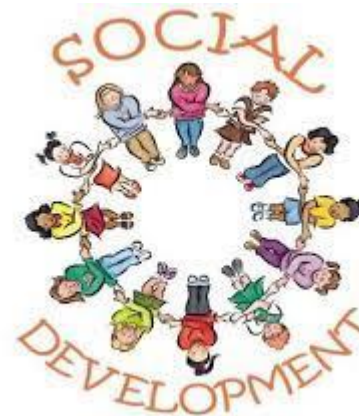**Physical factors**
Social Factors
Emotional Factors
Economic Factors
Cultural Factors
Environmental Factors

PIES: You need to know them
Physical: fine and gross motor skills, mobility, body changes, menopause, ageing characterises.
Intellectual: language development,
Emotional: Bonding, different attachments, independence, self-confidence, self image, self esteem.
Social: relationships, social skills and responsibilities.

2.1 IMPACTS OF LIFE EVENTS
Example of Factors

- Physical Factors: Diet and nutrition, activities, lifestyle choices eg alcohol, smoking, genetics, physical and mental health, disability, sensory impairment.

- Social Factors: positive and negative relationships, social inclusion/exclusion, opportunities, discrimination bullying.

- Emotional Factors: anxiety, fear, sadness, happiness, grief, attachments, family security.

- Cultural Factors: Community, religion, race, gender, sexual orientation.

- Environmental Factors: housing needs and conditions, pollution (air, noise light), neighbourhood, home environment (neglect, conflict), access to services.

EXPECTED AND UNEXPECTED LIFE EVENTS AND IMPACTS

PHYSICAL EVENTS: accidents, injury, illness, genetic disorders, puberty, menopause.
RELATIONSHIP CHANGES: starting/ending relationships, divorce/separation, parenthood, bereavement.
LIFE CIRCUMSTANCES: school starting/changing/exclusion, redundancy, imprisonment, retirement, bankruptcy.

IMPACTS:
Physical: illness/tiredness, pain, weight loss/gain, appearance.
Intellectual: adapting to change, learning new skills. Learning impairment.
Emotional: mental health, grief, anxiety, stress, depression, self-esteem/self-image.
Social: lifestyle choices, personal relationships with friends and family.
Financial: change in income, increases costs change in wealth.
INDIVIDUALS NEEDS EXAMPLES:
Weight gain-dietary advice and support.
Stress/anxiety-coping mechanisms, someone to talk to, mental health support.
Loss of income- financial advice and support
Learning impairment-specialist support, independent living, equipment.

3.1 Sources of support that meet individual needs

KEY WORDS

FORMAL

INFORMAL

CHARITIES

TYPES OF SERVICES

FORMAL: Hospitals, health centres, care homes, day centres, children's services, hospices, respite care, rehabilitation centres, (addiction)

INFORMAL: family/friends, religion/culture

CHARITIES: Relate, Gingerbread, Cruse, Age UK, MIND, specialist charities

WHAT YOU MUST KNOW!
ROLE OF PRACTITIONERS AND INFORMAL CARERS
HOW PRACTITIONERS MEET INDIVIDUAL NEEDS AND HOW THIS SUPPORTS SERVICE USERS

Task 2b: You will be set a task on researching and recommending support to meet individual needs, this may be on a local or national level.

PRACTIONERS EXAMPLES:

G.P

NURSE

MIDWIFE

SPECIALIST DOCTOR

PHYSIOPHERAPIST

DIETICIAN

SOCIAL WORKER

COUNSELLOR

OCCUPATIONAL THERAPIST

HEALTH CARE WORKER

CHARITY WORKERS

Year 10 British Medicine History KO.

Medieval 13th to 16th Centuries
Ideas on cause of disease
Four Humours: Idea by Hippocrates that body contained 4 humours (blood, black bile, yellow bile, phlegm)

that when imbalanced, made you ill, for example nosebleed = too much blood, that needed to be got rid of
Church supported idea of 4 Humours and people thought it made sense
Physicians used Urine Charts, linked to humours to diagnose illness
Miasma: Bad air called Miasma causes disease, caused by dirt/waste
God: Church taught God caused disease to test faith or for punishment
Supernatural: Astrologists blamed stars & planets for illness. Movement of Mars/Jupiter caused Black Death. People also superstitious, e.g. witches
Treatment of Disease
Four Humours: Galen's 'T*heory of Opposite*s' used to treat humour with opposite, phlegm= have hot/spicy food
Leeching, Cupping, to move bad blood
Purging with herbs, draw out humours
Herbal Remedies: Wise women gave homemade remedies that did work e.g. honey for infection, mint for stomach
Religious: Prayers, pilgrimage to shrine
Surgery: Barber surgeons used trepanning to remove demons from skulls, basic antiseptic like wine, experienced in times but high chance of death due to dirty tools, high risk of infection and no anatomical knowledge
Supernatural: eg. crushed magpie beak

Prevention of disease
Most people thought ONLY god could prevent disease, so focus on prayer, fasting
Rich used *Regmin sanitis*: eat & live healthy
Wearing amulets/charms for protection
Herbs and ringing bells to remove miasma
Public Health
Poor public health, dirty towns, water supplies and a lack of waste. No government spending but some cities employed rakers (12 in London) and installed cesspits and water supply (York)
Care & Hospitals
Physicians: trained by church at university, no anatomical knowledge as dissection was banned. Took observation and diagnosed
Apothecaries: Chemists who made herbal remedies, experienced but no training
Wise Woman: Local woman with medical skills such as midwifery & making remedies
Hospitals: First in 1123, ran by the church. Offered 'care not cure' , thought God would do it. Turned away those with diseases.
Black Death 1348-9
Causes: blamed on God, Planets, Jews and Miasma but no one knew it was rats
Treatment: Popping buboes, praying, spells
Prevention: Flagellants whipped themselves
Public Health: Govt. introduced quarantine
Progress?
Very little progress overall, continuity!
Factors for/against progress
Church: Church controlled everything and people afraid of God, limited change. They controlled education and ideas on disease, which support Hippocrates/Galen's ideas so no one dared or wanted to challenge ideas as if you challenged Church, you were God!
Tradition: Many simply respected tradition, e.g. Hippocrates/Galen and saw ideas as rational and respected. Galen wrote 300 books, so why bother looking for change?
Government: King and government spent nothing, only during Black Death

Renaissance 16th to 18th Centuries
Ideas on cause of disease
Change: Fewer people believed in supernatural or religious causes (reducing power of the Church in Reformation). Scientific thinking spreads, idea seeds in air may spread disease. Less use of Urine Chart
Thomas Sydenham promotes 'direct observation' of patients not using books
Continuity: Miasma theory continued and stayed popular whilst Four Humours continued, even used on King Charles II. People believed God caused Plague, 1666
Treatment of Disease
Change: Little change over the period
Alchemy: Over 122 chemical cures like Mercury to cure Smallpox but dangerous
Transference: Idea illness could be transferred to an object like an onion
New Remedies: New World (USA) brought herbs/spices like quinine for dysentery
Continuity: **Large amounts of continuity**
Herbal remedies remained popular
Bleeding and purging the Four Humours, even Charles II was and during Great Plague
Religious: People still believed God cured, 92,000 touched Charles II hand to cure scrofula. Many still prayed in Great Plague
Care & Hospitals
Change: Physicians had better access to medical books due to printing press, impact of Vesalius improved knowledge of anatomy. Dissection now allowed
Surgeons/Apothecaries could join guilds to get training to become masters : Over 122
Hospitals: More hospitals treating sick but Henry VIII closed monastery run hospitals
Pest house for contagious disease & some charity hospitals opened with physicians who focused on treatment not religion
Continuity: Large amounts of continuity
Physicians continued to be too expensive, most care done in the home by women
Most hospitals continued, no contagious

Prevention of Disease
Emphasis on removing Miasma: draining swamps & clearing rubbish. Closing bathhouses to stop Syphilis spread
The Scientific Revolution
Royal Society (1660) set up and given £ by Charles II, encouraged science printed scientific book '*Philosophical transactions*' e.g. Van Leeuwenhoek seeing of bacteria
Vesalius Italian professor who carried out dissection, improved understanding of anatomy and proved Galen wrong (Jaw) which encouraged others to challenge Galen/do dissections. Work printed in UK
William Harvey Royal physicians, did public dissections and recorded symptoms, not using books. Used Vesalius ideas to prove Galen wrong about blood circulation through arteries & veins. Ideas then taught in medical schools and encouraged further challenge of ideas
Thomas Sydenham Doctor, published *Observationes Medicae*, challenged four humours and suggested direct observation of patients symptoms. Part of Royal Society
Great Plague 1666-7
Causes: Most people blamed for Miasma, realised could be passed between people
Treatment: Similar to Black Death, many visited Quack Doctors & used transference
Prevention: Plague Doctors advised herbs
Public Health: Govt did much more, closed theatres, killed cats/dogs, burnt tar, carts collected the dad and quarantined houses
Factors for/against progress
Church: Decline of church power in reformation, allowed new ideas/dissection
Tech: Printing press allowed spread of ideas to challenge church and new scene ideas
Government: King supported scientific revolution, govt. action in Great Plague
Individuals: Sydenham, Vesalius, Harveru
BUT, little short term change as old ideas continued and new ones slow to spread

Industrial 18th to 20th Centuries

Ideas on cause of disease
Change: Considerable changes
Early scientists using microscopes so bacteria could be seen, led to theory of **Spontaneous Generation**, germs produced by decaying matter (waste)
Pasteur: Publishes Germ Theory 1861, proves SG wrong and that microbes in air cause decay and possibly disease
Koch: Proves Pasteur right that germs cause disease: TB 1882, Cholera 1883
Little impact at first, BUT eventually inspired Lister and other doctors
Continuity: Miasma theory remained

Treatment of Disease
Change: Significant change
Religious, supernatural, 4 humours gone
Surgery: Huge change in surgical treatment
Antiseptics: Using the Germ Theory, Joseph Lister developed first antiseptic: Carbolic Acid in 1867. Greatly reduced infection in surgery and help led to Aseptic Surgery (by 1900 Operating Theatres were sterilised: equipment, patients & clothing)
Anaesthetics: Before 1800 alcohol used, then tests with Ether, Laughing Gas until Simpson developed Chloroform in 1847. Worked well but incorrect dosage led to deaths (Surgery Black Period). Cocaine then developed as first local anaesthetic
However, many doctors reluctant to believe Germ Theory, so growth of antiseptics & anaesthetics was slow at first but long term there was huge impact as surgery became more complex (First heart surgery 1896)

Prevention of disease
Edward Jenner, English doctor focused on wiping out Smallpox and in 1798 proves vaccination could prevent it. Slow to be used and only from 1852 did government make it compulsory as doctors resistant
Pasteur/Koch then develops it using GT to find vaccinations for Cholera 1883

Care & Hospitals
Florence Nightingale: trained as nurse, led nurse team in Crimean war, encouraged hygiene, clean air and training for nurses. Wrote books & opened Royal College of Nursing to train nurses/midwives
Change: New hospitals opened by charities, small Cottage hospitals with Nurses & Doctors from 1859. Nurses given more training, hospitals cleaner (Aseptic) due to Germ Theory. Old, Sick or Poor still had to visit workhouses but eventually infirmaries opened for the poor. Specialist hospitals for mentally sick (Asylums)
Rich could pay doctors to visit at home.
Continuity: Still had to pay for treatment

Public Health
Government began to take steps to improve, end of the Laissez Faire policy
Public Health Act, 1975: authorities had to provide: clean water, sewers, public toilets, health officers and monitor buildings

Cholera, 1854
Causes: blamed on Miasma/Spont Gen but John Snow identified it was dirty water
Treatment: No treatment
Prevention: No immediate change but long term changes: sewage system, clean water
Public Health: Led to Public Health Act 1875

Progress?
Large amounts of progress (hospitals, surgery, cause of disease) but still low age expectancy (46) and most people did not experience changes to medicine/health yet especially the poor, as there was nothing

Factors for/against progress
Government: Government finally began to spend on health (Vaccinations/Public Health Act) which was first time in history
Individuals: Medieval & scientific Improvements pushed by Jenner, Lister, Pasteur, Koch and Simpson
Science/Tech: Development of microscopes, laboratories for discoveries

Modern 21st Century

Ideas on cause of disease
Change: Germ Theory only found bacteria cause, now improvements in genetic causes and diagnosis
Genetics: DNA identified by Crick/Watson in 1953, and then Human Genome Project allowed doctors to identify genetics diseases like Parkinson's and Alzheimer's. However, no treatment yet but can test/prevent Downs Syndrome in embryo
Diagnosis: Specific methods to diagnose e.g. CT Scans, Ultrasounds, Blood Tests, X Rays, MRI Scans, ECGs Scans could now test for; cancer, broken bones or diabetes. Huge improvement
Lifestyle: Understood impact of lifestyle on health; smoking, drinking and diet

Treatment of Disease
Change: More huge change in period
Antibiotics: Paul Ehrlich develops first **Magic Bullet** (**Salvarsan 606**) in 1914 to attack infections in body, chemical cure **Prontosil**, 2nd Magic Bullet developed which helped post-natal infection drop from 20% to 5%. Still not widely used
Penicillin: huge breakthrough with accidental discovery of penicillin by Fleming, then developed by Florey and Chain in 1938 to create pure penicillin. America funded production, NHS then made it free for all to treat most bacteria infections like pneumonia – huge impact!
But, growth of penicillin resistant bugs
Surgery: Key hole surgery to limit impact of surgery, microsurgery to help transplants (heart 1967) and anaesthetics now perfected.
Modern Treatments: New drugs like Aspirin to cure painkillers/fever, X-Rays for radiotherapy, blood transfusions, dialysis machines and prosthetic limbs

Prevention of Disease
Vaccination: National vaccination campaign for Diphtheria 1942 and Polio eradicated by 1984 due to compulsory vaccinations.
Lifestyle Campaigns: Understanding of causes led to specific campaigns, e.g. Stoptober to stop smoking for a month and everyone gets a free health check over 40
Government Actions: New laws to to provide a healthy environment for UK, e.g. Clean Air Act 1956 & Smoking Ban 2007.

Care & Hospitals
In 1911, National Insurance Act gave some care for working class but not enough
The NHS set up 1948 huge change, essentially free health care for all people
At first, lack of money, hospitals and GP quality and waiting times but improvements
GP's Charter 1966 to improve GPs, Quality Care Commission to monitor hospitals and more hospitals built, even specialists like Alder Hey for children. NHS played huge part in life expectancy growing to 83 due to free care and medical developments

Lung Cancer Study
Huge problem, almost 40,000 cases a year
Causes: CT Scan and Bronchoscope can identify type of cancer, but not early enough
Treatment: Improvements, surgery, radiotherapy and chemotherapy BUT at present there is NO CURE not cancer.
Prevention: Government slowly brought in Smoking Ban (2007), tobacco tax and encouraged advertising to stop smoking

Factors for/against progress
Science/Tech: Hugely important, led to rapid changes in causes and treatment
Government: NHS ad Vaccinations huge in put into improving public health
Individuals: Watson, Crick, Fleming, Florey and Chain all pushed huge discoveries
Massive change in Modern Age, 83 life expectancy and huge advances, but still genetics, cancer and superbug problems

CM1: Media products

Description:

A media product is a platform used to communicate information to a specific audience. There are different formats that can be used for this purpose.

Digital imaging and graphics

Definition/Meaning:
A product that uses technology to create images in digital form. This may involve the use of graphic tablets, cameras or specific software such as Photoshop.

Digital games

Definition/Meaning:
A product that uses games consoles aswell as personal computers to entertain the audience. In particular, online gaming.

Video

Definition/Meaning
A product that includes moving images and in most cases an auditory element. It's also referred to as an audio-visual product.

Animation

Definition/Meaning:
A product that converts still images into moving elements to illustrate a sequence of events.

Visual effects (VFX)

Definition/Meaning:
Technology is used to incorporate effects that may be too dangerous or impossible to add any other way. For example, a spaceship flying across the screen.

Audio

Definition/Meaning:
A product that is recorded or transmitted in the form of sound. For example, sound effects.

Music

Definition/Meaning:
A product that records audio as a way to express emotion.

Special effects (SFX)

Definition/Meaning:
Special effects that can be created on set. This includes physical character creation, puppetry, animatronics or humans wearing prosthetic make-up and costumes.

1

CM1: Media products

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Social media

Definition/Meaning:

Websites and applications that enable users to create and share content or to participate in social networking.

Apps

Definition/Meaning:

A mobile application or app is a computer program or software application designed to run on a mobile device such as a phone, tablet, or watch.

Comics and graphic novels

Definition/Meaning

A product that is designed to tell stories an in more visual way through illustrations and speech bubbles for dialogue.

Multimedia

Definition/Meaning:

A product that combines a range of assets such as text, images, video, animation and sound.

Virtual reality (VR)

Definition/Meaning:

Virtual reality is a computer-generated simulation in which a person can interact within an artificial three-dimensional environment.

Websites

Definition/Meaning:

A product that combines a range of multimedia elements to create a webpage that can be accessed with an internet connection.

eBooks

Definition/Meaning:

A product that is available in electronic form and accessible via apps or e-readers (e.g. Kindle)

Augmented reality (AR)

Definition/Meaning:

Augmented reality allows the user experience the real world, which has been digitally augmented or enhanced in some way.

CM1: Media sectors

Description:

The main means of mass communication (broadcasting, publishing, and the internet) regarded collectively. The industry itself branches out in 'traditional' media and 'new' media.

How has the traditional media industry evolved?

Examples:
- Special effects (SFX, VFX)
- Digital imaging and graphics
- Social media platforms/apps
- Digital games
- Websites
- Multimedia
- eBooks
- Augmented Reality (AR)
- Virtual Reality (VR)
- 3D technology
- Digital Audio Broadcasting (DAB)

Traditional media

Definition/Meaning
Traditional media refers to non-digital methods of communication. These methods have been long used to create awareness of a product and existed before the internet.

Sectors
- TV (Television)
- Radio
- Film
- Print publishing

New media

Definition/Meaning
On-demand content accessed via the internet through digital devices, such as personal computers and smartphones. New media can involve interactive elements such as audience engagement and feedback.

Sectors
- Interactive Media
- Video games
- Internet
- Digital publishing

Interactive media examples:

Examples include:

Website, apps, e-learning products, information points and digital maps

Key terms:

Media
Distribution
Multimedia
Streaming
Downloading

3

CM2: Symbolic codes

Description:

Symbolic codes are those elements that contain deeper, connotative meanings.
The acronym **SCAM**, can be useful to help remember these:
Setting, Colour, Acting, Mise-en-scene (SCAM)

Setting

Description:
- Time – this is used to established when this was taking place.
- Location – the physical location of where the scene is taking place can help support the narrative. Social structures/Economy – Does the story reflect a certain social status. For example, does it suggest the characters are wealth or poor?
- Moral attitudes – The narrative can help to determine the actions taken by the characters.

Colour

Description:
- The colour palette used in a film can help tell a story. This helps the viewer feel certain emotions, such as the use of red blood in a horror movie, or a shade of green for jealousy.
- Colour in film also helps draw the attention of the user to a specific detail, like a red handle on a white door.
- Colour can help the film identify character traits, such as having a greedy businessman wear green or a sad character wearing yellow.

Mise en scene

Description:
- Set/location
- Props (Items that would be used in the scene)
- Costumes (What they wear)
- Make-up (How they look – think back to the previous example of the Joker where makeup is quite prominent)
- Motif - a repeated narrative element that supports the theme of a story. (e.g. James Bond theme)
- Composition - The placement or arrangement of visual elements.

Actors

Description:
- Body language
- Gestures
- Facial expressions
- Vocal intonation which means the way someone's voice rises and falls as they're speaking.
- Personality actor (Their personality fits the role)
- Star actor (An actor who can adapt. For example, equally adept at playing a hero or villain.

CM3: Technical codes

Description:

Technical codes are created using technology or skills.
The acronym **SCALE**, can be useful to help remember these:
Special effects, Camerawork, Audio, Lighting, Editing.

Camera shots

Description:
- This is can also be referred to as 'framing', it's what you can see in the frame.

Examples:
- Establishing shot
- Long shot
- Crowd shot
- One shot
- Medium shot
- Medium close-up
- Close-up
- Extreme close-up
- Over the shoulder shot
- Wide shot

Camera angles

Description:
- This is determined by the position of the camera and the direction it is pointing to.

Examples:
- Eye-level shot
- Low angle
- High angle
- Dutch angle
- Shoulder level
- Hip level
- Ground level

Camera movements

Description:
- This also determines the position of the camera but may also use additional equipment to allow them to position the cameras where humans can't.

Examples:
- Dolly and Track
- Pan
- Zoom
- Crane
- Handheld
- Pedestal

Camera operator

Description of the role:
- assembling and setting up equipment.
- planning, preparing & rehearsing scenes
- following camera scripts.
- creatively framing and capturing action
- responding quickly to directions.

Director

Description of the role:
- read scripts and work with writers and provide feedback.
- working with casting directors and producers during this selection process.
- agree the budget and schedule of the film with the producer.

5

CM3: Technical codes

Description:

Technical codes are created using technology or skills.
The acronym **SCALE**, can be useful to help remember these:
Special effects, Camerawork, Audio, Lighting, Editing.

Editing

Description:
- An editor, under close guidance from the director, makes choices about when to cut a shot/sound, when to end a particular shot/sound and move on to another.

Examples:
- Continuity editing: Cutaway shot, Shot reverse shot, Eyeline match, Cross cutting,
- Non-continuity editing: Flashback, flash forward, montage.
- Transitions: Wipe, Dissolve, Fade and Cut

Audio

Description:
- Audio plays a significant role in conveying meaning to a media product.

Examples:
- Diegetic and non-diegetic sounds
- Foley (artificial audio recording)
- Soundtrack
- Silence
- Dialogue
- Sound effects

Sound editor

Description of the role:
- create, update, maintain and add to sample and sound libraries.
- develop the sound concept for a project and a sound map or storyboard from a script or project description.

Lighting

Description:
- Lighting helps to create an atmosphere and helps to convey meaning within the narrative and this could be to emphasise the characters emotions

Examples:
- High-key lighting
- Low-key lighting
- Back lighting
- Fill lighting

Audio technician

Description of the role:
- preparing and operating sound equipment.
- running audio equipment so everything is properly connected.
- testing audio equipment for volume, tone, and clarity.

CM4: Interactivity

Description:

Interactivity is a two-way flow of information between a computer and a computer-user; responding to a user's input.

Animation

Description:
- Taking still images and creating a sequence of moving images that follow a timeline.
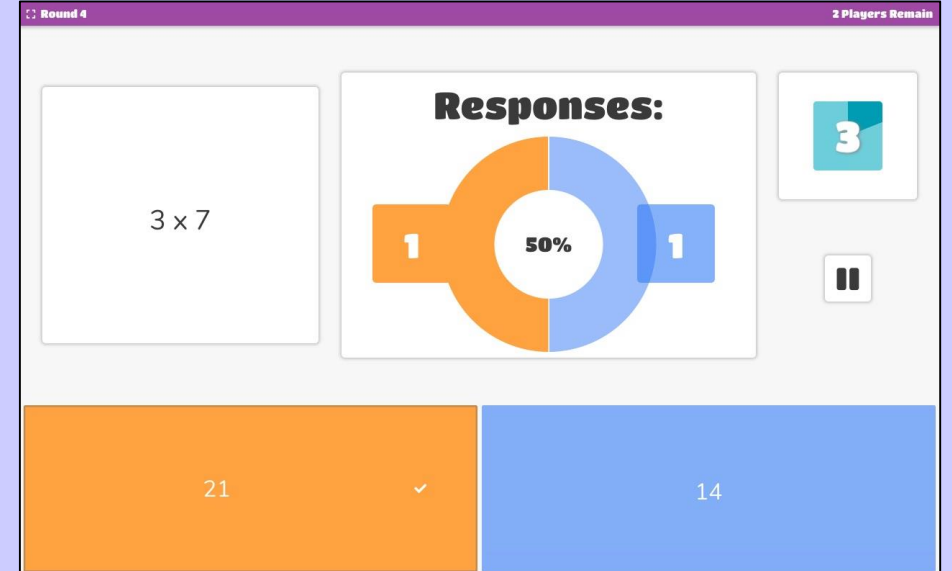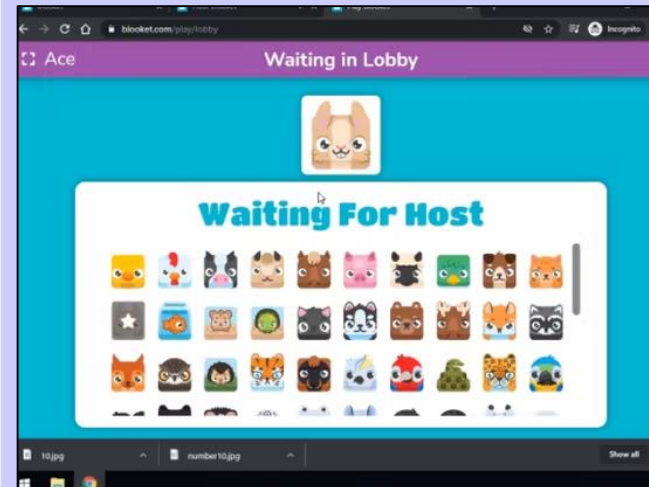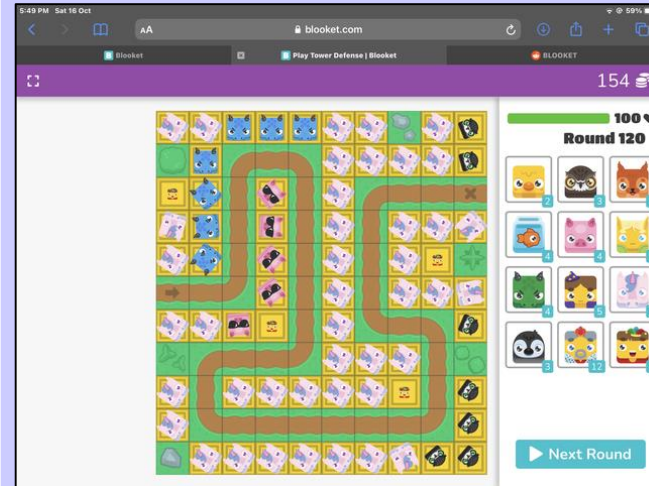
Examples:
- 3D Animation – this can include the use of Computer Generated Imagery (CGI)
- 2D Animation – hand drawn characters frame by frame.
- Vector 2D Animation – a rigged character.
- Animated graphics/text
- Motion capture – Claymation, puppet, silhouette.

Apps & Websites

Worked example: Blooket

Examples:
- Icons
- Graphics
- Animations
- Audio
- Video
- Music
- Navigation – buttons, icons, hyperlinks, rollovers, hotspots.

CM5: Purpose

Description:

Every media product is created for reason and this is known as purpose.

Inform

Description:
- To display information normally in a formal language because it's important.

Examples:
- Maps
- Books
- Leaflets

Influence

Description:
- To persuade consumers to change their behaviour.

Examples:
- Health advertisements
- Educational advertisements
- Political advertisements

Entertain

Description:
- This is to provide a narrative/plot/storyline that entices the user to consume the content.

Examples:
- Films
- TV shows
- Books
- Apps
- Video games

Educate

Description:
- This is to provide consumers with information that enables them to learn/gather new information

Examples
- Text books
- YouTube videos
- Online learning platforms

Advertise/Promote

Description:
- This is to persuade the consumer into committing to a product or service.

Examples:
- Posters
- Billboards
- TV advertisements
- Radio advertisements
- Banners on webpages
- Social media posts

Job roles:

Content creator
Copywriter
Campaign manager
Photographer
Web developer
Web designer
Animator
Games developer

CM5: Purpose

Description:

The style, content and layout has to be adapted meet a particular type of purpose such as: colour, conventions of genre, formal/informal language, tone of language, positioning of elements, audio representation and visual representation.

Colour

Definition/Meaning:
The colour can help to create a particular mood as they can represent certain feelings. For example red can represent danger, love and blood whereas blue can represent calm, peace or trust.

Conventions of genre

Definition/Meaning
Conventions are a commonly accepted way of doing things. Advertisements will share a common set of characteristics.

Tone of language

Definition/Meaning:
The tone can help to identify how serious the message may be. This depends on the type of media product.

Audio representation

Definition/Meaning:
A media product that can be represented in the form sound such as the use of music, dialogue and sound effects.

Visual representation

Definition/Meaning
The content used in the media product that helps the consumer to make a connection with that and the product that is being advertised.

Positioning of elements

Definition/Meaning:
Content will be placed at certain parts of product because that is where consumers may naturally be drawn to.

Formal/Informal language

Definition/Meaning:
The purpose of the product can affect the nature of the language used. For example, informal language is used for adverts where formal language may be used for educational purposes.

9

CM6: Audience segmentation

Description:

Target audience is made up of different characteristics known as demographics which are split into segments to help clearly define who the target audience is.

Benefits of audience segmentation

- Clearly defined target audience
- Increased chance of sales
- Personalised approach to marketing/advertising.
- Increased level of interest.

Lifestyles/Interests

Definition/Meaning:
This is linked to hobbies and what people actually enjoy. For example, a person who loves horror films will be more interested in products of this genre.

Location

Definition/Meaning
This is how accessible the product is. It might be available within a certain radius, in a city/town, a country or it may have a wider reach if it's an online service.

Age

Definition/Meaning:
This can be an age range such as 18-25 or broader categories such as teenagers, adults, retired people.

Occupation/Income

Definition/Meaning:
The type of job can determine the level of disposable income that person has and therefore shapes their consumer behaviour depending on what they can afford.

Ethnicity

Definition/Meaning
This focuses on cultures, country, religion or language. For example, some software used in the UK is designed using US English language instead.

Gender

Definition/Meaning:
Some products may be aimed at one gender more than the other.

Education

Definition/Meaning:
The population have different levels of education such as: degree level, A-level or GCSE and this can define the sort of language used in media products.

10

Client requirements

Description

A client brief is a written document or verbal discussion that outlines the key requirements of a project.

Client brief

Types:

- **Formal** - A scheduled meeting that will take place between the client and the producer.
- **Informal** - Client will discuss requirements during a telephone call, no do documentation provided. More of a verbal agreement.
- **Negotiated** - The client and the producer work together to develop a brief for a media product.
- **Commissioned** - A client will hire a separate independent company to create the media product for them.

How are client briefs communicated?

A client brief can be **written** and discussed in a **meeting**.

Interpreting client brief

Description:
A client brief would typically consist of the following components.

Type of product

The product that is being created.

Timescales

Key dates and deadlines for the project.

Audience

The segment of people this product is aimed at.

Purpose

The objective of the product

Client ethos

Ensuring the product meets the brands values.

Content

What needs to be included in the media product?
For example, a digital product then further consideration would need to be made into the use of other assets such as: sound, animation, video etc..

Genre, style and theme

The brand and their values will influence the design.
The type of product will follow a particular theme.

Client brief constraints

- Conflict of interest when it comes to design choices.
- A client brief can restrict what the production company can do.

CM8: Primary research

Description:

Primary data is any original information that you collect for the purposes of answering your research question (e.g. through focus groups, interviews, online surveys and questionnaires.

Focus groups

Description:
- A group of people assembled to participate in a discussion about a product before it is launched.

Pros	Cons
Valid set of results Less time-consuming than a survey. Additional feedback can be gathered in the session.	Sample size too small. Small samples can lack validity. Moderator might not record all responses.

Interview

Description:
- A meeting of people face to face or online.

Pros	Cons
Allow for more in-depth data collection and comprehensive understanding. Can be used for quantitative research	Interviews are more time consuming to recruit and conduct. Expensive form of research. Limited scope: you might miss out on interesting data

Online surveys

Description:
- A structured form that is completed over the internet.

Pros	Cons
Cost-effective and can capture a large sample very quickly. Quick to gather large sample sizes.	Need an internet connection to participate in a survey. Some respondents might lack technical skills to complete survey.

Questionnaires

Description:
- A list of questions or items used to gather data from respondents about their attitudes, experiences, or opinions

Pros	Cons
No technological constraints as it's paper-based so it's easy for everyone to access. Can include open and closed questions.	Paper can easily be misplaced/lost Time consuming Expensive to employ surveyors.

CM9: Secondary research

Description:

Secondary data are information that has already been collected by other researchers.

Primary v Secondary research

Primary research:

Pros	Cons
Can answer specific questions You control the sampling methods and size.	Time consuming to collect data. Staff might need training on collecting data.

Secondary research:

Pros	Cons
Easier and faster to access Collect data from a wider geographical location.	Time consuming, regularly need to check sources. No control over the data as it's already there.

Books

Pros	Cons
Indicate areas of professional interest Up to date coverage of news and opinion	Can become outdated quickly. Can include subjective content.

Television

Pros	Cons
Present information in different formats. Can include facts and opinions. Can be an up-to-date source of information.	Can be biased May not give further references to follow up. May not always give a fair representation of a subject. Often created for entertainment purposes.

Websites

Pros	Cons
Quick access to information Can be kept up to date easily	Not quality checked – anyone can create a website Not always reliable or of an academic standard

Questionnaires

Pros	Cons
Present information in different formats. Can include facts and opinions. Can be an up-to-date source of information.	Can be biased May not give further references to follow up. May not always give a fair representation of a subject. Often created for entertainment purposes.

Collecting data

Description:

Data can be collected in two formats: Quantitative and Qualitative data.

Quantitative v Qualitative

Quantitative:

Pros	Cons
Generates data that can be reproduced. Can describe large sets of data.	Requires statistical training to analyse data. Requires a larger sample.

Qualitative:

Pros	Cons
Flexible as you can easily adjust methods used. Can be conducted with small samples.	Difficult to moderate the research conducted. Cannot be analysed statistically.

Quantitative data

Definition/Meaning
Data that is measured numerically. Commonly made up closed questions that restrict the respondents to a fixed set of options.

Examples

Binary answer (Yes/No)

Likert scale

Other examples include: Questions with <u>one</u> answer and ones with <u>multiple</u> answers.

Qualitative data

Definition/Meaning
This provides a more detailed description of data. Commonly made up of open questions that allows respondents to elaborate further.

Examples

Examples of Open-Ended Questions

- What were the challenges you faced with us?
- What did you like the most about us?
- Is there anything else we should know?
- How would you describe your experience with us?
- What can we do better to improve your experience with us?
- What is the primary reason for your score?
- Would you recommend us to others? Please share the reason.
- What was missing in the experience you had with us?
- What are the factors that usually influence your purchase?
- What are one or more things that may stop you from making a purchase with us?

14

CM10: Work plan

Description:

A work plan is used to plan out all the tasks that need to be completed within a project.

Benefits of a work plan

- It can provide clear timescales for each task.
- To better understand the hardware, software and people required for each activity.
- To factor in unexpected events and putting contingencies in place.
- Increased the chance of the production meeting the deadline.

Work plan example

						Jan				Feb			
Pre-production						Week 1	Week 2	Week 3	Week 4	Week 1	Week 2	Week 3	Week 4
Task	Activity	Hardware	Software	People	Contingencies								
1	Read client brief	Monitor, Laptop	Word Processing Software	Production manager	Print out a hard copy	■							
2	Generating ideas	Laptop	Desktop publishing software	Creative director, Production manager.	Draw mind map on flipchart paper		■						
3	Visualisation diagram	Laptop	Desktop publishing software	Illustrator, Graphics artist	Draw visualisation diagram on paper			■					
4	Source assets	Laptop	Web browser software	Content creator	Books, Magazines, Television				■				
Milestone: Pre-production phase complete													
Production													
5	Repurpose assets	Laptop/Graphics tablet	Graphics software	Graphics designer	Use web-based graphics software					■			
6	Create the digital graphic	Laptop/Graphics tablet	Graphics software	Graphics designer	Use web-based graphics software						■	■	
Milestone: Production complete													
Post-production													
7	Export digital graphic	Laptop/Graphics tablet	Graphics software	Graphics designer	Use web-based graphics software								■
Milestone: Project complete													

Components of a work plan

Activity
A task within a task – known as a sub-tasks.

Resources
The hardware, software and people required to complete the task.

Contingencies
A plan put in place to deal with any unexpected events.

Milestone
A significant achievement within the project.

Tasks
The main parts of the project that need to be completed.

Timescales
The time given to each activity/task to be completed.

Workflow
The sequence/order in which the activities are carried out.

Creative Job roles

Description:

When putting together a work plan, one of the key components is the identification of resources meaning what hardware, software and people are required to complete each activity.

Three phases of production:

Pre-production

The pre-production stage of the production process is where you create a vision for your product. (i.e. design)

Production

The production stage is when all the development of the product happens.

Post-production

Post-production is where all of the pieces of your product come together. (i.e. editing)

Illustrator/graphics artist

Responsibilities:
- combining hand-drawing and painting with digital media to create complete illustrations.
- refining designs.
- using various colours, graphics and effects to better convey each concept.

Phase of production
- Pre-production

Scriptwriter

Responsibilities:
- developing believable plots and character.
- preparing short summaries of your ideas and selling (known as 'pitching') them to producers or development executives.

Phase of production
- Pre-production

Web designer

Responsibilities:
- creating website designs.
- producing sample sites.
- meeting with clients to discuss requirements and/or project progress.
- digital retouching and image editing.

Phase of production
- Pre-production, Production

Animator

Responsibilities:
- creating a series of images known as frames, to simulate movement.
- develop timing and pacing of motion.
- work with the story editors to merge various layers of animation.

Phase of production
- Production

16

Creative Job roles

Description:

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Three phases of production:

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The pre-production stage of the production process is where you create a vision for your product. (i.e. design)

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The production stage is when all the development of the product happens.

Post-production

Post-production is where all of the pieces of your product come together. (i.e. editing)

Graphics designer

Responsibilities:
- design graphics for use in media products such as magazines, labels, advertising etc..
- developing concepts, graphics and layouts for product illustrations, company logos and websites.

Phase of production
- Pre-production, Production

Content creator

Responsibilities:
- create content for websites including social media.
- using assets such as text, video and audio designed for a particular audience.
- aiming to generate interest/raise awareness for a brand.

Phase of production
- Production

Copywriter

Responsibilities:
- creates text for advertising/marketing purposes.
- writing content used in print media, radio advertising, product descriptions and social media posts.

Phase of production
- Production

Photographer

Responsibilities:
- captures high-quality images.
- collaborate with client to ensure right content is captured.
- sell their content in stock image libraries for others to purchase.

Phase of production
- Production, Post-production

17

Technical Job roles

Description:

When putting together a work plan, one of the key components is the identification of resources meaning what hardware, software and people are required to complete each activity.

Video editor

Responsibilities:
- assembling raw footage and transferring or uploading to a computer.
- following a script, screenplay or outline
- inputting sound to enhance footage.

Phase of production:
- Post-production

Web developer

Description:
- write code for how the website looks and how it works.

Phase of production
- Production

Camera operator

Responsibilities:
- assembling and setting up equipment.
- planning, preparing and rehearsing scenes
- following camera scripts.
- creatively framing and capturing action
- responding quickly to directions.

Phase of production
- Production

Audio technician

Responsibilities:
- preparing and operating sound equipment.
- running audio equipment so everything is properly connected.
- testing audio equipment for volume, tone, and clarity.

Phase of production
- Post-production

Sound editor

Responsibilities:
- create, update, maintain and add to sample and sound libraries.
- develop the sound concept for a project and a sound map or storyboard from a script or project description.

Phase of production
- Post-production

Games programmer

Responsibilities:
- writing/testing code for new programs.
- updating existing programs.
- identifying/correcting coding errors.
- secure programs against cybersecurity threats.

Phase of production
- Production

18

Senior Job roles

Description:

When putting together a work plan, one of the key components is the identification of resources meaning what hardware, software and people are required to complete each activity.

Campaign manager

Responsibilities:
- track campaign performance by compiling regular reports.
- organise trade shows, exhibitions and promotional events.
- recruit and train talent so they can be allocated roles.
- meet with all new clients to identify campaign strategies.

Phase of production:
- Post-production

Creative director

Responsibilities:
- developing concepts for advertising or promotional campaigns.
- pitching ideas to clients if working for an agency or present to directors.
- steering or writing scripts.
- overseeing photo or TV shoots.

Phase of production
- Pre-production, Production

Director

Responsibilities:
- read scripts and work with writers and provide feedback on the further development of scripts.
- select actors - working with casting directors and producers during this selection process.
- agree the budget and schedule of the film with the producer.

Phase of production
- Pre-production, Production and Post-production.

Sound editor

Responsibilities:
- planning and organising production schedules.
- assessing project and resource requirements.
- estimating, negotiating and agreeing budgets and timescales with clients and managers.

Phase of production
- Pre-production

Editor

Responsibilities:
- coordinate online or print publishing cycle and manage content areas.
- suggest stories and generate headline ideas.
- comply with media law and ethical guidelines.

Phase of production
- Production

19

Hardware

Description:

Hardware is an item you can physically touch. There is computer hardware in the form of internal components such as the CPU, RAM and Hard Drive. In addition to this, is external computer hardware known as peripheral devices. These are accessories that support the functionality of a computer system.

Multi-functional devices

Description:
There are some devices that can receive and send data (both input and output)

Device	Purpose
Touch screen	A display device that allows the user to interact with a computer by using their finger or stylus.
Graphics tablet	A device that enables a user to hand-draw images, animations and graphics, with a special pen-like stylus.

Input and Output devices

Description:
Input devices allows the computer to receive data.

Description:
Output devices that allows the computer to send data.

Device	Purpose
Mouse	It moves a pointer on the screen, allowing the user to select icons, buttons and menus.
Keyboard	Used to enter characters and functions into the computer system by pressing buttons, or keys.
Scanner	Captures images from photographic prints to be stored electronically.

Device	Purpose
Monitor	Displays the computer's user interface and open programs.
Printer	A device that accepts text/graphic output from a computer and transfers the information to paper.
Speakers	To produce audio output that can be heard by the listener.

Additional hardware

Microphone, Headphones, Computer/Laptop, Headsets.

Software

Description:

Software is a program that can be ran on the computer. Application software is a program designed for users to perform specific tasks. Each type of application software will be able to perform more specialised tasks. However, some can be a little more versatile.

Software used in the three phases:

Pre-production
- Word processing software
- Spreadsheet software
- Desktop publishing software

Production
- Graphic software
- Web authoring software
- Animation software

Post-production
- Audio editing software
- Video editing software

*This list is not exhaustive.

Different types of Software:

Word processing software	Allows the user to create, edit, format, and print written documents.	Database software	Used for storing, manipulating, and managing data.
Spreadsheet software	Displays data in a grid format and allows the user to enter and manipulate data using formulas.	Diary management software	Used to manage emails, calendars and set up appointments.
Presentation software	Used to show information, normally in the form of a slide show.	Graphics editing software	Used to manipulate or enhance digital images.
Desktop publishing software	Designed for creating visual communications in print form. (e.g. posters)	Audio editing software	Allows editing and generating of audio data.
Video-editing software	Involves putting together raw footage of various shots to create a sequence or scene.	Web browser software	Allows users to open and display web pages.
Web-authoring software	A type of desktop publishing tool that allows users to create websites.	Animation software	Allows for the creation of motion on a frame-by-frame basis.

21

CM11: Mind maps

Description:

Mind Maps are used to organise thoughts into a more formalised structure by having a main idea which branches off into different ideas that link to the central theme. It's a common pre-production document used in the first meeting because it's a quick way to generate new ideas.

Hardware & Software used:

Hardware:
- Mouse
- Keyboard
- Monitor
- Touch screen
- Graphics tablet
- Laptop/Computer

Software:
- Mind map software
- Desktop publishing software

Components of a mind map

Central idea
The central idea is what the project is about or what the theme is.

Nodes
Nodes are points connected to the central idea using branches which illustrated how the ideas are related to each other.

Sub-nodes
These are connected to nodes to organise ideas more clearly and provide more detail.
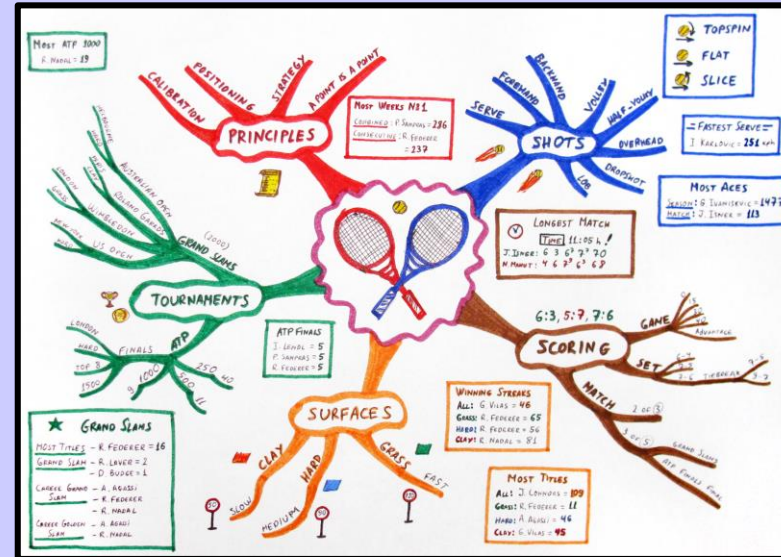
Keywords
Specific words may be used to help express the idea.

Colours
Colours can be used to differentiate between the ideas. Each node is in different colour in this example.

Who would use the mind map?

Creative director, Production manager, Illustrator, Graphics artist, Web designer, Director

CM11: Moodboard

Description:

A moodboard is a collection of sample materials which can be in paper or digital form. It's a way of generating ideas/setting a theme for the product.

Hardware & Software used:

Hardware:
- Mouse
- Keyboard
- Monitor
- Touch screen
- Graphics tablet
- Laptop/Computer
- Microphone
- Headphones
- Speakers
- Headset

Software:
- Desktop publishing software
- Graphics software
- Video editing software
- Presentation software

Components of a mind map

Colours
This can be represented with the inclusion of a colour swatch or colour palette.

Fabrics
A physical moodboard may include actual cut-outs of material that are stuck to the paper.

Multimedia assets
A digital moodboard may use videos, audio and animation to express an idea.

Images
Images are a key feature of a moodboard because of the visual representation it provides for the idea.

Text
Text may be used in the form of keywords that represent the theme or to provide information typography and colour schemes that could be used.
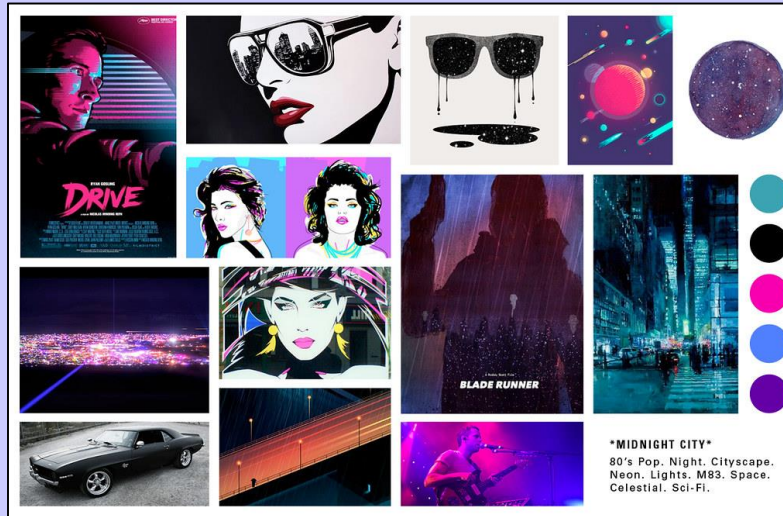
Who would use the mind map?

Creative director, Production manager, Illustrator, Graphics artist, Web designer, Director

23

Description:

A draft version to plan out a product in a visual way. It can be used to show the client what the final product could look like. This can be a good opportunity for the client to provide useful feedback to the designer.

Hardware & Software used:

Hardware:
- Mouse
- Keyboard
- Monitor
- Touch screen
- Graphics tablet
- Laptop/Computer

Software:
- Desktop publishing software
- Graphics software

People:
Illustrator, Graphics artist, Graphics designer, Content creator, Copywriter and Photographer

Components of a visualisation diagram

Title
This is because it tells you what the graphic is about. In this example, the title has been used to promote a festival, it's name and when it takes place.

Font
This is refers to typography choice such as font colour, size and style. This is helpful as it can help to determine to sizes of headings, sub-headings and the main body of text.

Text
This is refers to information that needs to be on the graphic.

Logo
The most recognisable part which should be easily visible to the viewer.

Colour
This is important because if it's left out then the graphics designer may not known what the colour scheme will be.

Images
This provides a more visual representation of what the product will look. Using clear images make it easier for the graphics designer to understand what assets need to be added.

Annotation
Another term used for labelling and this is important when doing a sketch design because it's not always easy to provide a complete visual representation of the final product. The more annotation, the more information the graphics has to work with.

CM13: Storyboard

Description:

A timeline that is designed to illustrate a sequence of events for content that requires movement. It allows changes to be seen over time, narrative to be included, storylines to be developed through dialogue and allows the ideas to be planned and linked together.

Hardware & Software used:

Hardware:
- Mouse
- Keyboard
- Monitor
- Touch screen
- Graphics tablet
- Laptop/Computer
- Microphone
- Headphones/Headset
- Speakers

Software:
- Desktop publishing software
- Graphics software
- Video editing software

Components of a storyboard

Scene content
This can be inferred from the drawings found in each panel.

Timings
How long each scene will last.

Scene numbers
Each panel will have clearly defined scene number which makes it easier to film these in isolation and use editing techniques to put them together.

Camera
This can be used to identify camera shots, movements and angles. It can also identify camera type such as a virtual camera.

Sound
Background music, dialogue or sound effects could be expressed

Lighting
Specify use of lighting techniques in scenes.

Order of panels
The storyboard should follow a logical structure to make it easier to put together.

Location
The scene is filmed outside (EXT) or inside (INT)

Who would use the storyboard?

Creative director, Camera operator, Audio technician, Illustrator, Graphics artist, Director

CM13: Script

Description:

A script is a pre-production document that is used as part of a narrative for an audio-visual product. It provides lines for the characters so they know what to say and provides direction for the camera crew to know what will be used within each scene.

Hardware & Software used:

Hardware:
- Mouse
- Keyboard
- Monitor
- Touch screen
- Graphics tablet
- Laptop/Computer

Software:
- Word processing software
- Script writing software

Components of a script

Location
The scene is filmed outside (EXT) or inside (INT)

Camera
This can be used to identify camera shots, movements and angles. It can also identify camera type such as a virtual camera.

Dialogue
he speaking parts of the product. But this can also include: Intonation, loudness, emotion.

Sound
Background music, dialogue or sound effects could be expressed.

Direction
This refers to what happens in the scene, this might be something as simple as a character movement.

Characters
It's important the character names are included as it helps to clearly define the dialogue for each character.

Who would use the script?

Creative director, Camera operator, Audio technician, Illustrator, Graphics artist, Director

26

CM14: Wireframe

Description:

A planning document that illustrates how a product will look. It will show how pages/screens are linked together and is used commonly for websites and apps. Wireframe focuses more on how the website will look and will be used by a front-end web developer.

Hardware & Software used:

Hardware:
- Mouse
- Keyboard
- Monitor
- Touch screen
- Graphics tablet
- Laptop/Computer

Software:
- Word processing software
- Desktop publishing software

Components of a wireframe

Images
These are usually displayed as a box with a cross which represents an image.

Video
The word video is displayed inside the box.

Text
These are usually displayed as a box with straight lines, the actual copy or by a placeholder text such as Lorem ipsum.

Annotation
This allows the designer to explain how different elements are linked together.
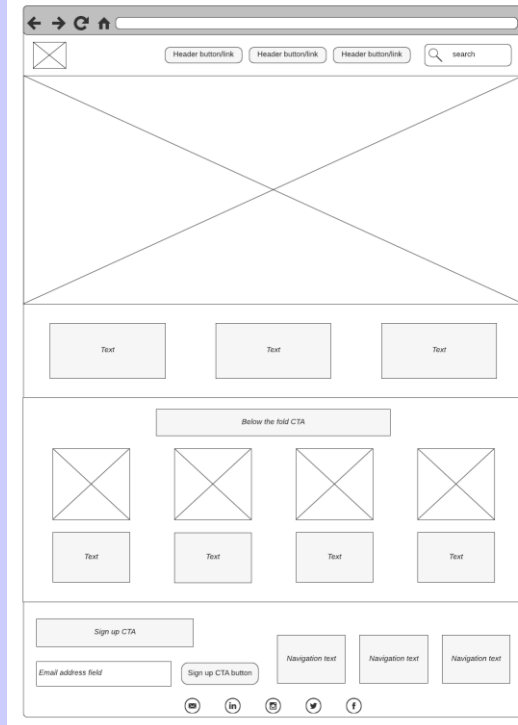
Hierarchy
The importance of a page is created by using headings, most often bold or heavier weighted text, of different sizes and location.

Links
Links are represented most often as blue, underlined text. Links may also be a different colour, keeping in line with a particular visual design direction.

Who would use the wireframe?

Photographer, Web designer, Illustrator, Graphics artist, Web developer

CM14: Flow chart

Description:

A diagram that represents the entire process from start to finish.
It's illustrated in a logical step by step sequence using shapes that each have their own function.
Flow charts focuses more on how the website will work and will be used by a back-end web developer.

Hardware & Software used:

Hardware:
- Mouse
- Keyboard
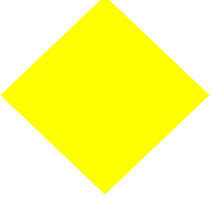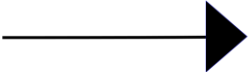- Monitor
- Touch screen
- Graphics tablet
- Laptop/Computer

Software:
- Word processing software
- Desktop publishing software
- Flow chart software

Flow chart symbols

	Start/Stop: This signals the beginning and the end of a flow chart.		**Decision:** This is used to represent selection and the outcomes when a certain condition is met.
	Input/Output: Used if data is being inputted into the system. If any data needs to be displayed then output could be used.		**Arrow:** This is used to connect the symbols together and to show the direction the flow chart is going.
	Process: This is used to process instructions. It could be used to process calculations or run events.		

Why use flow charts?
- Easy to show the layout each page.
- Show how all the pages/screens link together.
- It can show how functional the website is.

Who would use the flow chart?

Games programmer, Web designer, Web developer.

28

Description:

Legislation is the process of enacting laws so if they're breached then it can become a criminal office. Some laws are in place to protect individuals when they make a contribution to the creation of a media product.

Permissions when filming

Key facts:
- It's not against the law to film in a place that may include general members of the public.
- You may need to request permission of anyone who has been filmed if it was for commercial purposes.
- If filming takes place on private property then you must ask the land owner for permission.
- Photographers can capture images and sell them on image libraries.

Key term:

Defamation the action of damaging the good reputation of someone; slander or libel. Slander is a verbal statement and Libel is a written statement.

Slander

Description:
The action or crime of making a false spoken statement damaging to a person's reputation.

Libel

Description:
A published false statement that is damaging to a person's reputation; a written defamation.

Data protection

Description:
A piece of legislation that aims to protect a person's personal data.

Principles:
- Used for a specific purpose (as shown above)
- Relevant and not more than needed (as shown above)
- Accurate and kept up to date.
- Not kept longer than necessary (e.g. user closes account)
- Stored securely

CM16: Legislation for assets

Description:

Intellectual property is legislation designed stop your work from being copied and distributed without your permission and there are three types of intellectual property: Copyright, Trademarks and Patents which aim to protect ideas.

Trademarks

Description:
A sign or logo that identifies a brand or company as a unique entity. This is represented by the TM symbol. The R symbol protects words and phrases.

Using copyrighted materials

Examples:
- Ask permission from the copyright holder.
- Creative commons licensing
- Royalty free – pay a fee to gain a licence to use the image and remove the watermark.
- Stock libraries – assets that are free to use.

Copyright

Description:
- Copyright is the legal right to protect the original work of the people whom it may belong to.
- Copyright can protect....

Books	Music	Art
Images	Sound	Software

Fair use
This is when copyrighted material may be used for news reporting, commentary or educational purposes.

Creative commons licence

Description:
This license allows copyrighted material to be more freely distributed.

Attribution: Material can be copied, modified and used. However, the original creator must be given credit.

Non-commercial: Material can be copied, modified and used as long as there is no intention to make money from it.

Share-a-like: Material can be modified and used but must be covered by a similar license.

No derivative works: Material can be copied and used, but it cannot be modified.

CM16: Asset log

Description:

A pre-production document that is used to record all the assets that are potentially used when creating a media product and understand any legislative constraints there may be.

Hardware & Software used:

Hardware:
- Mouse
- Keyboard
- Monitor
- Touch screen
- Laptop/Computer

Software:
- Word processing software
- Spreadsheet software

Key term:

Assets: in the context of digital media, refers to the different components that can be used in a product such as: text, images, videos, animation and audio.

Components of an asset log

No/Asset ID
A count of how many assets are recorded or to give an asset a unique ID which is useful if the log contains a large volume of assets.

Filename
So the user knows what the file is called if they need to use it.

No.	Filename	Description	Properties	Source	Legal issues	Use
1	Pizza.jpg	Image of a pizza.	800 x 1022 96 DPI	https://clipart.world/ pizza-clipart/simple-pizza/	Should only be for personal use.	To be used in the YePizza logo.
2	Pizza paddle.jpg	Pizza paddle	450 x 450	https://www.123rf.com/photo_134983275_pizza-cooking-shovel-icon-isometric-style.html?vti=nbubvpvytl89e1e66y-1-2	Subscription required to download which will remove the watermark.	To be used in the YePizza logo.
3	Phone icon.png	Image of a phone	320 x 431	Client image	Not applicable	To be used to represent contact details on a poster.
4	Wood_fire_pizza.jpg	Image of a pizza that has been in a wood fire oven.	6016 x 4016 96 DPI	https://www.pexels.com/photo/baked-pizza-on-pizza-peel-in-oven-905847/	Free to use	To be included in the promotional poster.
5	Tomatoes.jpg	Image of fresh tomatoes	640 x 320	I took the image myself	Free to use as I'm the original owner.	To be included in the promotional poster to promote how fresh the ingredients are.

Description
To provide a description of what the asset is so the user knows what it is before they open it.

Properties
The resolution and dimensions if it's a digital graphic in case it needs repurposing.

Source
Where the asset has come from by recording the URL.

Legal issues
To record any legal considerations such as whether they need to ask permission to use the asset.

Use
What it will and what it could be used for.

Who would use the asset log?

Graphic artist, Web designer, Games programmer, Animator

31

CM17: Regulation, Classification and Certification

Description

The control or guidance of media content by governments and other bodies. This means media production and consumption are monitored.

Example:

Background:
- The ASA banned this Ryanair newspaper campaign featuring scantily-clad flight attendants, ruling that it linked female cabin crew with sexual behaviour.

BBFC

Description:
- The British Board of Film Classification who regulate media content and classify films that are distributed in the UK.

Ofcom

Description:
- The Office of Communications regulate all broadcasted content across UK television channels.

ASA

Description:
- The Advertising Standards Agency regulate all broadcast and non-broadcast content across the UK.

PEGI

Description:
- Pan European Game Information have classified all video game content in the UK. It used to be the role of the BBFC.

Key terms:

Certification
This is the award given to a media product as a result of the classification process which is displayed on the product. For example, a film might have an 18 certificate placed on the front cover.

Key terms:

Classification
The process of giving age ratings and content advice to films and other audio-visual content to help children and families choose what's right for them and avoid what's not..

CM18: Health and safety

Description:

Health and safety is about stopping you getting hurt at work or ill through work. Your employer is responsible for health and safety and they have a legal obligation to follow this through.

Healthy and safety in production:

Camera risks
- In some cases, camera operator may need to walk backwards? Or if they're suspended from a harness?

Lifting hazards
- May need to move equipment or props so manual handling training might be required.

Trip hazards
- Lots of cameras and other equipment will lead to more cables.

Electrocution
- If devices fail or are not connected correctly so people may need training.

Healthy and safety in pre and post-production

Regular breaks

Suitable lighting

Tiltable screens

Eyes must be level with the top of the screen.

Anti-glare filters

Clear working space

Wrist support

Desk needs to be about 70cm high

Chair needs to be adjustable for tilt and height.

Foot rest

Key term:

Mitigate: make (something bad) less severe, serious, or painful. In the context of health and safety, mitigating risks is all about reducing the risk of an accident happening.

CM18: Location recces

Description:

A location recce involves members of a production company visiting a potential location for filming and use a set of measures to assess it's suitability.

Risk assessment

Components of a risk assessment.
- Activity
- Hazard – what might cause danger or injury?
- Risk – what are the consequences of the hazard? Normally an injury.
- Prevention – what measure can be put in place to reduce the risk.

Key term:

Risk assessment: This is a document that identifies the hazards, the risks they pose and what can be put in place to mitigate these risks.

Location recce checklist

Safety
They can check for an potential trip hazards, potential obstructions when carrying equipment around, risk of electrocution.

Sound
Checking for any background noise that might affect the recording such as road traffic, trains, planes etc..

Lighting
Does the location have lots of natural lighting? Will there be a problem when it gets dark? What sort of lighting can the camera crew use?

Facilities
Toilets, areas for employees to have breaks, place for catering facilities, can people park? Is there parking that allows heavy equipment to be transferred?
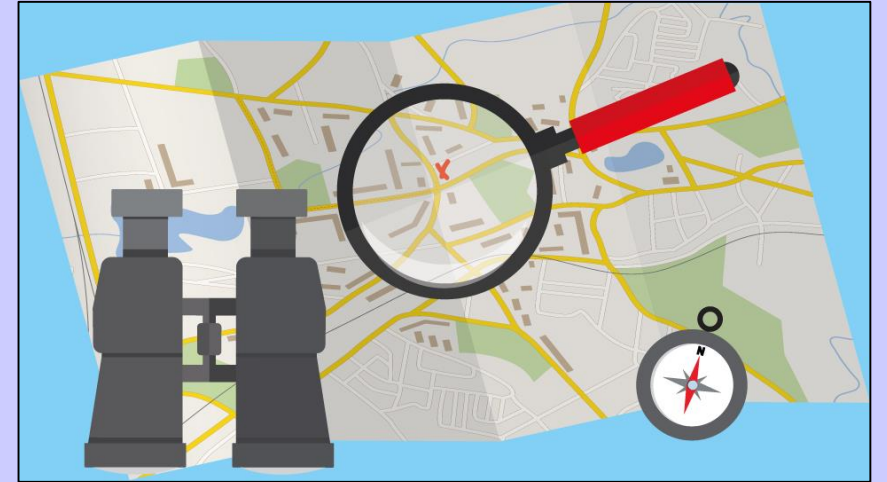
Power outlets
Are there enough sockets to plug them in? Is there enough distance between the outlet and where the equipment needs to go? Will the unit cope with the watts generated by the equipment?

Who would be involved in the location recce?

Director, Camera operator, Audio technician, Photographer

34

CM19: Distribution considerations

Description:

Distribution is the methods by which media products are delivered to audiences, including the marketing campaign.

Online platforms

Apps
- One of the most popular forms of distribution is they can be accessed via mobile devices
- They can be more responsive than website.
- However, some apps require an internet connection to use, even if they're downloaded onto the device.

Websites
- A popular method of distribution because of it's wider audience reach.
- It's ability to distribute content in different ways such as: videos, audio and images.
- Less favoured to apps as some websites aren't as responsive.
- Some website aren't user friendly especially when using mobile devices to access them.

Physical media

Examples:
- CD/DVD – Portable and cheap method of distribution but can be easily damaged.
- Memory stick – Portable method distribution but expensive and easy to misplace/lose.
- Paper-based media – A physical method of distribution, no device needed to access but can be expensive to print and transport.

Physical platforms

Computers
- Lots of people have access to a laptop or desktop computer which makes it a good choice to distribute content.
- Not very portable and may need to be constantly plugged in.

Mobile devices
- A small, lightweight and portable platform that allows users to access content on the go.
- Limited battery life and would need to be charged.

Interactive TV
- Providers users with more flexibility and not tied down to a schedule.
- Have to be physically plugged in to access.

Kiosks
- Automated system that provides users with real-time information.
- Fixed in one position and cannot be moved around.

Description:

Static images are images that have no moving elements.

File formats:

JPG:
- This is a bitmap image file format.
- Uses lossy compression.
- Commonly used to store photographs.

PNG:
- This is a bitmap image file format.
- Uses lossless compression.
- Supports transparency
- Commonly used for web graphics.

SVG
- This is a vector image file format.
- Uses lossless compression.
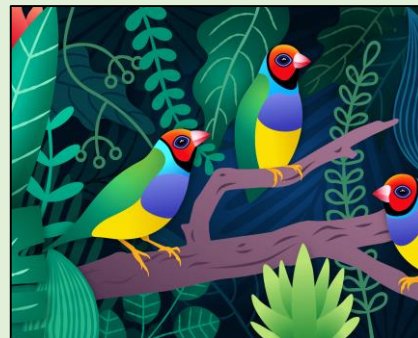- Small in file size.
- Commonly used for web graphics.

TIFF
- This is a bitmap image file format.
- Uses lossless compression.
- Large in file size.
- Commonly used for print graphics.

Vector graphics

Examples:
- Made up of lines of curves using mathematical equations to determine the scale of the graphic.
- It doesn't use pixels and is not dependent on resolution.
- Commonly used to create logos.

Bitmap images

Description:
Made up of pixels which help to determine the dimensions of an image which is measured by the number of pixels in height x number of pixels in length.
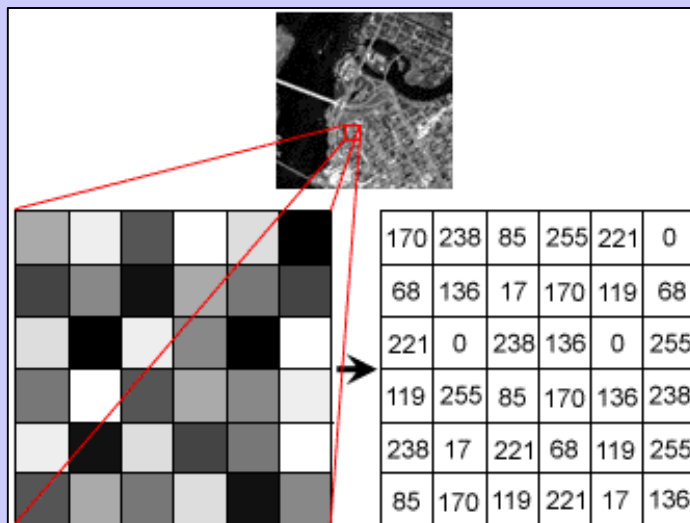
Resolution:
- The number of pixels stored in an image.
- Measured in PPI (Pixels per inch)/DPI (Dots per inch)
- Higher the resolution, the much sharper the quality of the image will be.
- Recommended resolution for a print graphic is 300 DPI.
- Recommended resolution for a web graphic is 72 DPI.

CM20: Compression

Description:

Compression is an algorithm designed to reduce the size of a file. There are two types of compression: Lossy and Lossless.

Lossy and Lossless Compression:

Lossy Compression	Lossless Compression
It reconstructs all the original data but this means data is lost during the compression process.	Data is reconstructed and doesn't remove any data.
Once data is removed, it's permanent and cannot be restored. It's irreversible.	Because data is retained, it's reversible so changes can continue to be made.
This can impact the overall quality of the graphic.	The overall quality of the graphic is retained.
It does significantly reduce the overall size of the file.	The size of these files tend to be large.
JPG is a common file format that uses lossy compression.	PNG are common file formats that use lossless compression.

Impact on size:

cafe_wonderland_teaparty	08/09/2020 12:38	JPG File	84 KB
cafe_wonderland_teaparty	10/05/2019 10:51	Adobe Photoshop...	2,449 KB

Example:
The top file has been compressed using lossy and this will:
- Save space on the device it's being stored.
- Use less bandwidth if file is transferred over a network (i.e. e-mail)

Impact on quality:

Example:
As you can see above, the image at the top has been saved in a lossless format whereas the image below, has been saved in a lossy format. You can see that the quality of the image below has reduced because data has been permanently removed.

Remember:
- Lossy and Lossless can impact audio and moving images.

CM21: Audio files

Description:

Audio can be in the form of music, dialogue and sound effects.

File formats:

MP3:
- This is a lossy file format.
- Small file size
- Stored on portable devices.

WAV:
- This is a lossless file format.
- No quality is lost.
- Used for studio recordings.

AAC:
- This is a lossy file format.
- Maintains a high quality of sound.
- The format for standard music for iTunes, Android etc...

FLAC:
- This is a lossless file format.
- Maintains all the data so quality retained.
- Can reduce file size.

Bit depth

Uncompressed audio formats		
Bit Depth	**Sample Rate**	**Application**
16 bit	44.1 kHz	CD quality audio
24 bit	48 kHz	High quality music production
24 bit	96 kHz	Archival quality audio

BLOG.LANDR.COM

Description
Bit depth is the number of bits available for each sample . If the bit depth increases it can increase the dynamic range of volume (this affects how loud the sound will be). This will also contribute to the quality of the sound file improving.

How sound becomes digitised

Analogue Data
ADC
Digital Data
11010011

Analogue signal sent from microphone

ADC converts analogue data to digital
(Sound Card is the ADC in this example)

Converted digital data recevied by computer
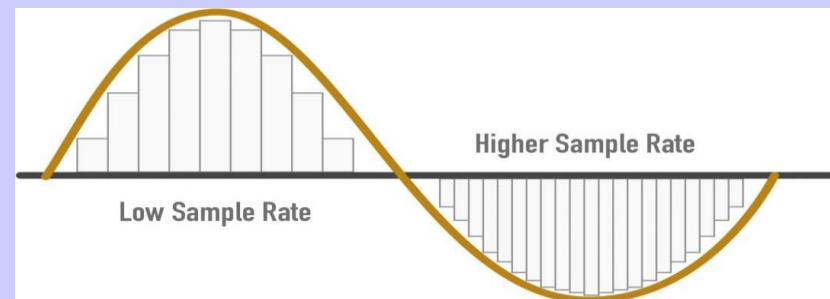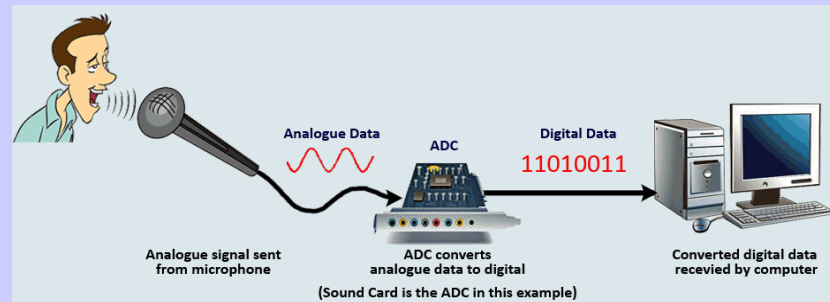
Analogue to Digital
During the conversion process, samples are taken that are then converted from analogue into a digital recording.

Sampling
When sound is recorded, samples are taken at regular intervals as you can see in the diagram on the right. The sample rate is measured in Hz (Hertz). The more samples taken improves the playback quality.

Higher Sample Rate

Low Sample Rate

CM22: Moving image files

Description:

Moving images can be in the form of a video or animation.

File formats:

MP4:
- This is a lossy file format.
- Small file size
- Used for streaming videos and films.

AVI:
- This is a lossless file format.
- No quality is lost.
- Used for editing raw footage.

MPEG:
- This is a lossy file format.
- Maintains a high quality of sound.
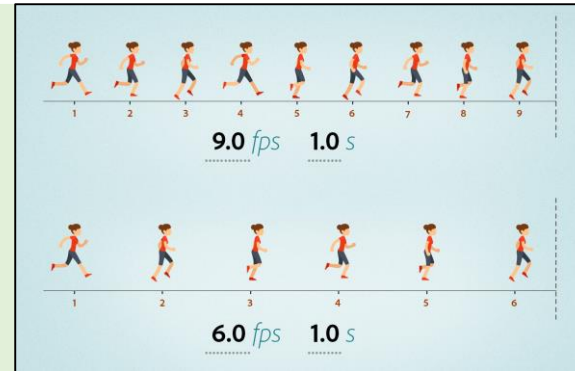- Used to be broadcasted on TV and released on DVD's

MOV:
- This is a lossy file format.
- Only compatible on Apple devices such as iPhone, iPad etc..

GIF and SVG

Frame rate

9.0 fps **1.0** s

6.0 fps **1.0** s

Description
Frame rate (frames per second or fps) is the speed at which individual still photo (frames) are projected onto a screen.

Impact
- A higher frame rate leads to a smoother motion.
- If the frame rate is too fast it will blur the details of the animation.
- If the frame rate is too slow will have a start/stop and jittery non-fluid effect.

Resolution
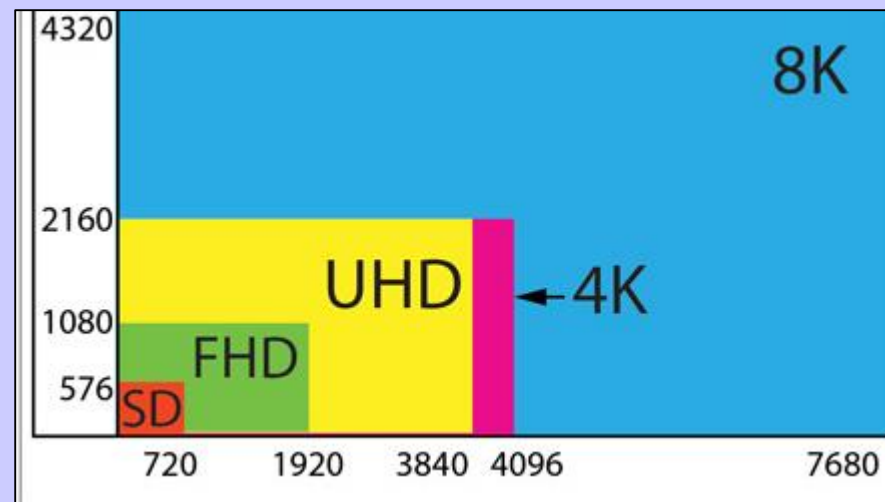
Description
Video resolution determines the amount of detail in your video, or how realistic and clear the video appears and is measured by the number of pixels. Examples include:
- SD (Standard)
- HD (High Definition)
- 4K UHD (4K Ultra High Definition)
- 8K UHD (8K Ultra High Definition)

Key words and definitions

Graph – A diagram showing the relationship between two variables (letters), each measured along one of a pair of axes.
Equation – A statement that the values of two mathematical expressions are equal (indicated by the sign '=')
Plot – Mark out (points on) a graph.
Parallel – Describing two lines that never meet.
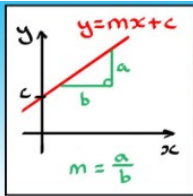**Perpendicular** – Describing two lines that meet at right angles.
Gradient – The steepness of a graph
Intercept – The point at which a given line cuts an axis; the value of the coordinate at that point.

The Equation of a Straight Line

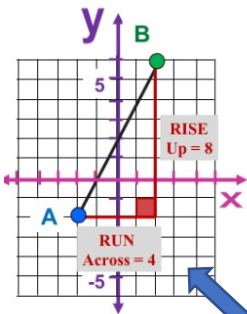**The Equation of a Line**

$$y = mx + c$$

m is the gradient

c is the y-intercept

The "Gradient" or "Slope" between two points is how far UP we have gone, DIVDED BY how far we have gone ACROSS.

$$m = \frac{RISE}{RUN}$$

$$m = \frac{8}{4}$$

$$m = 2 ✓$$

RISE Up = 8
RUN Across = 4

To find the equation of a line:
1) Find the gradient
2) Find the y-intercept
3) Write the equation of the line

In this example:
$$m = \frac{8}{4} = 2$$
$$c = 2$$
So the equation is
$$y = 2x + 2$$

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Midpoint and Length of a Line Segment

The Midpoint Formula is used to find the exact center point between two defined points in a line segment.
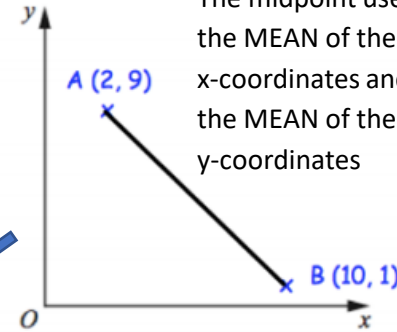
$$midpoint = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

The midpoint uses the MEAN of the x-coordinates and the MEAN of the y-coordinates

A (2, 9)
B (10, 1)

x: (mean of 2 and 10)
$$\frac{2 + 10}{2} = 6$$

y: (mean of 1 and 9)
$$\frac{1 + 9}{2} = 5$$

A is the point with coordinates (2, 9).
B is the point with coordinates (10, 1).

Work out the coordinates of the midpoint of the line AB.

Midpoint = (6, 5)

THE DISTANCE FORMULA

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Use Pythagoras' Theorem to find the length of a line.

Length $= \sqrt{(2 - -3)^2 + (3 - 1)^2}$

$= \sqrt{5^2 + 2^2} = \sqrt{29} = 5.39$

(2, 3)
(-3, 1)
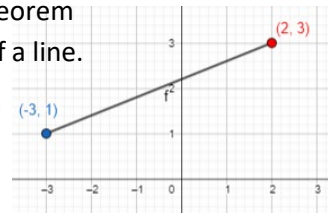
Real Life Graphs

Graphs can be used to model real life situations, for example a car journey.

When using a distance-time graph, the following parts of a graph have to be considered.

The gradient of the graph shows the speed of the car.
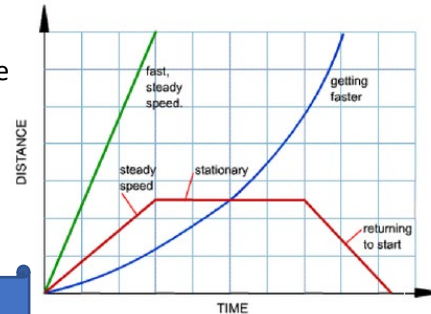
Drawing Straight Line Graphs

(a) Complete the table of values for y = 4x + 2.

To find y, multiply x by 4 and add 2.

x	-1	0	1	2
y	-2	2	6	10

2 x 4 + 2 = 10

(b) On the grid, draw the graph of y = 4x + 2.
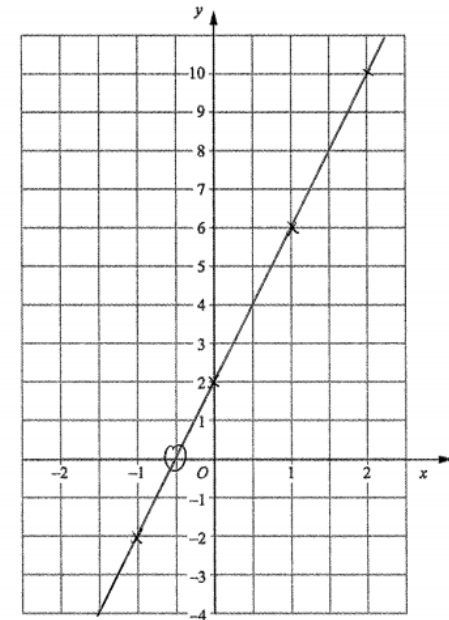
Plot the points:
(-1, -2)
(0, 2)
(1, 6)
(2, 10)
And join with a straight line.

Hegarty Maths Links

Coordinates and Midpoint: 199-200
Gradient: 201-204
Drawing Graphs: 205-213
Parallel and Perpendicular Lines: 214-216
Distance/Speed – Time Graphs: 874-886

Constructions Student Knowledge Organiser

Key words and definitions

Constructions- Mathematical drawings that use only a pencil, ruler, compass and protractor.
Perpendicular- At a 90⁰ angle from a line, surface or plane.
Bisector- Cuts somethings in half.
Congruent- Two shapes are congruent if they are mathematically identical
Parallel- Two lines that remain the same distance apart at all times.
Vertex- Point/Corner

Perpendicular bisectors

Start with a line segment
1) Place you compass on one end of the line and stretch it wider than half way across.
2) Without changing the compasses width make an arc across the line (red arcs on diagram).
3) Place your compass on the other end of the line segment and without changing the width of the compass make another arc across the line (red arcs on diagram).
4) Draw a line that crosses though where both arcs intersect. (Blue line of diagram)

Bisecting angles

Start with an angle
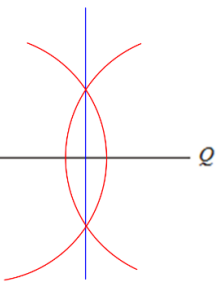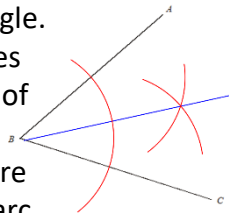1) Place you compass on the vertex of your angle and draw an arc right the way across the angle.
2) Place your compass on where the arc crosses one of the line and draw another arc inside of the angle.
3) Place your compass on the other point where the arc crosses the line and draw a second arc inside the angle.
4) Draw a line from the vertex to where your arcs cross.

Constructing Angles

Constructions can be used to draw 30⁰, 45⁰, 60⁰ and 90⁰. To remind yourself how to do these refer to the Hegarty Maths videos:
664- Construct a 90⁰ or 45⁰ angle.
665- Construct a 60⁰, 30⁰ or 120⁰ angle.

Constructing an equilateral triangle.

Start with a line segment that is the desired side length for your triangle.
1) Place you compass on one end of the line and stretch it to be the length of the line.
2) Make an arc above the line.
3) Keeping the compass the same length place it on the opposite side of the line and make another arc above.
4) Where the two arcs cross is the third corner of your triangle. Join it up with the other two.
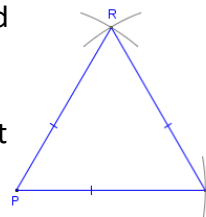
Constructing other triangles

There are many other ways to construct triangles. Including:
SSS- Using three side lengths.
SAS- Using an angle between two sides.
ASA- Using a side between two angles.
Please refer to the Hegarty video for instruction on drawing these:
683- Constructing triangles.

Tessellations

Shapes tessellate when they fit together to make a pattern without leaving any gaps. This is possible whenever the shape's angles add up to 360⁰.
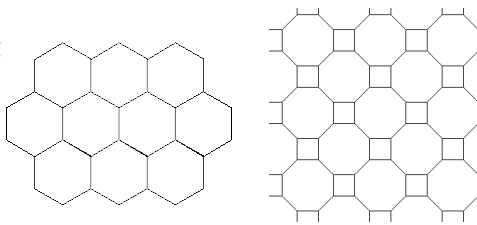
Loci

A locus (plural loci) is a set of points that satisfy a certain condition.
Example1: Draw the set of point that are 5cm away from a point.
To do this you would just draw a circle of radius 5cm around that point.
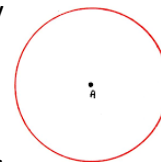
Example 2: Draw the set of points that are 2cm away from a line.
To do this you would draw two parallel lines above and below your that are 2cm away. At the end of those lines you would join them by a semi-circle that has its centre at the end of your original line
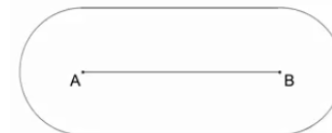
Plans and Elevations

Plans and elevations are 2D drawings of 2D shapes from different angles.
The **Plan** of a shape shows the shape from above.
The **Front Elevation** shows the shape from the front.
The **Side Elevation** shows the image from the side.
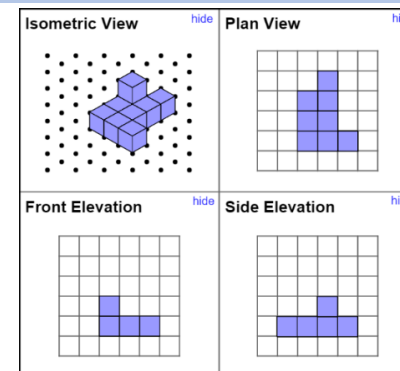
Hegarty Maths Links

Constructions= 659-669
Constructing triangles= 683
Loci= 674-679
Congruent triangles= 682
Bearings= 492-495
Plans and Elevations= 837-844

Key words and definitions

Quadratic graph - The graph of a quadratic function is a parabola whose line of symmetry is parallel to the y –axis.

Parabola - a symmetrical curve.

Gradient - Another word for "slope". The higher the gradient of a graph at a point, the steeper the line is at that point. A negative gradient means that the line slopes downwards.

Y intercept- The point where a line crosses the y axis.

Roots of a quadratic graph- These are the x-intercepts. It is where y = 0 so, ax² + bx + c = 0.

Quadratic Expressions

$$ax^2 + bx + c$$

c = y intercept (where the parabola CUTS the y axis)

Parabolas are symmetrical

When a is positive   When a is negative

Plotting a quadratic graph

Complete the table of values for $y = x^2 - 3x - 1$

x	-2	-1	0	1	2	3	4
Y	9	3	-1	-3	-3	-1	3

Substitute the x values into the equation to find the y coordinates. Be careful with negative numbers! Remember -3^2 is 9.

On the grid, draw the graph of $y = x^2 - 3x - 1$ for values of x from -2 to 4.
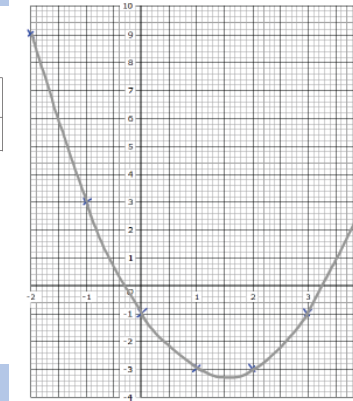
Key points on a quadratic graph

y intercept

Roots/solutions

Turning point

Equations of a straight line

The equation of a straight line graph is in the form:

$$y = mx + c$$

where **m= gradient   c = y intercept**

Example. For y = 2x + 3   the line has **a gradient of 2** and a **y intercept of +3**
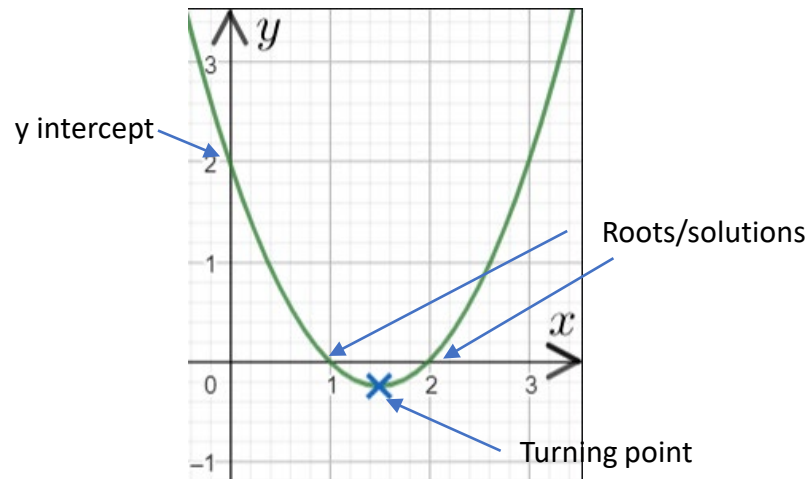
Finding the gradient

**Gradient of a Straight Line**
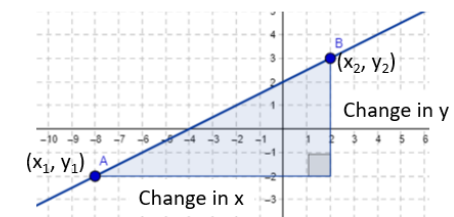
Gradient = $\frac{y_2 - y_1}{x_2 - x_1}$ = $\frac{\text{Change in y}}{\text{Change in x}}$

Example

Change in y = 3
Change in x = 5
Gradient = $\frac{3}{5}$
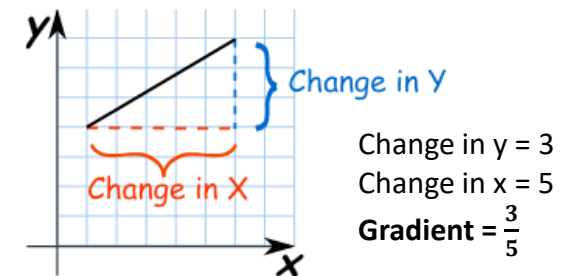
Parallel and perpendicular lines

Lines that have **the same gradient are parallel**
Eg. y = 3x + 4 is a parallel to the line y = 3x -4
They both have a gradient **of 3** so are **parallel.**

If two lines **are perpendicular**, then **their gradients will multiply together to give -1**. Find the equation of a line perpendicular to y = 3 - 5x. This line has gradient -5. **A perpendicular line will have to have a gradient of 1/5, because then (-5) × (1/5) = -1.**

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Area and Volume

Key words and definitions

Volume: The amount of 3Dimensional space an object takes up.
Surface area – The sum of the areas of all the faces of a 3D object.
Similar : Two or more shapes are **similar** if they have the same shape, but are not necessarily the same size. The corresponding sides are in proportion and the corresponding angles are equal.
Scale factor – The size of an enlargement/reduction.
Sphere – A round 3Dimensional shape like a ball.
Pyramid – A 3D shape with triangular sides and a polygon base.
Cone – A 3D shape with a circular base joined to a point by a curved side.
Frustum – What is remaining of a cone or pyramid after its upper part has been cut off flat.
Convert – change the units of measurement.

Similar Lengths

Two shapes are similar if one is an enlargement of the other using a **scale factor**.

9cm
12cm
60cm
cm
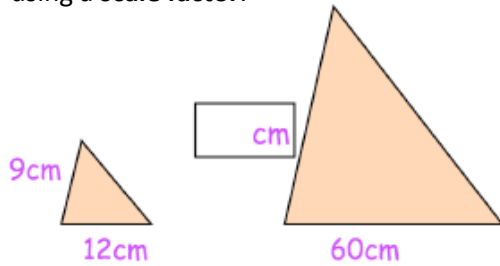
Scale factor = $60 \div 12 = 5$

Missing length = corresponding length × scale factor

$$= 9cm \times 5$$
$$= 45cm$$

Similar Area

$$Area\ scale\ factor\ = (scale\ factor)^2$$

Below are two similar triangles

A
B
7cm
14cm
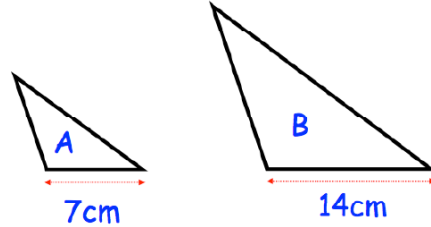
Scale factor = $14 \div 7 = 2$
Area scale factor = $2^2 = 4$
Larger area = smaller area × area scale factor
$$= 20cm^2 \times 4$$
$$= 80cm^2$$

The area of triangle A is 20cm². Work out the area of triangle B.

Similar Volume

$$Volume\ scale\ factor\ = (scale\ factor)^3$$

Work out the volume of shape B
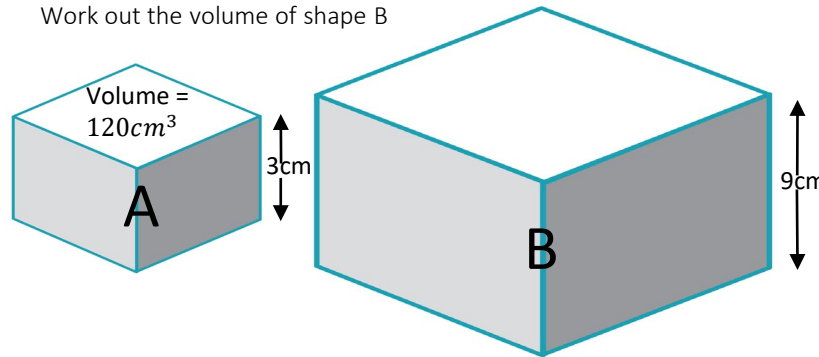
Volume = $120cm^3$
3cm
A
9cm
B

Scale factor = $9 \div 3 = 3$
Volume scale factor = $3^3 = 27$
$Larger\ volume\ =\ smaller\ volume\ \times volume\ scale\ factor$
$$= 120cm^3 \times 27$$
$$= 3240cm^3$$

Volume of non-prisms

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

Find the Volume of a Sphere with a radius of 3.2m

$$Volume = \frac{4\pi r^3}{3}$$

Sub in the value of r

3.2m

$$Volume = \frac{4 \times \pi \times 3.2^3}{3}$$

Calculate

$$Volume = 137.26cm^3$$
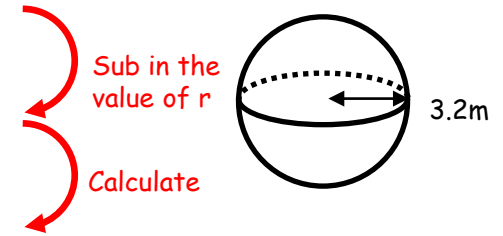
$$Volume\ of\ cone/pyramid\ = \frac{area\ of\ base \times height}{3}$$
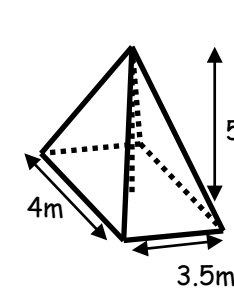
$$Volume = \frac{Area\ of\ Base \times Height}{3}$$

Sub in values

5m
4m
3.5m

$$Volume = \frac{4 \times 3.5 \times 5}{3}$$

Calculate

$$Volume = 23.3cm^3$$

Hegarty Maths Links

Area of Shapes: 539 – 543, 553 - 559
Volume of 3D Shapes: 567 - 583
Surface Area of 3D Shapes: 584 - 591
Similar Shapes: 608 - 621

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$$Volume = \frac{Area\ of\ Base \times Height}{3}$$

Sub in values

$$Volume = \frac{\pi \times 3^2 \times 8}{3}$$

Calculate

$$Volume = 75.4cm^3\ (24\pi)$$

8cm

3cm

Surface area of non-prisms

$$\boxed{\textbf{Surface area of sphere} = \textbf{4}\boldsymbol{\pi r^2}}$$

Calculate the surface area of a sphere with radius 10cm.

Surface area $= 4\pi \times 10^2$

$= 400\pi cm^2$

10cm

$$\boxed{\textbf{Surface area of cone} = \boldsymbol{\pi rl} + \boldsymbol{\pi r^2} = \boldsymbol{\pi r(l + r)}}$$

l

r

Calculate the surface area of a cone with radius 4cm and slant height 6cm.

Surface area $= \pi r(l + r)$
$= 4\pi(6 + 4)$
$= 40\pi cm^2$

$6cm$

$4cm$

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Find the Surface Area of this Pyramid

7m

5m

10m
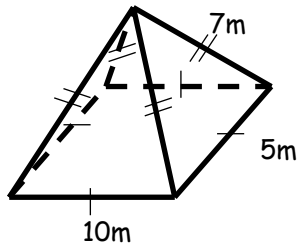
A square based pyramid has 5 faces, 4 of which are identical triangles and a base which is a square. To find the surface area, we need to find the area of each of the faces and add them all together.

7m   7m

4.9m

10m
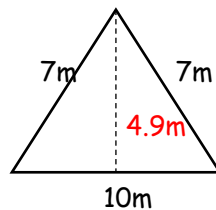
$c^2 - b^2 = a^2$ Sub in c and b

$7^2 - 5^2 = a^2$ Work out the left side

$24 = a^2$

$4.9 = a$ Square root

base x height ÷ 2

(10 x 4.9) ÷ 2   Sub in the base and height

= 24.49m²

= 97.98m²   Multiply by 4 as there are 4 triangular sides

$10 \times 10 = 100m^2$ ← Don't forget the base

$100m^2 + 97.98 = 197.98m^2$

Frustums

A frustum is usually a pyramid or cone with the top cut off flat
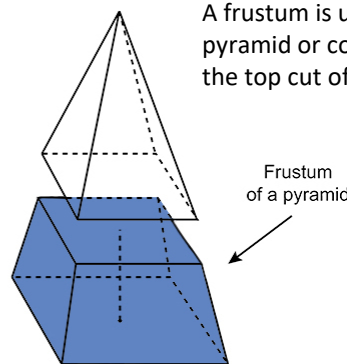
Frustum of a cone

Frustum of a pyramid

Volume
$$= Volume_{of\ large\ cone/pyramid} - Volume_{of\ small\ cone/pyramid}$$

Small cone   **Large cone**

10cm   5cm   5cm   10cm

2cm   2cm   10cm

4cm   4cm

Volume of large cone	$\frac{1}{3} \times \pi \times 4^2 \times 10 = 167.6cm^3$
Volume of small cone	$\frac{1}{3} \times \pi \times 2^2 \times 5 = 20.9cm^3$
Volume =	$167.6 - 20.9 = 147cm^3$

We use this method for pyramid shaped frustums as well.

Sometimes we may have to use similarity or Pythagoras to find missing lengths or heights.

Hegarty Maths Links

Area of Shapes: 539 – 543, 553 - 559
Volume of 3D Shapes: 567 - 583
Surface Area of 3D Shapes: 584 - 591
Similar Shapes: 608 - 621

Area and Volume

Similar Lengths

Question 1: Below are pairs of similar shapes. Find the missing lengths.

(a)

8cm
3cm

6cm
cm

(b)

5cm
4cm

15cm
cm

(c)

4cm 5cm
cm

16cm 20cm
12cm

(d)

2.5cm
1.5cm

15cm
cm
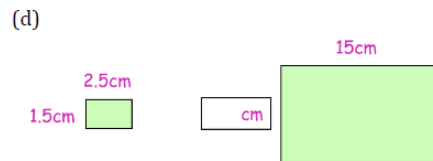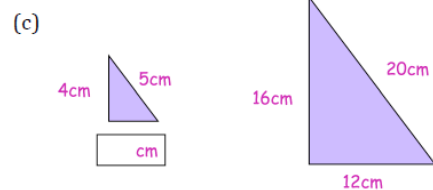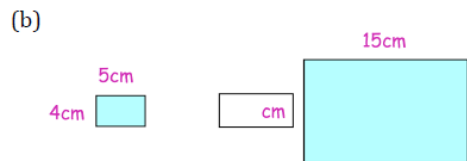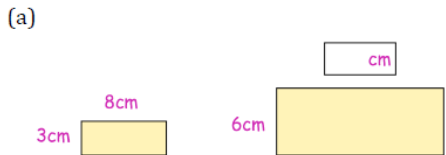
Similar Areas

Question 1:
Quadrilaterals P and Q are similar.
The area of quadrilateral P is 10cm².
Calculate the area of quadrilateral Q

3 cm
P

12 cm
Q

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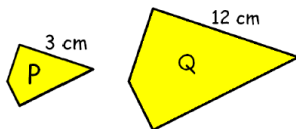
Question 2:
Below are to similar parallelograms.

4cm A

6cm B

The area of parallelogram A is 28cm².
Work out the area of parallelogram B.

Similar Volumes

Question 1:
Below are two similar pentagonal prisms

A

B

3cm

9cm
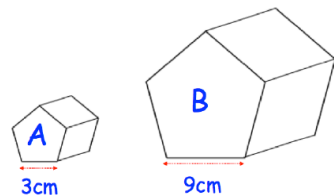
The volume of prism A is 15cm³.
Work out the volume of prism B

Question 2:
Below are two similar pyramids.

A

B

3cm

6cm
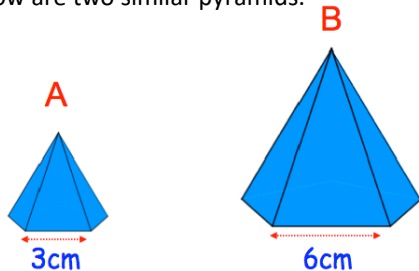
Pyramid A has a volume of 26cm³
Work out the volume of pyramid B.

Volumes of non-prisms

Find the volume of the following objects, leave your answer to 1 decimal place

(a) 8cm

(b) 22cm

(a)

20cm
7cm

(b)

9cm
8cm

(a)

7cm
6cm
9cm

(b)

8cm
6cm
6cm
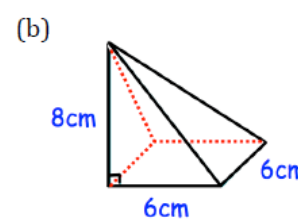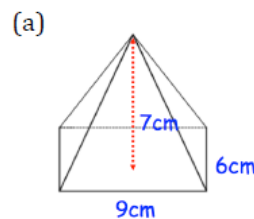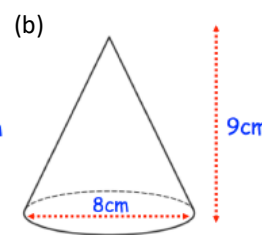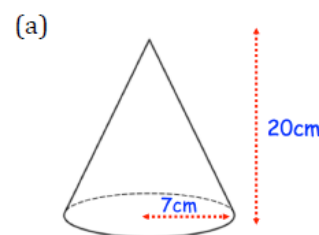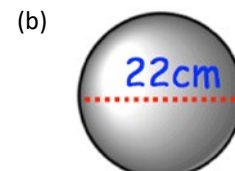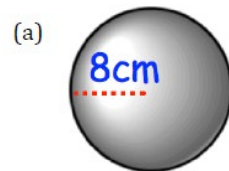
Surface areas of non-prisms

Work out the surface areas of the following objects, leave your answer to 1 decimal place

(a) 5cm

(b) 27cm

(a)

11cm
15cm
6cm

(b)

17cm
15cm
8cm

a)

5cm
8cm
8cm

b)

8cm
4cm
3cm
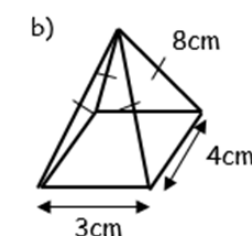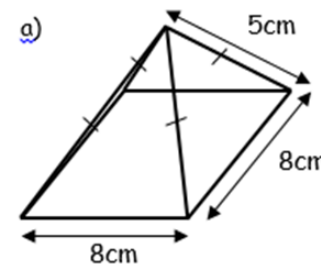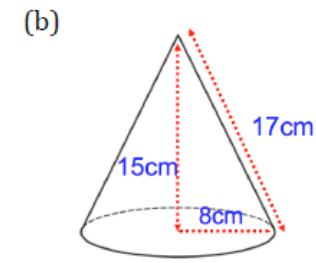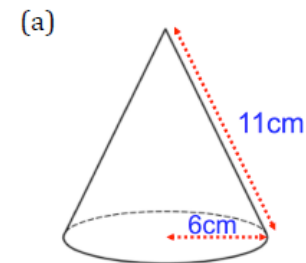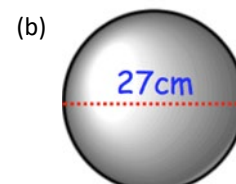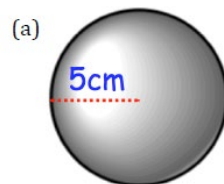
Frustums

Work out the volume of the following frustums

a)

9cm
2cm
3cm
6cm

b)

12cm
4cm
3cm

c)

5cm
8cm
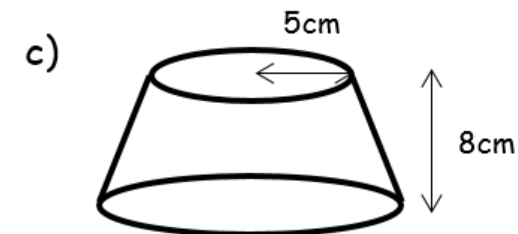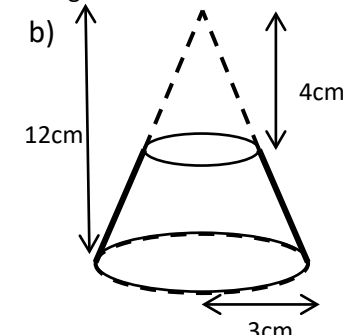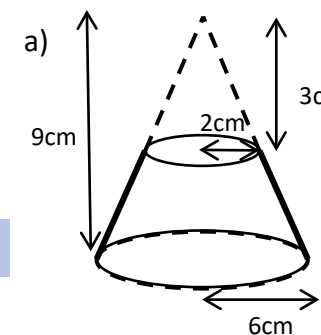
Linear Graphs

Key words and definitions

Parallel: Lines that have the same gradient and never meet.
Perpendicular: Lines that meet at a 90 degree angle.
Gradient: Steepness of a line.
y-intercept: Where a line crosses the y-axis.
Coordinate: How far along an axis a point is. In 2D space, a point will have two coordinates written as (x, y).
Plot: Draw points on a coordinate grid. When asked to plot a graph, you need to plot the points from the table of values and then join them together with a straight line.

Horizontal and Vertical Lines

A straight line can be **diagonal, vertical** or **horizontal**.

The x-coordinate of every point on this vertical line is 2.
The y-coordinate can have any value.
The equation of the line is $x = 2$.

The y-coordinate of every point on this horizontal line is 3.
The x-coordinate can have any value.
The equation of the line is $y = 3$.
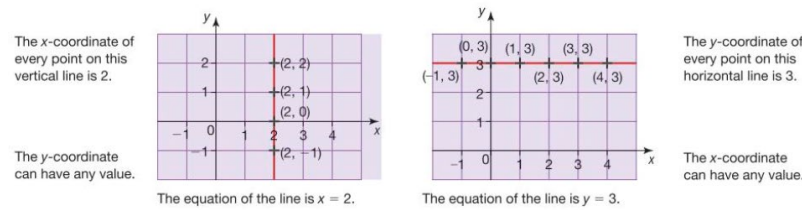
- Horizontal lines have equations of the form $y = c$.
- Vertical lines have equations of the form $x = c$.

c stands for a number.

Equation of a Straight Line

- The equation of a straight line is of the form $y = mx + c$, where m is the **gradient** and c is the **y-intercept**.

The y-intercept is the y-value where the graph cuts the y-axis.

The **gradient** of a line segment is calculated as
$$\frac{\text{Change in the } y\text{-direction}}{\text{Change in the } x\text{-direction}}.$$

$y = -2x - 1$
Gradient -2, cuts y-axis at $(0, -1)$

$y = 3x + 2$
Gradient 3, cuts y-axis at $(0, 2)$

$y = 3x - 1$
Gradient 3, cuts y-axis at $(0, -1)$

- **Parallel** lines have the same gradient.
- If line A has gradient m, any line perpendicular to line A has gradient $-\frac{1}{m}$.
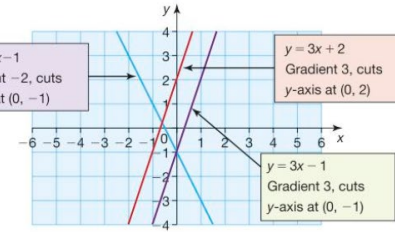
Plotting Straight Line Graphs

- The graphs of linear equations such as $y = 2x + 3$ are straight lines.

If you plot three points, you can tell if you have made a mistake.

To plot a graph of a function:
- Draw up a table of values
- Calculate the value of y for each value of x
- Draw a suitable grid
- Plot the (x, y) pairs and join them with a straight line.

One point must be wrong.

EXAMPLE

a Draw the graph of $y = 2x + 3$.
b Use the graph to find **i** the value of x when $y = 7$ **ii** the value of y when $x = 3\frac{1}{2}$

a Construct a table of values.
Choose four or five values, including negative values and zero.

x	-2	-1	0	1	2
y	-1	1	3	5	7

$(-2, -1)$ $(-1, 1)$ $(0, 3)$ $(1, 5)$ $(2, 7)$

Then plot the points and draw the line.
Make sure that your grid includes the smallest and largest y-values.

b i Find $y = 7$ on the y-axis. Draw a horizontal line to the graph line. Draw a vertical line to the x-axis. Read off the value of x.
$x = 2$
ii Find $x = 3\frac{1}{2}$ on the x-axis. Draw a vertical line to the graph line. Draw a horizontal line to the y-axis. Read off the value of y.
$y = 10$
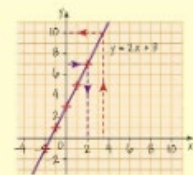
Solving Simultaneous Equations

You can solve **simultaneous** equations graphically. A solution is at a point of **intersection**.
For example, for the equations $3x - y = 2$ and $2x + y = 8$, the lines intersect at $(2, 4)$ so the solution is $x = 2$ and $y = 4$.

HOW TO
① Use the information in the question to form a pair of simultaneous equations.
② Solve the simultaneous equations using elimination, substitution or by drawing a graph.
③ Give your answers and check that they make sense.

Distance-Time Graphs and Velocity-Time Graphs

A distance–time graph shows information about a journey.
The gradient of a straight line in a distance–time graph is the speed of the object.

Velocity–time graphs also give information about a journey.

- The gradient of a straight line in a velocity–time graph is the **acceleration** of the object.
- The area under a line in a velocity–time graph is the distance travelled by the object.
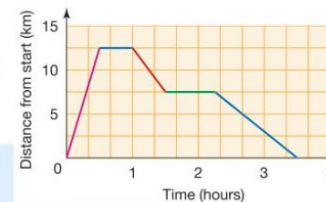
Velocity is speed in a certain direction.

Equation of a Straight Line Example

EXAMPLE
Find the equation of the line perpendicular to $y = 2x - 1$ that passes through $(4, 5)$.

$y = 2x - 1$ has gradient 2, so a line perpendicular to it has gradient $-\frac{1}{2}$.

$y = -\frac{1}{2}x + c$

At $(4, 5)$: $5 = \left(-\frac{1}{2}\right) \times 4 + c$

$c = 7$

The equation is $y = -\frac{1}{2}x + 7$.

If the equation is not in the form $y = ...$, rearrange it first, for example
$$3x + 2y = 12 \implies 2y = -3x + 12 \implies y = -\frac{3}{2}x + 6$$
Now you can see that the gradient is $-\frac{3}{2}$ and the intercept is 6.

Hegarty Maths Links

Straight line Graphs: 205 - 216
Solving Simultaneous Equations with Lines: 218, 219
Distance-Time Graphs: 874 – 879
Speed-Time Graphs: 880 - 886

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Constructions

Key words and definitions

Construct: Draw accurately with mathematical equipment.

Arc: A curved line, often drawn with a pair of compasses.

Perpendicular: Meeting at a 90 degree (right) angle.

Bisector: Dividing into two equal pieces.

Loci: Potential positions for an object on a diagram.

Region: A 2D space that satisfies certain criteria.

Equidistant: The same distance away.

Perpendicular Bisector

- The **perpendicular** bisector of a line bisects the line at right angles.

- To construct the perpendicular bisector of line *AB*
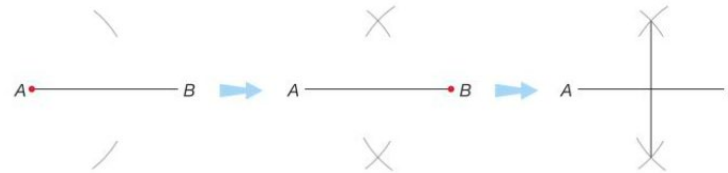
- All points on the perpendicular bisector of *AB* are equidistant from *A* and *B*.

Perpendicular From a Point

- To construct the perpendicular from a point *X* to a line *YZ*.
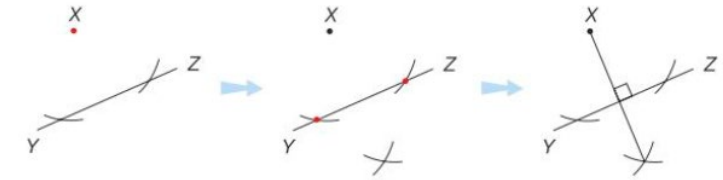
Start at the red dots.

Keep the same compass radius throughout the construction.

Constructing Triangles

You can **construct** a unique **triangle** when you know

two sides and the angle between them (SAS) or two angles and a side (ASA) or right angle, the hypotenuse and a side (RHS) or three sides (SSS).
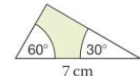
Any two triangles constructed using any one of these four sets of information will be congruent.

5 cm 30° 6 cm

60° 30° 7 cm

5 cm 3 cm

P 6 cm *R* 8 cm 10 cm *Q*
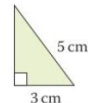
You will need a ruler and a protractor for SAS, ASA and RHS triangles.
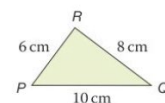
You will need a ruler and compasses for SSS triangles.

Angle Bisector

You can use a straight edge and compasses to construct an angle bisector.

- To bisect angle *ABC*
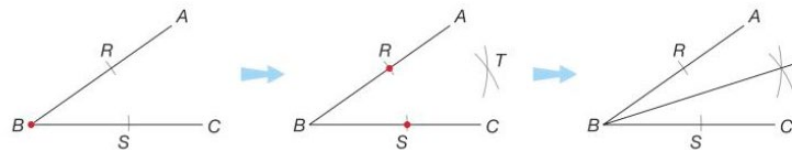
- All points on the angle bisector are **equidistant** from the arms of the angle.

Loci Example

EXAMPLE

P and *Q* are two points 2.5 cm apart on a line.

P   *Q*

Shade in the region that satisfies all these conditions:

- Right of the perpendicular to the line *PQ* at point *P*.
- Closer to *P* than to *Q*.
- More than 1 cm from *P*.

④
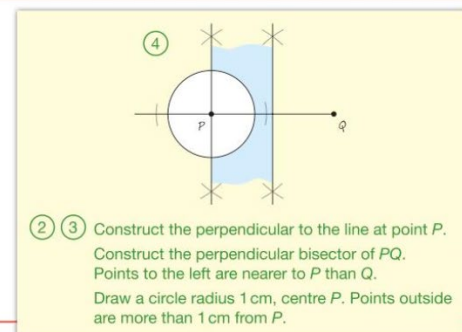
② ③ Construct the perpendicular to the line at point *P*.
Construct the perpendicular bisector of *PQ*. Points to the left are nearer to *P* than *Q*.
Draw a circle radius 1 cm, centre *P*. Points outside are more than 1 cm from *P*.

Loci

- The locus of a point which is a constant distance from another point is a circle.

- The locus of a point that is **equidistant** from two other fixed points is the **perpendicular bisector** of the line joining the fixed points.

- The locus of a point at a constant distance from a fixed line is a parallel line.

- The locus of a point equidistant from two intersecting lines is the angle bisector of the lines.

Hegarty Maths Links

Constructing Triangles: 683
Basic Constructions: 659 – 668
Loci: 674 - 679

North East Learning Trust

Key Terms

- **Masthead:** The title of the magazine
- **Coverline:** hints at the biggest articles in magazine.
- **Spornosexual:** a muscular representation of men
- **Metrosexual:** a fashion-centric representation of men

Target audience

- GQ is aimed at ABC1 men
- aged between 20 and 44
- Has now broadened to appeal to, inspire and empower younger readers too.
- Consumerist culture of men that frequently purchase products they see in the magazine.

VALs

- Promotes the idea of the "all-round man" (men must excel in all areas).
- "The greatest magazine around. The men's magazine with an IQ. Whether it's fashion, sport, health, humour, politics or music, GQ covers it all with intelligence and imagination."

Media Language

Image

- There is a long shot of footballer and celebrity Raheem Sterling, ensuring the magazine has star appeal for the audience.
- The black wings strongly establish him as a Proppian hero and BAME icon defending against racism in football.

Written Language

- GQ calls Sterling a "Guardian Angel", which connotes a sense of guidance and protection, suggesting he is looking after players and the values of the game by rooting out racism.
- "Why it's finally OK to own a belt bag" reinforces a metrosexual representation that focuses heavily on aesthetics.

Layout and Design

- The choice of gold font, connoting luxury and exclusivity – traits that the brand associates with.
- The coverlines frame his expose muscular abs and chest, reinforcing his role as the epitome as a spornosexual male icon.

Contexts

- Launched in 1931, GQ began its life as a quarterly publication called Gentleman's Quarterly, aimed specifically at fashion industry insiders.
- Rebranded in 1967 to GQ.
- GQ is a multiplatform brand. Each issue is published in print and digitally; it has its own acclaimed website and apps.
- 212,000 monthly print readership
- over 2 million monthly unique online users, and more than 2 million social media followers.
- Historically, British black men have been underrepresented on magazine front covers due to systemic racism within the industry.
- In December 2018, Raheem Sterling took to social media to highlight racism in the British press.
- Gary Lineker has called him "perhaps the most influential player in the game" off-field.

Representation

Race

- Raheem Sterling challenges Alvarado's threatening, aggressive and "dangerous" stereotype of black males.
- He strongly acts as a successful role model for a BAME audience.
- Creates an inclusive attitude to race to challenge Hall's idea of "Otherness".
- Epitome of British success as a key player and icon for the England football team.

Gender

- Raheem Sterling is a powerful role model for a young male audience.
- The choice to represent Sterling topless with his tattoos on show reinforces the stereotype of men as having to be hyper masculine, strong and muscular.
- Tattoos represent his nurturing role as a father (modern masculinity)

Other Key Ideas

- His thick silver jewellery reinforces the capitalist ideology that for a man to be thought of as successful you must be wealthy and make a lot of money.
- Conspicuous consumption: His jewellery is a prop used to highlight his wealth to others.

LUTHER

Media Language – Key

Diegetic sound: Sound that you can see the source of. Used to create a sense of realism.

Non-diegetic sound: Sound editing into the shot. Used to create tension.

Binary oppositions: direct opposites like good and evil/ strong and weak.

Audience

- **Audience Reception:**
  - **Preferred reading:** Audiences may admire Luther's maverick crime solving methods.
  - **Oppositional reading:** Audiences may disapprove of his violent responses to challenging situations and be disappointed at the lack of closure as Alice walks free.
- **Audience consumption:**
  - Active audiences: Some audiences watch crime drama to solve the crime alongside the lead protagonist.
- **Uses and Gratifications:**
  - **Personal Identity:** Black males make identify with Luther or aspire to be like him.
  - **Information:** N/A
  - **Entertainment/ escapism:** Watching intense plots such as Luther can help audiences escape boring everyday life.
  - **Social Interaction:** Audiences may enjoy talking about the developing character arcs.

Context

Product Context:

- Crime drama accounts for

- Produced by the BBC, (PSB) publicly funded broadcaster.
- Aired on BBC 1, Netflix and BBC worldwide Convergence with other technologies.

Social/ Cultural Context:

- **Gender equality**: the female representations reflect that women have gained power in the workplace:
  - Rose – Detective superintendent (Luther's boss)
  - Zoe – Humanitarian lawyer
  - Alice – a brilliant adversary/antagonist femme fatale character.
- **Racial equality:**
  - Luther's name could be a reference to Martin Luther King, the American civil rights leader.
  - Luther's ethnicity id not a major focus in the plot, reflecting greater social equality.
  - Luther is a clear black role model, as a senior officer in the police.
- **Representation of London:**
  - Many establishing shots of central London, modern buildings and skyscrapers.
  - Reflects the contemporary culture and success of London as a major financial/ business centre.

Representation

- **Stock Characters:**
  - **Maverick Detective:** Luther has both anger issues and a troubled past, which can be said to impair his judgement and crime solving methods.
  - **Femme Fatale:** Alice is represented as a dominant woman using her sexuality to intimidate Luther.
  - **Victim:** both Zoe and Alice are represented as the Proppian "damsel in distress" within the narrative.

Conventions

- **Settings:**

Industry

VOGUE

JULY 2021

LOVE AFTER
LOCKDOWN
*The return
of dating*

FIGHTING TALK
*Jourdan Dunn
meets
Anthony Joshua*

THE SHAPE
OF NOW
*Pleated skirts,
puff sleeves,
perfectly cut
trousers*

VOGUE'S
GUIDE TO
SUMMER
BEAUTY

The extraordinary life of
Malala
Survivor, activist, legend

Key Terms

- **Masthead:** The title of the magazine.
- **Typography:** The style of the writing.
- **Colour palette:** the colours used in the image.
- **Direct address:** when the media text talks directly to the audience.

Target audience

- Vogue is aimed at ABC1 fashion and style conscious women who are educated, sophisticated and wealthy.
- traditionally targeted an older female audience of 30–45-year olds.
- Has now broadened to appeal to, inspire and empower younger readers too.
- much more culturally diverse audience, under the influence of the new editor.

VALs

- Image-centric (image is the most important thing).
- "British Vogue is the authority on fashion, beauty and lifestyle, and is a destination for women to learn, be challenged, inspired and empowered"

Media Language

Image

- The headscarf she wears indicates her culture and her religion and is an essential part of her identity.
- She engages the reader with direct eye contact and a slight smile – a mode of address that is personal and welcoming but confident and self-assured

Written Language

- The word vogue means something that is trendy or popular.
- The caption: 'Survivor, Activist, Legend' is a lexical set of strength and empowerment for female audiences.

Layout and Design

- The all-uppercase serif font gives it a classic, architectural look, an aesthetic that commands respect.
- The use of the dominant colour red in this context suggests celebration, joy, luxury, power and strength, a call to action to identify with Malala, the survivor/activist/legend.

Contexts

- First issued as a high society diary in 1892.
- Became focused as a women's fashion magazine in 1902.
- British Vogue launched in 1916.
- Former model Edward Enninful was appointed editor in December 2017.
- In 2021, British Vogue had an average circulation figure of 191,000 issues.
- Vogue claims to have 5.3 million digital subscriptions and a social media following of 14.3 million.
- Historically, the editors of mainstream women's magazines claimed that featuring models of colour on their front covers badly affected sales of the magazine.
- Naomi Campbell has famously challenged the industry for this systemic racism throughout her career, advocating wider diversity

Representation

Race

- Challenges the negative stereotypes surrounding the Islamic identity (especially with Islamic woman).
- Malala is a powerful role model for BAME audiences as an empowered activist.
- Costume and colour contribute to celebrate her cultural heritage, challenging the white-washing common in the magazine industry.

Gender

- Malala is a powerful role model for young female readers in modern society.
- Malala is the Proppian hero of her own life story.
- Strongly challenges the negative stereotype that women are weak and need a male rescuer as a Damsels in Distress.

Other Key Ideas

- Positive representation of youth culture: she is an inspirational figure who has achieved so much, against all odds, at such a young age.
- Challenges Wolf's beauty myth, prioritising personality and education over appearance.
- Cultivation theory: creating a modern culture that supports gender equality.

Year 10 French – Knowledge Organiser – Holidays vocabulary

Holiday activities				Verb phrases	
visiter	to visit	faire de la planche à voile	to do windsurfing	c'était	it was
admirer	to admire	faire de la plongée	to do diving	ce n'était pas	it wasn't
passer (du temps)	to spend (time)	faire de l'équitation	to do horse riding	il y avait	there was / were
nager / baigner	to swim / to bathe	faire des promenades	to do a walk	il n'y avait pas de	there wasn't / weren't
acheter des cadeaux	to buy gifts / presents	faire des achats	to buy things	il n'y avait rien à	there was nothing to
manger des spécialités de la région	to eat regional specialities	faire une randonnée	to do a hike	on peut	you can
louer un vélo / un kayak	to hire a bike / kayak	faire une balade	to do a stroll / walk	on ne peut pas	you cannot
porter mes lunettes de soleil	to wear my sunglasses	faire une visite guidée	to do a guided tour		
apporter de la crème solaire	to bring some sun cream	aller à la pêche	to go fishing	**Dream holiday**	
bronzer	to get a tan	aller à l'étranger	to go abroad	mes vacances de rêve	my dream holiday
finir	to finish	aller à un parc d'attractions	to go to a theme park	mes vacances idéales	my ideal holiday
perdre	to lose	aller à un musée	to go to a museum	serait / seraient	would be
voir les monuments historiques	to see the historic monuments	rester	to stay	ce serait	it would be
boire de l'eau minérale	to drink mineral water	arriver	to arrive	si je pourrais	if I could
prendre des photos	to take photos	partir	to leave	si j'avais l'argent	if I had the money
apprendre une langue étrangère	to learn a foreign language	se reposer	to rest	si j'avais le temps	if I had the time
comprendre les habitants	to understand the inhabitants	se relaxer	to relax	j'irais	I would go
découvrir un autre pays	to discover another country	se détendre	to relax		
lire un roman / un livre	to read a novel / a book	s'amuser	to enjoy yourself		

Year 10 French – Knowledge Organiser – Holidays vocabulary

Transport		Accommodation, destinations and attractions		Advantages and disadvantages	
le voyage	the journey	le monde	the world	le pire c'est	the worst thing is
le trajet	the journey, the trip	un pays	a country	le meilleur	the best
le séjour	the stay	à l'étranger	abroad	c'est mieux	it's better
le vol	the flight	chez (ma tante)	at (my auntie's) house	ce qui m'intéresse c'est	what interests me is
en voiture	by car	dans une caravane	in a caravan	ce qui m'énerve c'est	what annoys me is
en car	by coach	dans un camping	in/on a campsite	ce qui me détend c'est	what relaxes me is
en avion	by plane	dans une auberge de jeunesse	in a youth hostel	ce qui m'amuse c'est	what I enjoy is
en bateau / ferry	by boat / ferry	station de ski	ski resort	ce qui m'ennuie c'est	what bores me is
en train	by train	station balnéaire	seaside resort	ce que j'aime le plus c'est	what I like the most is
à pied	on foot / by foot	au bord de la mer	by the seaside	ce que j'aime le moins c'est	what I like the least is
à vélo	by bike	à la plage	to/at the beach	ma destination préférée c'est	my favourite destination is
Time and seasons		à la montagne	to/in the mountains	je l'adore	I love it
en hiver	in winter	à la campagne	to/in the countryside	je l'aime	I like it
au printemps	in spring	le paysage	the landscape	je ne l'aime pas	I don't like it
en été	in summer	la mer	the sea	cher	expensive
en automne	in autumn	les magasins	the shops	rien de spécial / mémorable	nothing special / memorable
les vacances de Noël/Pâques	the Christmas/Easter holidays	l'hôtel de ville	the town hall	sale / propre	dirty / clean
une nuit	one night	le château	the castle	chaud / froid	hot / cold
une semaine	one week	les églises	the churches	bruyant / paisible	noisy / peaceful

Year 10 – Knowledge Organiser – the perfect tense

The perfect tense is a past tense which describes a one off, completed action or event in the past. For example:

I visited the museum

I went fishing

Both of these specific actions cannot be repeated again. You could go to the museum again or go fishing another time, but it's not the exact same event.

In French, the perfect tense is the most complicated tense you will use.

In French, verbs in the perfect tense fall into three groups:

1. Regular –er, –ir or –re	2. Irregular past participles	3. Uses être
j'ai visité j'ai mangé j'ai fini j'ai perdu	j'ai vu j'ai bu j'ai fait j'ai pris	je suis allé je suis resté je suis parti je me suis amusé

Most verbs fall into Group 1.
There are some additional exceptions but let's not worry about that for now ☺

Perfect tense meanings

The perfect tense is extra complicated because in English there are **two** possible meanings. In French there is only **one**.

j'ai joué	I have played
	I played

nous avons fini	we have finished
	we finished

Forming the perfect tense

To form the perfect tense we need two elements:

1. The present tense of *avoir* or *être*

2. The past participle

j'ai bronzé

As we know, the majority of verbs fall into Group 1 which use *avoir* – to have

Irregulars – Group 2
Some verbs have irregular past participles. They behave the same as Group 1 verbs, but the second element is different.

Unfortunately we just need to learn them.

faire (to do, to make)	fait
prendre (to take)	pris
voir (to see)	vu
boire (to drink)	bu
lire (to read)	lu

Year 10 – Knowledge Organiser – the perfect tense with être

Verbs in the third group use être in the perfect tense.

There are two layers to this group:

1. Part of the MRS VANDERTRAMP group

2. Reflexive verbs → the infinitive has se or s'

These are clear and distinct groups of verbs which we can learn. If they do not fall into this group, then they are either Group 1 or Group 2.

Some of these verbs are **very** common:

aller → to go
partir → to leave
sortir → to go out
arriver → to arrive
rester → to stay
venir → to come
devenir → to become

Irregulars – Group 3

Guess what, some verbs have irregular past participles in this group as well!

Predictably, we just need to learn them.

venir (to come)	venu
devenir (to become)	devenu

Forming the perfect tense

To form the perfect tense with être we need three elements:

1. The present tense of *être*

2. The past participle

3. Agreement for gender and/or plural

je suis allée *(f)*

nous sommes partis *(pl)*

Reflexive verbs in the perfect tense

If an infinitive has **se** or **s'**, this verb must use *être* in the perfect tense.

We need to change the **se** pronoun to reflect the subject of the sentence. For now, let's stick with *je* and *nous*.

se relaxer → je me suis relaxé
se reposer → je me suis reposée *(f)*
se détendre → nous nous sommes détendus *(pl)*
s'amuser → nous nous sommes amusées *(fpl)*

DESCRIBING MUSIC

When we describe the music that we hear, we have to use a lot of musical words. Music is another language, so we have to put a number of these words together to create a complete sentence.

DYNAMICS
Pianissimo – Very Quiet
Piano – Quiet
MezzoPiano – Kinda Quiet
MezzoForte – Kinda Loud
Forte – Loud
Fortissimo – Very Loud
Crescendo – Getting Louder
Diminuendo – Getting Quieter

TEXTURE
Monophonic – only 1 sound
Homophonic – more than 1 sound but all playing together
Polyphonic – more than 1 sound all playing differently
Melody – the tune
Harmony – the backing

RHYTHM
Long notes
Short notes
Repetitive rhythm
Jazzy Rhythm

The **FLUTE** plays the **MELODY** which is **SMOOTH** and in a **HAPPY**, **MAJOR KEY**. The **MELODY** starts off **PIANO** and gradually **CRESCENDO'S** to **FORTE**. The **KEYBOARD** then joins in accompanying the **FLUTE** playing the **HARMONY**. The **KEYBOARD** plays **CHORDS** underneath which makes the **TEXTURE HOMOPHONIC**. The **TEMPO** of the piece is **FAIRLY SLOW (ADAGIO)** and has lots of **LONG NOTES**.

MELODY
Smooth
Spikey
Wide range of …
Fragments
Mood

SONORITY
Strings
Brass
Woodwind
Percussion
Male singer
Female singer
What instruments/sounds can you hear?

HARMONY
Major – happy/peaceful
Minor – sad/uneasy
Uses chords
Long/short notes

MOOD
Happy   Uneasy
Sad   Sorrowful
Cheerful   Tense
Playful   Angry
Cheeky

TEMPO
Largo – very slow
Adagio – Slow
Andante – Walking pace
Allegro – Fast
Presto – very fast
Accelerando – Speeding up
Rallentando – Slowing down

Music for ensemble

Area of study 2 - Eduqas GCSE Music

eduqas

Texture

MONOPHONIC	A single melodic line.
HOMOPHONIC	A chordal style or melody and accompaniment: moving together.
POLYPHONIC	A more complex (contrapuntal) texture with a number of different lines.
Melody and accompaniment	A tune with accompaniment (e.g. chords).
Unison	All parts play/sing the same music at the same time.
Chordal	The music moves in chords (e.g. like a hymn/chorale).
Descant	A decorative, higher pitched line.
Countermelody	A new melody, combined with the theme.
Round	A short (vocal) canon.
Canon	The melody is repeated exactly in different parts but starting at different times, with parts overlapping.
Drone	Long held notes.
2-3-4 part texture	Textures which have 2/3/4 different lines.

Jazz and blues

Scat: vocal improvisation using wordless/nonsense syllables.

Improvised: music made up on the spot.

Blue notes: flattened 3rd, 5ths, 7ths.

Syncopation: off-beat accents.

Call and response: a phrase played/sung by a leader and repeated by others.

Walking bass: bass line that 'walks' up and down the notes of a scale/arpeggio.

Swing style: 'jazzy' rhythm with a triplet/dotted feeling.

A jazz ensemble may contain:

Rhythm section
- Drums
- Bass (guitar or double bass)
- Piano/guitar

'Horn section'
- Trumpet
- Trombone
- Saxophone

Some groups use a wider range of instruments e.g. clarinet, violin.

12 bar blues

Chords

I	I	I	I
IV	IV	I	I
V	IV	I	I/V

Example in C major

C	C	C	C
F	F	C	C
G	F	C	C/G

Chamber music

Chamber music was music for a small ensemble, originally played in a small room in someone's home.

Baroque: The **trio sonata** featured one or two soloists, plus **basso continuo** (which consisted of a low-pitched instrument such as a cello playing a bassline, with an instrument playing chords e.g. harpsichord).

Classical: String quartets (two violins, a viola and a cello) were popular. They had **four** movements, with the 1st movement usually in sonata form.

Romantic: Chamber music groups were more varied in the Romantic era, using a wider range of instruments (e.g. piano quintet, horn trio). Performances happened in larger concert halls as well as in small 'chambers'.

A piece of music for:

DUET	2 performers
TRIO	3 performers
QUARTET	4 performers
QUINTET	5 performers
SEXTET	6 performers
SEPTET	7 performers
OCTET	8 performers

Musical theatre

Musical numbers may include:

Solo: a song for one singer.

Duet: a song for two singers.

Trio: a song for three singers.

Ensemble: a song sung by a small group.

Chorus: a large group (usually the full company/cast).

Recitative: a vocal style that imitates the rhythms and accents of speech.

Overture: an orchestral introduction to the show, which usually uses tunes from the show.

The orchestra/band is used to **accompany** the voices and to **underscore**.

Voices

Soprano
Alto
Tenor
Bass

The band/orchestra (sometimes called the 'pit' orchestra), may use **strings, woodwind** (sometimes called 'reeds'), **brass** and **percussion** and/or a rock/pop band, depending on the style. Most shows also use keyboards or synths.

Year 10 - Drugs and Alcohol

KEYWORDS:

Drug – any chemical that changes the way the mind and body work.

Depressants – chemicals that reduce brain activity and make you sleepy e.g. cannabis, alcohol, and solvents.

Stimulants – chemicals that increase brain activity and make you feel alert e.g. caffeine and cocaine.

Hallucinogens – chemicals that cause you to see and hear things that are not real e.g. LSD, magic mushrooms

Painkillers – chemicals that reduce pain and create numbness e.g. aspirin, heroin

Performance Enhancing Drugs (PEDs) – chemicals used to change hormones, increase pain thresholds for performance in sport.

Peer Pressure – influence from peer group

Dependency – inability to stop doing something harmful

Vaping – inhaling a vapour norming containing Nicotine via an electronic device.

PAYING THE PRICE OF ALCOHOL

Reasons why people drink...

Availability: It is widely available, and some pubs and off-licences are not as strict as they should be. People of legal drinking age have been known to purchase it for younger people.

Peer pressure: some are influenced or pressurised to drink by 'friends'

Packaging: there are no real health warnings on the packaging and young people tend not to stop and think about its dangers. Colourful drinks like Alcopops are eye-catching.

Advertising: drink adverts are on TV, social media, posters and magazines.

Culture: Growing up in a 'binge-drinking' culture. Seeing others dinking and drunk may encourage them to engage in similar behaviour.

Pricing: Happy hours and drink promotions raise the debate about whether it is too cheap.

Home environment: approx. 40% of alcoholic drinks sold are drunk at home. Parental attitudes to alcohol can influence whether a young person drinks under the age of 18.
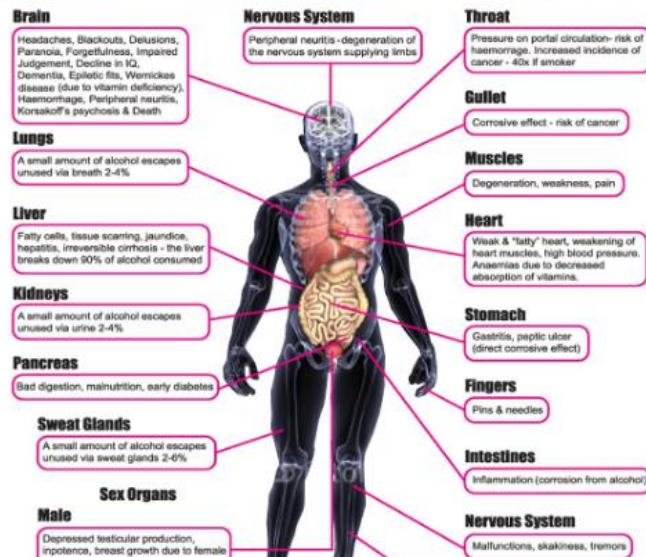
Consequences of Substance Abuse:

- Anti-social behaviour
- Impaired judgement
- Violence and injuries
- Vomiting
- Slurred speech
- Heart attack
- Seizures
- Cancer
- Liver or heart disease
- Nerve damage
- Stress, anxiety, depression
- Underage sex
- Debt
- Family breakdown

Illegal drugs are classified A-C and it is illegal to possess, supply or make them.

	Drug	Possession	Supply and production
Class A	Crack cocaine, cocaine, ecstasy (MDMA), heroin, LSD, magic mushrooms, methadone, methamphetamine (crystal meth)	Up to 7 years in prison, an unlimited fine or both	Up to life in prison, an unlimited fine or both
Class B	Amphetamines, barbiturates, cannabis, codeine, ketamine, methylphenidate (Ritalin), synthetic cannabinoids, synthetic cathinones (for example mephedrone, methoxetamine)	Up to 5 years in prison, an unlimited fine or both	Up to 14 years in prison, an unlimited fine or both

It is illegal for people under the age of 18 to purchase smoking or vaping products.

BUSTED 5 Vaping Myths

ARGUMENTS FOR LEGALISING DRUGS:

- Some drugs such as cannabis relieve symptoms and pain
- Police resources could be better used for more violent crimes
- Likely to disband the black market (organized crime/gangs etc.)
- Drug users could afford to fund their habit without stealing or prostitute, etc.
- Drug users would be able to seek help without having to worry about punishment

ARGUMENTS AGAINST LEGALISAING DRUGS:

- Illegal drugs are illegal because they are harmful
- Legalisation has been tried before and failed miserably
- Many people could be more tempted to experiment
- The government will not be protecting people from harm

Eid-ul-Fitr

Key Facts:
- Celebrated by Muslims worldwide after fasting month of **Ramadan** where Muslims don't eat during daylight hours.
- Date changes each year.
- Celebrated when the crescent moon is sighted in the 10th months of Islamic calendar
- Festival lasts three days each year.

Social Aspects:
- Wear best clothes and decorate homes and exchange gifts.
- Share feasts with family and friends
- Give to charity **(Zakat)**
- Special foods depend on location e.g., Baklava is exchanged (sweet pastry) in Turkey.

Religious Aspects:
- Celebrated at home/mosque.
- Honours **Muhammad** and **Quran** being revealed to him by **Allah.**
- Special morning Eid prayers
- Special greeting of 'Eid Mubarak' meaning 'Blessed Eid'

Story behind the festival:
According to Islamic tradition, the festival of Eid ul Fitr was established by the Prophet **Muhammad** after he migrated from Mecca to Medina. The first Eid ul Fitr was celebrated in the year 624 CE in Medina, after the Muslims had completed their first month-long fast during **Ramadan.**

Importance of Eid-ul-Fitr:
- Brings Muslims closer to **Allah** where they thank him for the strength and opportunities, he gives them.
- Muslims can seek forgiveness and strengthen their relationships with friends, family, and community.
- Gain empathy with those less fortunate and serve **Allah** by helping others.

KKYWORDS:

Diwali

Story behind the festival:

The Ramayana is an epic poem telling the story of Hindu deities Rama and Sita.

Rama is sent away to a far-off country by his father. Rama leaves with his wife, Sita, but Sita gets kidnapped by a wicked demon called **Ravana**. Rama and Lakshman searched many months for Sita. Finally, they asked Hanuman, king of the monkey army, for help. Hanuman could fly. The monkey god **Hanuman**, helps Rama save Sita and kill Ravana so they can finally return home. This story is about good overcoming evil. Lamps were lit to guide Rama and Sita home, and therefore most Hindus light Diya lamps during Diwali today.

Importance of Diwali:
- Believed to be the ultimate victory of good over evil.
- Diya lamps are seen as the eradication of darkness and hope for a bright future.
- It unites people from all parts of the country and fills everyone's hearts with joy, happiness, and compassion.

Key Facts:
- Happens each year between October and November.
- Lasts for 5 days
- Celebrated by Hindus and some Sikhs and Buddhists
- Diwali means **'row of lights.'**

Social Aspects:
- Exchanging gifts
- Sharing meals
- Firework displays
- Singing and dancing
- Give to charity (Dana)
- Lighting Diya Lamps to guide the way.

Religious Aspects:
- Celebrated at home or in the mandir.
- Honour Goddess Lakshmi for good fortune by cleaning home and lighting Diya Lamps.

Dana – Hindus give money to the poor.
Lakshmi – Hindu goddess of fortune.
Diya Lamps – Hindus give money to the poor.
Ramayana – 10th month of Islamic calendar
Mandir – Hindu place of worship
Deity – a god or goddess with divine status
Shawwal – 10th month of Islamic calendar
Zakat – one of the 5 pillars (charity)
Ramadan – month long period of fasting

Allah – Muslim term for God
Quran – Muslim holy book
Mecca – Muslim holy place in Saudi Arabia
Prophet – Holy messenger of God
Eucharist – sharing bread and wine
Sermon – a religious speech
Resurrection – raised from the dead
Crucifixion – method of capital punishment
Atone – make amends

Incarnation – God took human form by becoming Jesus
Ascension – when Jesus returned to heaven after resurrection
Lent – 40 days leading to Easter
Last Supper – Jesus' final meal with disciples before crucifixion
Advent – four Sundays leading to Jesus' birth
Nativity - story of the birth of Jesus
Orthodox - conforming to traditional practices
Wreath – arrangement of leaves and ornaments
Salvation Army – Christian charity that helps the less fortunate

Easter

Key Facts:
- Begins with **Lent** – 40 days leading to Holy Week.
- Christians give up something to remember Jesus fasting in desert and being tempted by the devil.
- Date varies – celebrated on first Sunday after the full moon on or after 21 March

Religious Aspects:
- **Palm crosses** are given to remember Jesus' entrance into Jerusalem and his crucifixion.
- **Holy Communion** – sharing bread and wine (Eucharist) to remember Jesus dying to atone for human sin.
- Roman Catholic priests wash feet of 12 people to remember Jesus washing his disciple's feet at the **Last Supper.**
- Hymns, prayers and sermons on Good Friday to reflect on Jesus' sacrifice.
- Special church service - Jesus believed to have resurrected at dawn on Easter Sunday.

Social Aspects:
- Families dress in new clothing and gather to share meals.
- People exchange chocolate eggs wrapped in foil.
- Easter eggs are said to represent Jesus' resurrection.
- Decorating eggs is a tradition dating back to the 13th century

Wider Community:
GREECE – eggs painted red to represent the blood of Christ. Cracking eggs symbolic of Jesus breaking out of tomb. **USA** - annual Easter egg roll held on the lawn of White House. **FRANCE** - around 15,000 eggs are used to make a large omelette. **POLAND** – people throw water over each other (wet Monday) to recall Baptism of Polish prince.

Holy Week Timeline

Palm SUNDAY   **Maundy** THURSDAY   **Good** FRIDAY   **Holy** SATURDAY   **Easter** SUNDAY

Palm Sunday (Sunday before Easter)
Celebrates Jesus's arrival in **Jerusalem.** Crowds of people gathered to greet him, throwing down **palm branches** on the road. Some Christians keep palm crosses in their homes all year as a symbol of their faith.

Maundy Thursday (Thursday before Easter)
Christians remember when Jesus ate the **Passover meal** with his disciples, breaking bread and drinking wine **(Last Supper).**

Good Friday (Friday before Easter Sunday)
Commemorates the execution of Jesus by **crucifixion.** Good Friday is a day of mourning in church. During special Good Friday services Christians remember Jesus's suffering and death on the cross, and what this means for their faith. In some countries, there are special Good Friday processions, or re-enactments of the Crucifixion.

Holy Saturday
The day when **Jesus' body was in the tomb.**

Easter Sunday
Marks Jesus's **resurrection**. After Jesus' crucifixion, his body was buried in a cave tomb that was closed with a large stone and guarded by Roman soldiers. **Mary Magdalene** and some of Jesus's disciples visited the tomb and found the stone moved and Jesus's body gone. Jesus was seen later by Mary and the disciples. His followers realised God had raised Jesus from the dead.

Key Facts:
Christmas is celebrated on the 25th December each year. Or, on 7th January for Orthodox Christians. The time in between is known as the 12 days of Christmas. The time leading up to Christmas is known as **Advent** which is preparation for the Second Coming of Christ. It begins on the closest Sunday to November 30th.

Story Behind Christmas:
- Christmas is the celebration of Jesus' incarnation. There are two stories on the birth of Jesus in the gospels of Luke 2:1-20 and Matthew 2:1-12.
- An angel visited to announce the birth of Jesus.
- Jesus was born in Bethlehem to the Virgin Mary. Mary was married to a man named Joseph.
- Jesus was visited and worshipped by shepherds who were guided there by an angel (Luke) and wise men who were guided by a star and offered gifts (Matthew).

Significance to believers:
His birth gave Christians hope of a new beginning. It also gave the possibility of a restored personal relationship with God and eternal life with Him after death.

Christmas is a time to reflect on the need to peace in the world and helping the less fortunate. The Salvation Army work to shelter the homeless remembering the struggle Jesus' family faced at his birth.

Christmas

Religious Aspects:
- Christingle service – Jesus coming as the light of the world to show people the way to God
- Service that includes a nativity play - Sunday before Christmas
- Midnight mass reflecting the holiness of the night and the joy Christians feel at Jesus' birth

THE SYMBOLS OF CHRISTMAS

ORIGINS
The first missionaries in Europe took advantage of the pagan traditions to evangelize. One of them consisted of lighting candles during the winter, which represented the sun god.

CIRCULAR SHAPE
It represents God's eternal love for us and also speaks of our own love towards the Lord and others, which needs to be renewed constantly.

THE ADVENT WREATH

THE BRANCHES
Green is the color of hope and life. Our biggest hope should be to achieve a closer union with God as the tree and its branches.

THE CANDLES
The four candles of the wreath are lit each Sunday of Advent. They represent the dissipation of darkness as we approach the birth of the Lord.

Social Aspects:
- **Christmas cards** - sold in aid of different charities. Time of peace and goodwill.
- **Christmas tree** - The evergreen was offered as a symbol of Christianity. Put up on Christmas Eve.
- **Angel or star on Christmas tree** – the angels told the shepherds about Jesus' birth, and the wise men followed a star to Jesus
- **Carol services** – songs and bible readings
- **Exchanging presents** – wise men gave Jesus presents. Jesus is the ultimate gift to the world.

Paper 1: Health and components of fitness

Health and fitness:

Fitness definition: 'The ability to meet the demands of the environment'
Explanation: Are you fit enough to do your everyday tasks in your everyday life. e.g. the fitness needed to be a window cleaner to that of an office worker

Health: 'A state of complete emotional, physical and social wellbeing ant not merely the absence of disease or infirmity'
Explanation: Not only are you free from disease and infirmity you are socially active, physically fit and have no emotional problems such as stress

The relationship between health and fitness:

Regular Exercise → Increased Fitness → Health benefits (cycle)

- Exercise improves fitness, an increase in fitness will improve performance
- Exercise improves all aspects of health (physical, social, emotional)
- If you are not healthy enough to take part in regular exercise your fitness will deteriorate causing your performance to drop. Health benefits will not be gained

Cardiovascular fitness	Muscular Endurance	Flexibility	Reaction Time	Power	Speed	Agility	Balance	Coordination	Strength
'The ability of the heart and lungs to supply oxygen to the working muscles'	'The ability of a muscle group to undergo repeated contractions, avoiding fatigue'	'The range of movement possible at a joint'	'The time taken to respond to a stimulus'	'Is the ability to do strength performances quickly' Power = Strength x Speed	'The amount of time it takes to perform a particular action or cover a particular distance'	'Is the ability to change position of the body quickly while maintaining control of the movement'	'Is the ability to retain the body's centre of mass above the base of support' static or dynamic	'Is the ability to use two or more body parts together smoothly and efficiently'	'The ability to overcome a resistance. it requires a force to be applied to a muscle or muscle group'
Explanation	**Explanation**	**Explanation**	**Explanation**	**Explanation**	**Explanation**	**Explanation**	**Explanation**	**Explanation**	**Explanation**
They need good cardiovascular fitness to be able to maintain a high standard of performance throughout the race/match.	They need a prolonged additional oxygen delivery to the working muscles to repeat muscle contractions over a long period of time without tiring	Performers need good flexibility to be able to get into position without getting injured and to perform complex movements	Performers need to react to a stimulus. A stimulus can include: a ball, whistle, starters gun, or an opponent	Performers need power to improve performance. Speed and strength are needed in sports where you throw jump kick and sprint	Performers need speed to get from one position to another. This may be leg speed to run or arm speed when throwing or hitting	Performers need agility to change direction quickly. This can be used to evade opponents or move around the court or pitch quickly	Performers need balance so they don't fall over. E.g. in gymnastics when performing a balance (static) or travelling across the beam (dynamic)	Performs need coordination when they are using two body parts at the same time. It can be used when aiming, or striking/hitting a ball	Performers need Strength to support weight **(static)** lifting a weight **(maximal)** punch **(dynamic)** throw **(explosive)**
Sports	**Sports**	**Sports**	**Sports**	**Sports**	**Sports**	**Sports**	**Sports**	**Sports**	**Sports**
Games players Long distance runners/rowers	Cyclist (legs) Boxing (punching) Swimmer (arms/legs)	Gymnasts Goal keepers Divers	Sprinters Badminton players Rugby players	Shot put Football (kicking) High jump	Sprinting Badminton Javelin thrower	Rugby side-step Tennis Badminton	Gymnastics Skiing Hammer throw	Tennis Archery Football	Weight lifting Rugby Gymnastics
Fitness Test	**Fitness Test**	**Fitness Test**	**Fitness Test**	**Fitness Test**	**Fitness Test**	**Fitness Test**	**Fitness Test**	**Fitness Test**	**Fitness Test**
Multi stage fitness test	Sit-up bleep test	Sit and reach	Ruler drop test	Vertical jump	30m sprint	Illinois agility run	Stork balance test	Wall toss	Grip dynamometer 1 rep max test

Key Words

Akhirah	Life after death	Tawhid	Oneness of God
Al- Qadr	Shi'a	Shi'a	Muslims who believe in the Imamate, successorship of Ali
Kutub	Holy books	Six articles of faith	The foundations of the faith in Sunni Islam; six key beliefs: Tawhid (the Oneness of God), Angels, Holy Books, Prophethood, Akhirah, Predestination
Malaikah	Angels	Sunni	Muslims who believe in the successorship of Abu Bakr, Umar, Uthman and Ali
Omnipotence	All-powerful; belief about the nature of God and one of the 99 Beautiful Names of Allah	The five roots of Usul ad-Din	The foundations of the faith in Shi'a Islam; five key beliefs: Tawhid (the Oneness of God), Adalat (justice), prophethood, imamate, resurrection
Risalah	Prophets	The imamate	One of the Five Roots of Usul-ad-Din, 'Leadership.' Shia belief in the twelve imams who succeeded Muhammad as the leaders of Islam

Key Ideas

The six articles of faith in Sunni Islam and the five roots of Usual ad-Din in Shi'a Islam	TAWHID – Belief that there is only one God. ANGELS – Belief in angels, who passed on God's message to the prophets THE HOLY BOOKS - Respect for the Holy Books and particularly the Qur'an, the highest authority in Islam. THE PROPHETS - Respect for the prophets (rasuul) and particularly Muhammad, who received the final revelation of Islam from God. THE DAY OF JUDGEMENT – The belief that at the end of the world, every person will be judged by God and sent to paradise or hell THE SUPREMACY OF GOD'S WILL – Belief that nothing happens unless God wants it to happen		TAWHID – There is only one God (who is not divided into parts) RISALAH – Prophets are an important chancel of communication between God and humans. IMAMATE – Divinely appointed leaders, from the descendants of Muhammad. ADALAT (divine justice) – God is just and fair. When he judges humans, he will base it on how they have behaved. MI'AD (day of resurrection and judgement) – Muslims believe they will be resurrected from the dead on the Day of resurrection and then judged by God on the Day of Judgment. This is the start of the afterlife (Akhirah).
The nature of God	Tawhid – the oneness of God 'He is God the One' - there is only one God 'God the eternal' – God has always existed 'He begot no one not was He begotten' - God was not born or came out of something else	'The supremacy of God's will Muslims believe God's will is supreme (most powerful). Nothing happens unless God allows it to happen. This helps to give Muslims confidence when something goes wrong – part of God's plan.	Omnipotence – God is all powerful: 'all power belongs to God' Mercy – God shows compassion when humans do wrong: 'My Lord is merciful and loving' Justice – God is just and does not oppress anyone at any time. He ensures humans get what they deserve when he judges then. Beneficence – God is kind and loving Fairness – God treats humans fairly: 'On the Day of Resurrection…the Record of Deeds will be laid open'
The role of angels (Malaikah)	Angels are God's messengers, often speak with prophets to give God's revelation, do not have free will and are made from light, with wings.	Isra'il – angel of death Jibril – angel of revelation. He brings good news and revealed the words of the Qur'an starting on the night of Power. Mika'il – angel of mercy. He asks God to forgive humans' sins. He rewards humans for good deeds and is in charge of rain, thunder and lightning.	
Predestination and Akhirah	Predestination God already knows the future and what will happen in each human being's life. This is balanced with the belief humans have free will and make their own decisions. 'Only what god has decreed will happen to us'. Human Freedom God knows everything that is going to happen because he is omniscient. Some Muslims think he doesn't decide what will happen as humans have free will, but God already knows what decisions and actions they will take.	Day of Judgment God will hold humans accountable for their actions. Life is a test which humans will be rewarded for good actions by going to heaven and punished for bas actions by going to hell. 'Every soul will taste death ad you will be paid in full on the Day of Resurrection'.	Akhirah A person's soul is taken by the angel Isra'il to barzakh where it waits until judgement. When the Day of judgement arrives the angel Israfil blows a trumpet, and all humans will be resurrected. They will face God and be judged according to their deeds. Humans will be responsible for their intentions (niyyah). If a person's deeds are good, they will be rewarded with heaven (Jannah) and bad punished in hell (Jahannam).

Prophets (Risalah)	Prophets are chosen by God to give out the message of Islam. The first prophet was Adam and the final prophet was Muhammad. They are important because they are role models, they are a method of communication between God and humanity, and they are sinless.	**Adam** First steward on Earth and first prophet. He was made from clay and God breathed life into him. Whilst he disobeyed God by eating the forbidden fruit he asked for forgiveness: 'Adam disobeyed his Lord and was led astray'.	**Ibrahim (Abraham)** Showed his faith to God by standing up to idol worshippers. He followed God's instructions and showed commitment by being prepared to sacrifice his son: 'Abraham was truly an example: devoutly obedient to God and true in faith' Showed his faith to God by standing up to idol worshippers. He followed God's instructions and showed commitment by being prepared to sacrifice his son: 'Abraham was truly an example: devoutly obedient to God and true in faith'		Muhammad Also known as the seal of the prophets. He restored the Ka'aba to the worship of one God. He defended Islam by performing the Lesser Jihad. He received the Qur'an. His first revelation of the Qur'an by the angel Jibril was on the Night of Power.

Holy Books	**Qur'an** Only surviving book that is complete revelation in its original language that has not been changed. It is the final revelation to the final prophet, Muhammad. The angel Jibril started to reveal the words of the Qur'an during the night of Power and these revelations have continued over approximately 23 years It includes stories, history and teachings which act as a guide.	**Torah (Tawrat)** Contains teachings and laws on how people should live, including the Ten Commandments. It is referred to as 'guidance and light'.	**Pslams (Zabur)** Are prayers and poems used for the worship of God.	**Gospel (Injil)** The revelation to Jesus predicted the coming of the prophet Muhammad.	**Scrolls of Abraham (Sahifah/Suhuf)** Are known as the first holy book in Islam revealed to Ibrahim (Moses).

The Imamate	When Muhammad died it wasn't clear who should succeed him and so Muslims split into two groups: Sunni and Shi'a. Sunni Muslims believe Abu Bakr was elected as their first leader (Caliph). Shi'a Muslims believe Muhammad named his cousin and son-in-law Ali as his successor. He was the first Imam. When Ali died his son became the Imam. Each Imam that followed was the son of the previous Imam. The Imamate is the name given to the divine appointment of the Imams. 'I am putting a successor on Earth'.	The Twelver branch of Shi'a Islam teaches there have been 12 Imams in total. The twelfth Imam has been kept alive by God, hidden on Earth and will return in the future. The Imamate are infallible – free from error and sin, receive divine inspiration, are role models and are the representatives of Allah on Earth.

AQA Religious Studies A – Islam Practices

Key Words			
Ablution (wudu)	Ritual washing before prayer	Khums	One of the Ten Obligatory Acts in Shi'a Islam; practice of alms giving
Ashura	Important festival in Shi'a Islam, to commemorate the martyrdom of Hussein (Muhammad's grandson). Sunni Muslims observe Ashura as a day of repentance for sins in the belief that they will be forgiven	Salah	Prayer
Hajj	Pilgrimage	Sawm	Fasting
Id-ul-Adha	Festival; celebration of the Prophet Ibrahim's willingness to sacrifice his son for Allah	Shahadah	Declaration of faith
Id-ul-Fitr	Festival; celebration that comes at the end of Ramadan and marks the end of fasting.	The Five Pillars	Important duties for Sunni Muslims which support the main principles of Islam. Shahadah, salah, zakah, sawm and hajj.
Jihad	The struggle for Islam/God.	Zakah	Almsgiving

Key Ideas			
The five pillars of Sunni Islam and ten obligatory acts of Shi'a Islam	**The Five Pillars** Shahadah – declaration of faith. Believing and at certain times saying "There is no God but Allah and Muhammad is his prophet". Salah – prayer. Muslims pray 5 times a day. Sawm – Fasting in the month of Ramadan. No food, drink or sex during daylight hours. Zakah – Almgiving. Muslims give 2.5% of their wealth to charity. Hajj – Pilgrimage to Makkah. Perform at least once in their lifetime.	**The Ten Obligatory Acts** Salah Sawm Zakah Hajj Jihad – Lesser Jihad (struggle to defend Islam) and Greater Jihad (personal struggle to be a good Muslim) Khums – Giving 20% of surplus income or profits on; war gains, minerals, treasure, precious items, land Amr-bil-Maruf – Following the straight path by doing what is right (halal) Nahy Anil Munkar – Prohibiting what is bad Tawallah – Following the Prophet Muhammad and his family. Avoiding that which is not allowed (haram) Tabarrra – Staying away from those that are against God. Dissociate with enemies.	
Shahadah	Declaration of faith. It is said at key moments in a Muslim's life: when someone becomes a Muslim, when a Muslim wakes up and goes to bed, whispered into the ear of a new-born baby, the last thing a person says before they die and when they are buried. Sunni – There is no God but Allah and Muhammad is his prophet Shi'a – There is no God but Allah, Muhammad is his prophet and Ali is the representative of God		
Salah	Brings Muslims closer to God. Muhammad told Muslims to pray 5 times a day. It's one of the 5 pillars of Sunni Islam and the ten obligatory acts of Shi'a Islam. It unites the Muslim community (Ummah).	Wudu – Before prayer Muslims should find a clean place and perform. This prepares them physically and spiritually. Each part of the body is cleaned 3 times.: 'Allah loves those who turn to him and who care for cleanliness' Rak'ahs – set way of performing salah involves prostration and movements.	Muslims pray facing the direction of Makkah. Sunni Muslims pray 5 times a day and Shi'a Muslims pray 3 times a day. Friday prayer – Jummah. All men are expected to attend, women may do so. Cannot be performed individually - it develops the concept of brotherhood as it gives opportunity for people to meet and socialise.
Sawm	It's one of the 5 pillars of Sunni Islam and the ten obligatory acts of Shi'a Islam. Muslims fast during the month of Ramadan. Both the Qur'an and the hadith make it clear that Muslims should fast: 'You who believe, fasting is prescribed for you'. Exempt from fasting: pregnant women, people that are ill, young children and the elderly.	Muslims believe that they are rewarded by God for fasting. It reminds them to be thankful to Gd for the food they are able to eat. It gives them a greater awareness of those who may not have enough food to eat.	Ramadan is the month in which Muhammad first started to receive the revelations of the Qur'an. The Night of Power was the first time Jibril appeared to Muhammad in a cave to reveal the Qur'an. Some Muslims may stay awake on the odd nights in the last ten nights and focus on worship. They may read the Qur'an and reflect on its meaning or offer voluntary prayers and pray for forgiveness of sin.
Zakah	It's one of the 5 pillars of Sunni Islam and the ten obligatory acts of Shi'a Islam. Muslims fast during the month of Ramadan. It is 2.5% of a Muslim's savings over a certain amount, given as alms each year to help others: 'pay the prescribed alms'.	Muhammad said in his final sermon to "pay your wealth in zakah'. The Qur'an says to pay in alms. It purifies the rest of a Muslim's money. It creates equality in society to help reduce poverty. Some Muslims pay zakah monthly, and others annually. Some give it directly to the mosque and others give it to a charity.	Some Shi'a Muslims don't end up paying zakah because they believe that it only applies to gold and silver coins, cattle and crops. So iy may only be paid by farmers and those with gold/silver. They follow the instruction to give a fifth (20%) of year surplus income or profits to those in need, known as khums.

Hajj	Is the pilgrimage to Makkah. It's one of the 5 pillars of Sunni Islam and the ten obligatory acts of Shi'a Islam. 'Perform Hajj if you can afford it'. Muslims complete set rituals during pilgrimage. Many of the actions performed on Hajj link to the life of Ibrahim or Muhammad.	Ka'aba – Muslims walk around 7 times in an anti-clockwise direction (tawaf). Some Muslims believe that Ibrahim rebuilt the Ka'aba with his son. Muhammad performed tawaf. Muzdalifah – Muslims collect stones Mina – Muslims throw stones at the Jamarat. This reminds them when Ibrahim threw stones at the devil that tried to tempt him not to complete the sacrifice of his son. Today it represents getting rid of temptation and rejecting evil. Arafat – Muslims stand before God and pray and ask for forgiveness. This reminds them of the Day of Judgement where they will stand before God.	Hajj brings Muslims closer to God. It shows self-discipline and strength in belief. It means sins are forgiven and gives a fresh start to life as a Muslim. Promotes importance of the Ummah.
Jihad	**Greater Jihad** Personal, daily struggle to be a good Muslim. It means completing religious duties and resisting evil.	**Lesser Jihad** Holy War. Means physically defending Islam/God. 'Fight in God's cause against those who fight you'. Conditions: Must be declared by a religious leader, must be in response to a threat to the faith and must be a last resort.	
Festivals	**Id-Ul-Adha (festival of sacrifice)** Celebrates when Ibrahim was prepared to sacrifice his son Ishmael. It is celebrated by sacrificing a lamb to remember God giving Ibrahim a ram to sacrifice instead of Ishmael, prayers at the mosque, visiting family and friends, listening to the Imam's sermon at the mosque.	**Id-ul-Fitr (festival of the breaking the fast)** Celebrates the end of Ramadan. Celebrated by giving alms to the poor, prayers in the mosque, sharing food with family and friends, wearing best or new clothes and remembering and praying for loved ones who are deceased.	**Ashura – Sunni festival (Day of Atonement)** Celebrates Moses rescuing the Israelites from slavery in Egypt and Noah leaving the ark for the first time following the flood. It is celebrated by completing a voluntary fast, going to the mosque, praying and giving to charity. **Ashura – Shi'a commemoration** It commemorates the death of Imam Husayn (third in the imamate) as a martyr in the Battle of Karbala. It is a day of great sorrow and mourning. Shi'a Muslims go on a march and join as a community, Some wail and beat their chests, whilst others give blood to save lives.

Health and Infectious Disease
Knowledge Organiser

Health

Health is a state of physical and mental well-being.

The following factors can affect health:

- Communicable and non-communicable diseases
- Diet
- Stress
- Exercise
- Life situation

Different types of disease may interact, for example:

- Defects in the immune system make an individual more likely to suffer from infectious diseases
- Viral infection can trigger cancers
- Immune reactions initially caused by a pathogen can trigger allergies, for example skin rashes and asthma
- Severe physical ill health can lead to depression and other mental illnesses.

Cancer

Cancer is the result of changes in cells that lead to uncontrolled growth and division by mitosis.

Rapid division of abnormal cells can form a tumour.

Malignant tumours are cancerous tumours that invade neighbouring tissues and spread to other parts of the body in the blood, forming secondary tumours.

Benign tumours are non-cancerous tumours that do not spread in the body.

Risk factors and non-communicable diseases

Risk Factor	Disease	Effects of risk factor
Diet (obesity) and amount of exercise	Type 2 diabetes	Body does not respond properly to the production of insulin, so blood glucose levels can not be controlled
	Cardiovascular disease	Increased blood cholesterol can lead to CHD
Alcohol	Impaired liver function	Long-term alcohol use causes liver cirrhosis (scarring), meaning the liver cannot remove toxins from the body or produce sufficient bile
	Impaired brain function	Damages the brain and can cause anxiety and depression
	Affected development of unborn babies	Alcohol can pass through the placenta, risking miscarriages, premature births and birth defects
Smoking	Lung disease and cancers	Cigarettes contain carcinogens, which can cause cancers
	Affected development of unborn babies	Chemicals can pass through the placenta, risking premature births and birth. defects
Carcinogens, such as ionising radiation, and genetic risk factors	Cancers	For example, tar in cigarettes and ultraviolet rays from the Sun can cause cancers
		Some genetic factors make an individual more likely to develop certain cancers

Treatment of non-communicable diseases linked to lifestyle risk factors – such as poor diet, drinking alcohol, and smoking – can be very costly, both to individuals and to the Government.

A high incidence of these lifestyle risk factors can cause high rates of non-communicable diseases in a population.

Key terms   artificial heart   benign   carcinogen   cholesterol   coronary heart disease   health   malignant   risk factor   statin   stent   transplant

Health and Infectious Disease
Knowledge Organiser

Communicable disease

A communicable disease is one caused by pathogens that can be passed from organism to organism. A pathogen is a microorganism that causes a disease. Examples of pathogens are: bacteria, fungi, viruses and protists.

Viruses live and reproduce rapidly inside an organism's cells. This can damage or destroy the cells.
Bacteria reproduce rapidly inside organisms and may produce toxins that damage tissues and cause illness.

Pathogens can be spread in the air, water or by direct contact.

Viruses

	Spread by	Symptoms	Prevention and treatment
measles	inhalation of droplets that are produced by infected people sneezing and coughing	• fever • red skin rash • complications can be fatal	• painkillers to treat the symptoms • young children are vaccinated to immunise them against measles
HIV	Exchange of body fluids such as: • sexual contact • blood when drug users share needles	• flu-like symptoms at first • virus attacks the body's immune cells, which can lead to AIDS – when the immune system is so damaged that it cannot fight off infections.	• antiretroviral drugs – are very damaging to the body • barrier methods of contraception, such as condoms • using clean needles
TMV	• direct contact of plants with infected plant material • animal and plant vectors • soil: the pathogen can remain in soil for decades	• mosaic pattern of discolouration on the leaves – where chlorophyll is destroyed • reduces plant's ability to photosynthesise, affecting growth	• removing infected plants

Bacteria

	Spread by	Symptoms	Prevention and treatment
Salmonella	bacteria in or on food being ingested	Salmonella bacteria and the toxins they produce cause • fever • abdominal pains • vomiting • diarrhoea	• poultry are vaccinated against Salmonella bacteria to control spread
Gonorrhoea	direct sexual contact – gonorrhoea is a sexually transmitted disease (STD)	• thick yellow or green discharge from the vagina or penis • pain when urinating	• treatment with antibiotics (many antibiotic-resistant strains have appeared) • barrier methods of contraception

Fungi

	Spread by	Symptoms	Prevention and treatment
Rose black spot	Water and wind	• purple or black spots on leaves, which turn yellow and drop early • reduces plant's ability to photosynthesise, affecting growth	• fungicides • affected leaves removed and destroyed

Protists

	Spread by	Symptoms	Prevention and treatment
Malaria	Mosquitos feed on the blood of infected people and spread the protist pathogen when they feed on another person – organisms that spread disease by carrying pathogens are known as vectors	• recurrent episodes of fever • can be fatal	• prevent mosquito vectors breeding • mosquito nets to prevent bites • anti-malarial medicine

Controlling the spread of communicable disease

There are a number of ways to prevent the spread of communicable diseases from one organism to another.

Hygiene
Hand washing, disinfecting surfaces and machinery, keeping raw meat separate, covering mouth when coughing/sneezing.

Isolation
Isolation of infected individuals – people, animals, and plants can be isolated to stop the spread of disease.

Controlling Vectors
If a vector spreads a disease, destroying or controlling the population of the vector can limit the spread of disease.

Vaccination
Vaccination can protect large numbers of individuals against diseases. It cannot be used in plants as they don't have an immune system.

Herd immunity

If a large proportion of a population is vaccinated against a disease, the disease is less likely to spread even if there are some unvaccinated individuals.

Vaccination involves injecting small quantities of dead or inactive form of a pathogen into the body

↓

This stimulates lymphocytes to produce the correct antibodies for that pathogen

↓

If the same pathogen re-enters the body, the correct antibodies can be produced quickly to prevent infection.

Key terms

Bacterium   communicable disease   fungicide   fungus   herd immunity   pathogen   protist   sexually transmitted disease (STD)   toxin   vaccination   vector   virus

Health and Infectious Disease
Knowledge Organiser

Non–specific defences

Non-specific defences of the human body against all pathogens include:

Skin
- physical barrier to infection
- produces antimicrobial secretions
- Microorganisms that normally live on the skin prevent pathogens growing

Nose
Cilia and mucus trap particle in the air, preventing them from entering the lungs. Trachea and bronchi produce mucus, which is moved away from the lungs to the back of the throat by the cilia, where it is expelled.

Stomach
Produces strong acid (pH2) that destroys pathogens in mucus, food and drinks.

White blood cells

If a pathogen enters the body, the immune system tries to destroy the pathogen.
The function of white blood cells is to fight pathogens.
There are two main types of white blood cell - lymphocytes and phagocytes.

Lymphocytes fight pathogens in two ways:

Antitoxins
Lymphocytes produce **antitoxins** that bind to the toxins produced by some pathogen (usually bacteria). This *neutralises* the toxins.

Antibodies
Lymphocytes produce antibodies that target and help to destroy specific pathogens by binding to antigens (proteins) on the pathogen's surface's.

1. **Phagocytes** are attracted to areas of infection.
2. The phagocyte surrounds the pathogen and engulfs it.
3. Enzymes that digest and destroy the pathogen are released.

phagocyte
pathogen

antibody
antigen
pathogen
lymphocyte
antibody attached to antigen

Treating diseases

Antibiotics
- **Antibiotics** are medicines that can kill *bacteria* in the body.
- Specific bacteria need to be treated by specific antibiotics
- Antibiotics have greatly reduced deaths from infectious bacterial diseases, but antibiotic-resistant strains of bacteria are emerging.

Treating viral diseases
- Antibiotics *do not* affect viruses.
- Drugs that kill viruses often damage the body's tissues.
- Painkillers treat the symptoms of viral diseases but do not kill pathogens.

Discovering and developing new drugs

Drugs were traditionally extracted from plants and microorganisms, for example

- The heart drug digitalis comes from foxglove plants
- The painkiller aspirin originates from willow trees
- Penicillin was discovered by Alexander Fleming from *Penicillium* mould.

Most modern are now synthesised by chemists in laboratories.

New drugs are extensively tested and trailed for

- Toxicity – is it harmful?
- Efficacy – does it work?
- Dose – what amount is safe and effective to give

Stages of clinical trials

Pre-clinical trials
Drug is tested in cells, tissues, and live animals.

Clinical trials
1. Healthy volunteers receive vary low doses to test whether the drugs is safe and effective.
2. If safe, large numbers of healthy volunteers and patients receive the drugs to find the optimum dose.

Peer review
Before being published, the results of clinical trials will be tested and checked by independent researchers. This is called **peer review**.

Double-blind trials
Some clinical trials give some of their patients a placebo drug – one that is known to have no effect.
Double-blind trials are when neither the patients nor the doctors know who has been given the real drug and who has been given the placebo. This reduces biases in the trail.

Key terms

Bacterium   communicable disease   fungicide   fungus   herd immunity   pathogen   protist   sexually transmitted disease (STD)   toxin   vaccination   vector   virus

Health and Communicable Disease
Knowledge Organiser – Year 10 – Science

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Fungi

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Viruses

	Spread by	Symptoms	Prevention and treatment
measles	inhalation of droplets that are produced by infected people sneezing and coughing	• fever • red skin rash • complications can be fatal	• painkillers to treat the symptoms • young children are vaccinated to immunise them against measles
HIV	Exchange of body fluids such as: • sexual contact • blood when drug users share needles	• flu-like symptoms at first • virus attacks the body's immune cells, which can lead to AIDS – when the immune system is so damaged that it cannot fight off infections.	• antiretroviral drugs – are very damaging to the body • barrier methods of contraception, such as condoms • using clean needles
TMV	• direct contact of plants with infected plant material • animal and plant vectors • soil: the pathogen can remain in soil for decades	• mosaic pattern of discolouration on the leaves – where chlorophyll is destroyed • reduces plant's ability to photosynthesise, affecting growth	• removing infected plants

Bacteria

	Spread by	Symptoms	Prevention and treatment
Salmonella	bacteria in or on food being ingested	Salmonella bacteria and the toxins they produce cause • fever • abdominal pains • vomiting • diarrhoea	• poultry are vaccinated against Salmonella bacteria to control spread
Gonorrhoea	direct sexual contact – gonorrhoea is a sexually transmitted disease (STD)	• thick yellow or green discharge from the vagina or penis • pain when urinating	• treatment with antibiotics (many antibiotic-resistant strains have appeared) • barrier methods of contraception

Controlling the spread of communicable disease

There are a number of ways to prevent the spread of communicable diseases from one organism to another.

Hygiene
Hand washing, disinfecting surfaces and machinery, keeping raw meat separate, covering mouth when coughing/sneezing.

Isolation
Isolation of infected individuals – people, animals, and plants can be isolated to stop the spread of disease.

Controlling Vectors
If a vector spreads a disease, destroying or controlling the population of the vector can limit the spread of disease.

Vaccination
Vaccination can protect large numbers of individuals against diseases. It cannot be used in plants as they don't have an immune system.

Herd immunity

If a large proportion of a population is vaccinated against a disease, the disease is less likely to spread even if there are some unvaccinated individuals.

Vaccination involves injecting small quantities of dead or inactive form of a pathogen into the body

↓

This stimulates lymphocytes to produce the correct antibodies for that pathogen

↓

If the same pathogen re-enters the body, the correct antibodies can be produced quickly to prevent infection.

Key terms

Bacterium communicable disease fungicide fungus herd immunity pathogen protist sexually transmitted disease (STD) toxin vaccination vector virus

Health and Communicable Disease
Knowledge Organiser – Year 10 – Science

Detection and identification of plant diseases

Signs that a plant is diseased:
- stunted growth
- spots on leaves
- areas of rot or decay
- growths
- malformed stems or leaves
- discolouration
- pest infestation

Ways of identifying plant diseases

- gardening manuals and websites
- laboratory testing of infected plants
- testing kits containing monoclonal antibodies

Plant diseases and insects

Plant diseases can also be directly caused by insects.

Aphids are insects that suck sap from the stems of plants. This results in

- reduced rate of growth
- wilting
- discolouration of leaves.

Ladybirds can be used to control aphid infestations as ladybirds larvae eat aphids.

sharp mouthpiece

plant stem

aphid

Plant defences

Physical barriers

- cellulose cell walls – provide a barrier to infection
- tough waxy cuticle on leaves
- bark on trees – a layer of dead cells that can fall off

Chemical barriers

- many plants produce antibacterial chemicals
- poison production stops animals eating plants

Mechanical adaptations

- thorns and hairs stop animals eating plants

- leaves that droop curl when touched to scare herbivores or dislodge insects

- some plants mimic the appearance of unhealthy or poisonous plants to deter insects or herbivores

Health and Communicable Disease
Knowledge Organiser – Year 10 – Science

Non–specific defences

Non-specific defences of the human body against all pathogens include:

Skin
- physical barrier to infection
- produces antimicrobial secretions
- Microorganisms that normally live on the skin prevent pathogens growing

Nose
Cilia and mucus trap particle in the air, preventing them from entering the lungs. Trachea and bronchi produce mucus, which is moved away from the lungs to the back of the throat by the cilia, where it is expelled.

Stomach
Produces strong acid (pH2) that destroys pathogens in mucus, food and drinks.

White blood cells

If a pathogen enters the body, the immune system tries to destroy the pathogen.
The function of white blood cells is to fight pathogens.
There are two main types of white blood cell - lymphocytes and phagocytes.

Lymphocytes fight pathogens in two ways:

Antitoxins
Lymphocytes produce **antitoxins** that bind to the toxins produced by some pathogen (usually bacteria). This *neutralises* the toxins.

Antibodies
Lymphocytes produce antibodies that target and help to destroy specific pathogens by binding to antigens (proteins) on the pathogen's surface's.

1. **Phagocytes** are attracted to areas of infection.
2. The phagocyte surrounds the pathogen and engulfs it.
3. Enzymes that digest and destroy the pathogen are released.

Health and Communicable Disease
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Producing monoclonal antibodies

Monoclonal antibodies are produced from a single clone of cells.

1 Mice are injected to stimulate the production of **lymphocytes** that make specific antibodies.

Lymphocytes make antibodies but *cannot* divide to form clones

2 Tumour cells are cultured. These cells can divide and grow endlessly.

Tumour cells *can* divide to form clones

3 The lymphocytes are fused with the tumour cells to create **hybridoma** cells.

A single hybridoma cell can divide to make a large number of identical cells called a clone.

All the cloned cells can make the antibody.

4 A large amount of the monoclonal antibody can then be produced, collected, and purified for use.

Use of monoclonal antibodies

Monoclonal antibodies are specific to a single binding site on a specific protein antigen.

This means they can be used to target specific chemicals or cells.

Research

Specific molecules can be located in cells and tissues by using monoclonal antibodies to bind them to a florescent dye.

Treatment

Monoclonal antibodies can deliver toxic chemicals and drugs specifically to cancer cells, limiting their harm to other cells in the body

Diagnostic testing

Monoclonal antibodies can be used to measure the levels of a particular chemical in the blood or to detect pathogens

Pregnancy tests

Pregnant women produce the hormone HCG, which is excreted in their urine.
Monoclonal antibodies can be used to detect HCG in a pregnant woman's urine:

1) Urine is applied to the end of the stick

2) The test stick contains monoclonal antibodies that only bind HCG, attached to a dye.

3) If HCG is present in the urine, the monoclonal antibodies cause a line of dye to appear. This means the pregnancy test is positive.

4) A second line appears in the control zone to show the test is valid, even if the result is negative.

Treating diseases

Antibiotics

- **Antibiotics** are medicines that can kill *bacteria* in the body.
- Specific bacteria need to be treated by specific antibiotics
- Antibiotics have greatly reduced deaths from infectious bacterial diseases, but antibiotic-resistant strains of bacteria are emerging.

Treating viral diseases

- Antibiotics *do not* affect viruses.
- Drugs that kill viruses often damage the body's tissues.
- Painkillers treat the symptoms of viral diseases but do not kill pathogens.

Discovering and developing new drugs

New drugs are extensively tested and trailed for

- Toxicity – is it harmful?
- Efficacy – does it work?
- Dose – what amount is safe and effective to give

Stages of clinical trials

Pre-clinical trials
Drug is tested in cells, tissues, and live animals.

Clinical trials
1. Healthy volunteers receive vary low doses to test whether the drugs is safe and effective.
2. If safe, large numbers of healthy volunteers and patients receive the drugs to find the optimum dose.

Peer review
Before being published, the results of clinical trials will be tested and checked by independent researchers. This is called **peer review**.

Double-blind trials
Some clinical trials give some of their patients a placebo drug – one that is known to have no effect.
Double-blind trials are when neither the patients nor the doctors know who has been given the real drug and who has been given the placebo. This reduces biases in the trail.

Key terms

Bacterium communicable disease fungicide fungus herd immunity pathogen prot... sexually transmitted disease (STD) toxin vaccination vector virus

Inheritance
Knowledge Organiser

Types of reproduction

Sexual	Asexual
Two parents	One parent
Cell division thorough meiosis	Cell division by mitosis
Joining of male and female sex cells (gametes) – sperm and egg in animals, pollen and ovule in plants	No fusion of gametes
Produces non-identical offspring that are genetically different to parents	Produces offspring that are genetically identical to parent (clones)
Results in wide variation within offspring and species	No mixing of genetic information

Meiosis

Meiosis is a type of cell division that makes gametes in the reproductive organs.

Meiosis halves the number of chromosomes in gametes, and fertilisation (joining of two gametes) restores the full number of chromosomes.

The fertilised cell divides by mitosis, producing more cells. As the embryo develops, the cells differentiate.

parent cell

DNA replicates

two daughter cells, each with a paired chromosome set

four daughter cells (gametes), each with a single chromosome set and all genetically different

DNA and the genome

Genetic material in the nucleus of a cell is composed of DNA.
DNA is made up of two strands forming a double helix.
DNA is contained in structures called chromosomes.
A gene is a small section of DNA on a chromosome that codes for a specific sequence of amino acids, to produce a specific protein.
The genome of an organism is the entire genetic material of that organism.
The whole human genome has been studied, and this has allowed scientists to:
• Search for genes linked to different diseases
• Understand and treat inherited disorders
• Trace human migration patterns from the past.

Inherited disorders

Some disorders are due to the inheritance of certain alleles:
• Polydactyly (extra finger or toe) is caused by a dominant allele.
• Cystic fibrosis (a disorder of cell membranes) is caused by a recessive allele.
Embryo screening and gene therapy may alleviate suffering from these disorders, but there are ethical issues surrounding their use.

Genetic inheritance

You need to be able to explain these terms about genetic inheritance:

gamete	Specialised sex cell formed by meiosis
chromosomes	Long molecule made from DNA found in the nucleus of cells
gene	Part of a chromosome that codes for a protein – some characteristics are controlled by a single gene (e.g. fur colour in mice and red-green colour blindness in humans), but most are controlled by multiple genes interacting
allele	Different forms of the same gene
dominant	Allele that only needs one copy present to be expressed
recessive	Allele that needs two copies to present to be expressed
homozygous	When an individual carries two copies of the same allele for a trait
heterozygous	When an individual carriers two alleles for a trait
genotype	Combination of alleles an individual has
phenotype	Physical expression of the genotype – the characteristic shown

Genetic crosses

A genetic cross is when you consider the offspring that might result from two known parents. Punnett squares can be used to predict the outcome of a genetic cross, for both the genotypes the offspring might have and their phenotypes.
For example, the cross bb (brown fur) x BB (black fur) in mice:

		mother	
		B	B
father	b	Bb	Bb
	b	Bb	Bb

Offspring genotype: 100% Bb
Offspring phenotype: all black fur

Sex determination

Normal human body cells contain 23 pairs of chromosomes-one of these pairs determines the sex of the offspring.
In human females the sex chromosomes are the same (XX) and in males there are different (XY).
A Punnett square can be used to determine the probability of offspring being male or female. The probability is always 50% in human as there are two XX and two XY outcomes.

		mother	
		X	X
father	X	XX	XX
	Y	XY	XY

Inheritance
Knowledge Organiser

Variation in populations

Differences in the characteristics of individuals in a population are called variation.
Variation may be due to differences in:
- the genes they have inherited, for example eye colour (genetic causes)
- the environment in which they have developed, for example, language (environmental causes)
- a combination of genes and the environment.

Mutation

There is usually a lot of genetic variation within a population of species – this variation arises from mutations.
A mutation is a change in a DNA sequence:
- mutations occur continuously
- very rarely a mutation will lead to a new phenotype
- some mutations may change an existing phenotype and most have no effect
- if a phenotype is suited to an environmental change, it can lead to a relatively rapid change in the species – this is the theory of evolution by natural selection.

Genetic Engineering

Genetic engineering is a process that involves changing the genome of an organism by introducing a gene from another organism to produce a desired characteristic.

For example:
- Bacterial cells have been genetically engineered to produce useful substances, such as human insulin to treat diabetes.
- Plant crops have been genetically engineered to be resistant to diseases, insects, or herbicides, or to produce bigger and better fruits and higher crop yields. Crops that have undergone genetic engineering are called genetically modified (GM).

Selective Breeding

Selective breeding (artificial selection) is the process by which humans breed plants and animals for particular genetic characteristics.
Humans have been using selective breeding for thousands of years, since breeding crops from wild plants and domesticating animals.

Process of selective breeding:
1. choose parents with the desired characteristics from a mixed population
2. breed them together
3. choose offspring with the desired characteristic and breed them together
4. continue over many generations until all offspring show the desired characteristic.

Disadvantages of selective breeding:
- can lead to inbreeding, where some breeds are particularly prone to inherited defects or diseases
- reduces variation, meaning all members of a species could be susceptible to certain diseases.

The characteristic targeted in selective breeding can be chosen for usefulness or appearance, for example
- disease resistance in food crops
- animals that produce more meat or milk
- domestic dogs with a gentle nature
- larger or unusual flowers.

There are many benefits to genetic engineering in agriculture and medicine, but also some risks and moral objections.

Benefits	Risks
• Potential to overcome some inherited human diseases • Can lead to higher value of crops as GM crops have bigger yields than normal • Crops can be engineered to be resistant to herbicides, make their own pesticides, or be better adapted to environmental conditions.	• Genes from GM plants and animals may spread to other wildlife, which could have devastating effects on ecosystems • Potential negative impacts on populations of wild flowers and insects • Ethical concerns, for example, in the future people could manipulate the genes of foetuses to ensure certain characteristics • Some people believe the long-term effects on health of eating GM crops have not been fully explored.

Key terms   genetically modified   genetic engineering   inbreeding   mutation   selective breeding   variation

Inheritance
Knowledge Organiser

Theory of evolution

Evolution is the gradual change in the inherited characteristics of a population over time.

Evolution occurs through the process of natural selection and may result in the formation of new species.

Process of natural selection

The theory of evolution by natural selection states that:
- Organisms within species show a wide variation in phenotype
- Individuals with characteristics most suited to the environment are more likely to survive and breed successfully
- These characteristics are then passed on to their offspring.

Resistant bacteria

Bacteria can evolve rapidly because the reproduce very quickly. This has lead to many strains of bacteria developing antibiotic resistance, such as MRSA. The development of antibiotic resistance is evidence for the theory of evolution by natural selection.

The development of new antibiotics is expensive and slow, so is unlikely to keep up with the emergence of new antibiotic-resistant bacteria strains.

To reduce the rise of antibiotic-resistant strains
- doctors should only prescribe antibiotics for serious bacterial infections
- patients should complete their courses of antibiotics so all bacteria are killed and non survive to form resistant strains.
- the use of antibiotics in farming and agriculture should be restricted.

Key
- bacteria not resistant to antibiotic
- bacteria with mutation giving antibiotic resistance

antibiotic used to treat disease for the first time

resistant bacteria grow and reproduce

non-resistant bacteria stop growing and reproducing or are killed
antibiotic continues to be used

all bacteria now resistant to the antibiotic

selection has occurred for antibiotic resistance

Fossils

Fossils are the remains of organisms from millions of years ago, which are found in rocks.
Fossils can be formed from:
- Parts of the organism that do not decay because one or more of the conditions needed for decay are absent
- Hard parts of an organism (e.g. bones) when replaced by minerals
- Preservation of the traces of organisms (e.g. burrows, footprints, and rootlet traces).

Evidence for evolution

The theory of evolution by natural selection is now widely accepted because there are lots of data to support it, such as
- It has been shown that characteristics are passed on to offspring in genes
- Evidence from the fossil record
- The evolution of antibiotic resistance in bacteria

Benefits of the fossil record	Problems with the fossil record
• Can tell scientists how individual species have changed over time • Fossils allow us to understand how life developed over the Earth's history • Fossils can be used to track the movement of a species or its ancestors across the world	• Many early organisms were soft-bodied, so most decayed before producing fossils • There are gaps in the fossil record as not all fossils have been found and others have been destroyed by geological or human activity – this means scientists cannot be certain about how life began on Earth.

Classification of living organisms

Carl Linnaeus developed a system to classify living things into groups, based upon observable characteristics.

New models of classification were proposed as understanding of biochemical processes developed and improvements in microscopes led to discoveries of internal structures.

There is now a three-domain system developed by Carl Woese, dividing organisms into:
- Bacteria (true bacteria)
- Archea (primitive bacteria usually living in extreme conditions)
- Eukaryota (including protists, plants, fungi and animals).

Kingdom → Phylum → Class → Order → Family → Genus → Species

Organisms are named by the binomial system of genus and species e.g. **Homo Sapiens**

Homo is our **Genus**
Sapien is our **Species**

Evolutionary Trees

Evolutionary trees use current classification data for living organisms and fossil data for extinct organisms to show how scientists believe organisms are related.

Extinction

Extinction is when there are no remaining individuals of a species still alive.
Factors that may contribute to a species' extinction include:
- new predators
- new diseases
- new competitors
- catastrophic events
- changes to the environment

1 The reptile dies and falls to the ground

2 The flesh decays, leaving the skeleton to be covered in sand or soil and clay before it is damaged

3 Protected, over millions of years, the skeleton becomes mineralised and turns to rock. The rocks shift in the earth with the fossil trapped inside

4 Eventually, the fossil emerges as the rocks move and erosion takes place

Key terms Antibiotic resistance   binomial system   evolution   evolutionary tree   extinction   fossil record   natural selection   three-domain system

Inheritance
Knowledge Organiser – Year 10 – Science

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Produces non-identical offspring that are genetically different to parents	Produces offspring that are genetically identical to parent (clones)
Results in wide variation within offspring and species	No mixing of genetic information
Advantages: • Produces variation in offspring • If the environment changes, the offspring may have a survival advantage by natural selection due to their genetic variation.	Advantages: • Only one parent needed • Time and energy efficient as do not need to find a mate • Faster than sexual reproduction • Many identical offspring can be produced when conditions are favourable • Successful traits passed on as offspring are identical
Disadvantages • Finding a mate and reproducing is time consuming and requires lots of energy • Much slower than asexual reproduction	Disadvantages • Reduced genetic variation – if the environment changes, the offspring may have a survival disadvantage • Harmful mutations in parent would be passed on to all offspring

Depending on the circumstances, some organisms reproduce by both methods. For example:

• malaria parasites reproduce asexually in human hosts, but sexually in mosquitoes
• many fungi reproduce asexually by spores, but also sexually to give variation.
• many plants produce seeds sexually, but also reproduce asexually by bulb division (daffodils) or runners (strawberry plants).

Meiosis

Meiosis is a type of cell division that makes gametes in the reproductive organs.

Meiosis halves the number of chromosomes in gametes, and fertilisation (joining of two gametes) restores the full number of chromosomes.

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Inheritance
Knowledge Organiser – Year 10 – Science

DNA and the genome

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DNA is made up of two strands forming a double helix.

DNA is contained in structures called chromosomes.

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The genome of an organism is the entire genetic material of that organism.

The whole human genome has been studied, and this has allowed scientists to:
- Search for genes linked to different diseases
- Understand and treat inherited disorders
- Trace human migration patterns from the past.

Structure of DNA

DNA is a polymer made from four different nucleotides.

A nucleotide is a molecule made of phosphate, a sugar, and one of four organic bases (A, C, G and T).

A sequence of three bases codes for a particular amino acid.

The order of the bases determines the order in which amino acids are assembled to produce a specific protein.

In complementary DNA strands, a C base is always linked to a G base on the opposite strand, and a T to an A.

Inherited disorders

Some disorders are due to the inheritance of certain alleles:
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- Cystic fibrosis (a disorder of cell membranes) is caused by a recessive allele.

Embryo screening and gene therapy may alleviate suffering from these disorders, but there are ethical issues surrounding their use.

Protein Synthesis

Proteins are synthesised on the ribosomes using a template of DNA.

Carrier molecules bring amino acids to add to the protein chain in the correct order.

When the protein is complete it folds up to form a specific shape, and this shape allows proteins to do a specific job (as enzymes and hormones, or forming structures).

Non-coding parts of DNA can control the expression of genes by switching them on and off.

Mutations and genetic variability

Mutations occur continuously and change the base code of DNA. In coding DNA they may alter the activity of a protein:
- Most do not alter the appearance of function of the protein the DNA produces.
- A change in DNA structure may change the amino acid order, causing a gene to synthesis a different protein.
- Some mutations alter the shape of the protein, so the protein may no longer fit the substrate binding site, or lose its strength if it is structural.

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Genetic crosses

A genetic cross is when you consider the offspring that might result from two known parents. Punnett squares can be used to predict the outcome of a genetic cross, for both the genotypes the offspring might have and their phenotypes.

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father	X	XX	XX
	Y	XY	XY

Key terms

allele   chromosomes   clone   DNA   dominant   double helix   fertilisation   gamete   gene   genetic cross   genome   genotype   homozygous   heterozygous   meiosis   mitosis   phenotype   Punnett square   recessive

Evolution
Knowledge Organiser – Year 10 – Science

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Speciation

Alfred Russel Wallace independently proposed the theory of evolution by natural selection.
He published joint writings with Darwin in 1858 on the subject, prompting Darwin to publish his book the next year.
Wallace worked worldwide gathering evidence for evolutionary theory.
He is best known for his work on warning colours in animals and for his pioneering work on the theory of speciation.

Speciation in the gradual formation of a new species as a result of evolution. More evidence and work from scientists over time have led to our current understanding of the theory of speciation.
1. Two populations of one species are isolated.
2. Natural selection occurs so that the better-adapted individuals reproduce and pass on the genes for these different characteristics
3. The populations have an increasing number of genetic mutations as they adapt to their different environments
4. Eventually the two populations are so genetically different they cannot breed to produce fertile offspring.

Darwin's work

Charles Darwin proposed the theory of evolution by natural selection after gathering evidence from a round-the-world expedition, experimentation and discussion.

This states that all living species evolved from a common ancestor that first developed more than three billion years ago.

Darwin published this theory in On the Origin of the Species (1859). His ideas were considered controversial and only gradually accepted because
- They challenged the idea that God made all of the Earth's animals and plants
- There was insufficient evidence at the time the theory was published, although much more evidence has been gathered since
- Mechanisms of inheritance and variation were not known at the time.
- Other theories, such as that of Jean-Baptiste Lamarck, were based on the idea that the changes that occur in an organism over its lifetime could be passed on to its offspring. We now know that in the majority of cases this type of inheritance cannot occur.

Evidence for evolution

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Key terms
Antibiotic resistance   binomial system   evolution   evolutionary tree   extinction   fossil record   natural selection   three-domain system

Evolution
Knowledge Organiser – Year 10 – Science

Classification of living organisms

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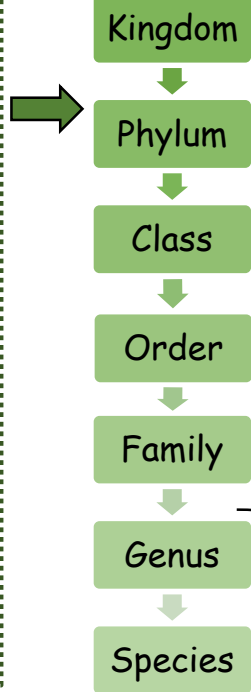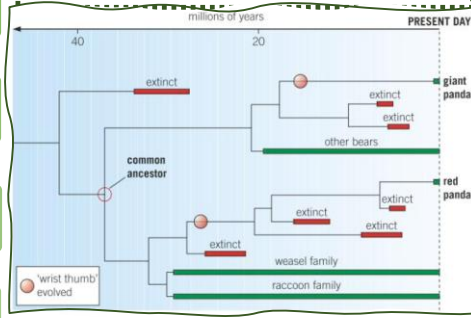- Eukaryota (including protists, plants, fungi and animals).

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Homo is our **Genus**
Sapien is our **Species**

Evolutionary Trees

Evolutionary trees use current classification data for living organisms and fossil data for extinct organisms to show how scientists believe organisms are related.

Understanding of genetics

Gregor Mendel development our understanding of genetics by carrying out breeding experiments on plants in the mid-nineteenth century.

For example, he showed that crossing a plant that produces yellow peas and a plant that produces green peas always bred offspring with green peas. But when crossing these offspring, some offspring of later generations might have yellow peas again.

Through experiments like these, Mendel observed that the inheritance of each characteristic is determined by units – later called genes – that are passed on unchanged to offspring and that these genes can be dominant or recessive.

The significance of Mendel's work was not recognised until after his death, because

- Most scientists believed in blended inheritance (e.g. a white flower and a purple flower producing a lilac flower).

- He published his work in an obscure journal so not many people saw it.

- He was a monk and not a scientist.

Development of gene theory

Further work by many scientists led to the development of gene theory.

In the late nineteenth century the behaviour of chromosomes during cell division was observed.

In the early twentieth century genes and chromosomes were observed to behave similarly, leading to the idea that genes were located on chromosomes.

In the mid-twentieth century the structure of DNA and mechanism of gene function were determined.

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antibiotic used to treat disease for the first time

resistant bacteria grow and reproduce

non-resistant bacteria stop growing and reproducing or are killed

antibiotic continues to be used

all bacteria now resistant to the antibiotic

selection has occurred for antibiotic resistance

Variation
Knowledge Organiser – Year 10 – Science

Variation in populations

Differences in the characteristics of individuals in a population are called variation.
Variation may be due to differences in:
- the genes they have inherited, for example eye colour (genetic causes)
- the environment in which they have developed, for example, language (environmental causes)
- a combination of genes and the environment.

Mutation

There is usually a lot of genetic variation within a population of species – this variation arises from mutations.
A mutation is a change in a DNA sequence:
- mutations occur continuously
- very rarely a mutation will lead to a new phenotype
- some mutations may change an existing phenotype and most have no effect
- if a phenotype is suited to an environmental change, it can lead to a relatively rapid change in the species – this is the theory of evolution by natural selection

Methods of Cloning

Tissues culture
Small groups of cells from part of a plant are used to grow identical new plants. This is important for preserving rare plant species and growing plants commercially in nurseries.
Cutting
An older, simple method used by gardeners to produce many identical plants from a parent plant.
Embryo transplant
Cells are split apart from developing animal embryo before they become specialised, then the identical embryos are transplanted into host mothers.

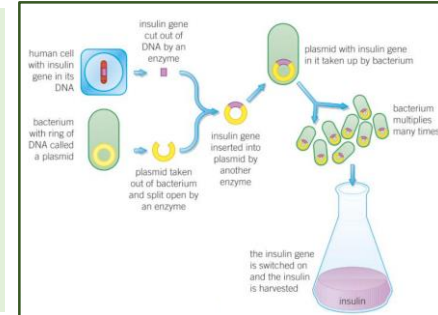| Benefits	Risks
• Large number of identical offspring produced • Quick and economical • Desired characteristics guaranteed	• Limits variation and causes reduction in gene pool • Clones may be vulnerable to diseases/changes in the environment • Ethical considerations around cloning living organisms

Selective Breeding

Selective breeding (artificial selection) is the process by which humans breed plants and animals for particular genetic characteristics.
Humans have been using selective breeding for thousands of years, since breeding crops from wild plants and domesticating animals.

Process of selective breeding:
1. choose parents with the desired characteristics from a mixed population
2. breed them together
3. choose offspring with the desired characteristic and breed them together
4. continue over many generations until all offspring show the desired characteristic.

The characteristic targeted in selective breeding can be chosen for usefulness or appearance, for example
- disease resistance in food crops
- animals that produce more meat or milk
- domestic dogs with a gentle nature
- larger or unusual flowers.

Disadvantages of selective breeding:
- can lead to inbreeding, where some breeds are particularly prone to inherited defects or diseases
- reduces variation, meaning all members of a species could be susceptible to certain diseases.

Genetic Engineering

Genetic engineering is a process that involves changing the genome of an organism by introducing a gene from another organism to produce a desired characteristic.

For example:
- Bacterial cells have been genetically engineered to produce useful substances, such as human insulin to treat diabetes.
- Plant crops have been genetically engineered to be resistant to diseases, insects, or herbicides, or to produce bigger and better fruits and higher crop yields. Crops that have undergone genetic engineering are called genetically modified (GM).

There are many benefits to genetic engineering in agriculture and medicine, but also some risks and moral objections.

Benefits	Risks
• Potential to overcome some inherited human diseases • Can lead to higher value of crops as GM crops have bigger yields than normal • Crops can be engineered to be resistant to herbicides, make their own pesticides, or be better adapted to environmental conditions.	• Genes from GM plants and animals may spread to other wildlife, which could have devastating effects on ecosystems • Potential negative impacts on populations of wild flowers and insects • Ethical concerns, for example, in the future people could manipulate the genes of foetuses to ensure certain characteristics • Some people believe the long-term effects on health of eating GM crops have not been fully explored.

Cloning

A clone is an individual that has been produced asexually and is genetically identical to its parent. There are several methods for producing both plant and animal clones, but there are benefits and risks associated with cloning.

genetically modified   genetic engineering   inbreeding   mutation   selective breeding   variation

Quantitative Chemistry 01
Knowledge Organiser – Year 10 – Science

North East Learning Trust

Conservation of mass

The conservation of mass states that atoms cannot be created or destroyed during a chemical reaction., so the mass of the reactants will equal the mass of the product. In other words, all the atoms you had in the reactants must be present in the products.. For some reactions, the mass appears to **decrease**. This typically occurs when a gas is produced and lost to the surroundings. For other reactions, the mass appears to **increase**. This typically occurs when a gas is a reactant.
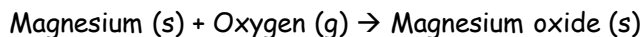
Decrease in mass

Sodium carbonate (s) → sodium oxide (s) +carbon dioxide (g)

When sodium carbonate is thermally decomposed, carbon dioxide gas is produced and released into the surroundings.

Increase in mass
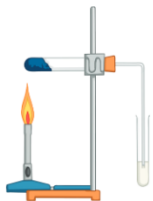
Magnesium (s) + Oxygen (g) → Magnesium oxide (s)

Oxygen from the air is added to the magnesium which will be heavier in mass.

Relative mass

The masses of atoms are compared by measuring them relative to atoms of carbon-12. You can work out the relative formula mass (M_r) of a compound by adding up the relative atomic masses (A_r) of the elements in it, in the ratio shown by its formula

Concentration

Concentration is the amount of solute in a volume of solvent. The more substance that is dissolved, then the more concentrated the solution is.
It is possible to calculate concentration using:

$$Concentration = \frac{Mass}{Volume}$$

With concentration measured in g/dm^3, mass in g and volume in dm^3.
Remember:

$$Volume(dm^3) = \frac{Volume(cm^3)}{1000}$$

Moles (HT)

The **Avogadro constant,** 6.02×10^{23}, is the number of molecules of a substance that make up one mole of that substance.
One mole of a substance has the same mass as the M_r of the substance. E.g. Oxygen (O_2) has an M_r of 32, so 1 mole of oxygen has a mass of 32g.

The number of moles can be determined using:

$$Moles = \frac{Mass\,(g)}{M_r}$$

Balanced equations (HT)

When writing symbol equations you need to ensure that the number of each atom on each side is equal.

$$2H_2 + O_2 \rightarrow 2H_2O$$
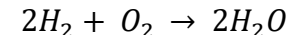
There are 4 hydrogen and 2 oxygen atoms on each side.
You can deduce the balanced symbol equations from the masses (and hence the ration of the numbers of moles) of substances involved in a chemical reaction. On the other hand, balanced symbol equations tell you the number of moles of substances, and thus the masses of reactants and products.

Excess and limiting reactants (HT)

In a chemical reaction between two or more reactants, often one reactant will run out before the others.
The reactant that is left over is in **excess.**
The reactant that runs out is the **limiting reactant.**

North East
Learning Trust

Titration

Titrations are used to experimentally determine the concentration of an unknown solution in a reaction.

Method
1. Measure 25 cm³ of sodium hydroxide solution in to a conical flask.
2. Place flask on a white tile.
3. Clamp the burette vertically and close the burette tap.
4. Using a small funnel, fill the burette with sulfuric acid.
5. Put 5-10 drops of phenolphthalein indicator into the conical flask. Swirl the flask to ensure the indicator mixes with the sodium hydroxide.
6. Slowly open the burette tap so that the sulfuric acid slowly flows into the flask. Add acid drop by drop until you see a permanent colour change from pink to colourless in the flask. Close the burette tap.
7. Read the burette scale an record the volume of added acid.
8. Repeat steps 1-7 until you get 2 concordant titres. i.e are within 0.1 cm³ of each other.
9. Determine the mean:

Use a beaker and funnel to fill burette.

The burette reading is taken from the bottom of the meniscus.

Use one hand to control the flow rate.

Swirl the flask with the other hand whilst the drops are being added.
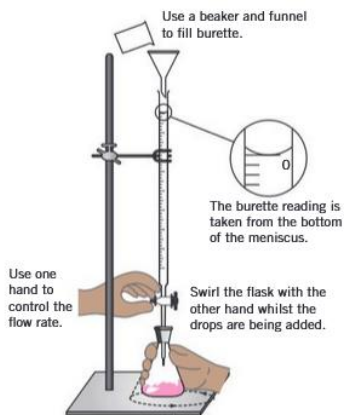
$$Mean = \frac{sum\ of\ the\ concordant\ results}{number\ of\ concordant\ resulst}$$

To determine the concentration of the unknown:
1. Construct a balanced equation
2. Determine the number of moles from the known solution
3. Use the ratio from the equation to determine the moles of the unknown
4. Determine the concentration using:

$$Concentration(mol/dm^3) = \frac{moles}{volume\ (dm^3)}$$

Theoretical yield

The theoretical yield is the mass of a product that you expect to be produced.
It is not always achievable because:
- Some product is lost when separated from reactant mixture
- Unexpected side reactions occur and produce other products
- The reaction may be reversible

The theoretical yield can be calculated as follows:
1. Balance the equation
2. Calculate moles of substance with known mass
3. Use the balanced equation to work out the ratio of moles.
4. Determine mass from mass = moles x Mr

Concentration in mol/dm³

Concentration can also be measured in mol/dm³.

$$Concentration\ of\ solution\ (mol/dm^3) = \frac{numbet\ of\ moles\ of\ solute}{volume\ of\ solution\ (dm^3)}$$

You can combine this formula with the moles equation to calculate the mass of solute dissolved in a solution.

Percentage yield

The percentage yield is the mass of a product that is actually produced.
Percentage yield can be calculated as follows:

$$Percentage\ yield = \frac{actual\ yield}{theoretical\ yield}\ x\ 100$$

Atom economy

The atom economy gives an indication of the proportion of atoms that become part of the useful products.
The percentage atom economy is determined as follows:

$$Atom\ economy = \frac{M_r\ of\ useful\ products}{M_r\ of\ all\ products}\ x\ 100$$

Moles of gas

At room temperature (25° C) and atmospheric pressure (1 atm), one mole of gas will occupy 24 dm³
To determine the number of moles of a gas:

$$Moles\ of\ gas = \frac{volume\ of\ gas\ (dm^3)}{24\ dm^3}$$

$$Moles\ of\ gas = \frac{volume\ of\ gas\ (cm^3)}{24000\ cm^3}$$

Key terms

Atom economy	burette	concordant	percentage yield	pipette	yield
room temperature and pressure		theoretical yield	titration	titre	useful

Chemical Changes 01
Knowledge Organiser – Year 10 – Science

Reactivity series

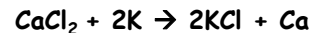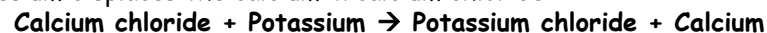| Reaction with water	Reaction with acid	Reactivity series		Extraction method
		Metal	Reactivity	
Fizzes, gives off hydrogen gas	Explodes	Potassium	High reactivity	Electrolysis
		Sodium		
		Lithium		
Reacts very slowly	Fizzes, gives off hydrogen gas	Calcium		
		Magnesium		
		Aluminium (carbon)		
		Zinc		Reduction with carbon
		Iron		
No reaction	Reacts slowly with warm acid	Tin		
		Lead (hydrogen)		
	No reaction	Copper		
		Silver	Low reactivity	Mined from Earth's crust
		Gold		

Oxidation and reduction

Oxidation occurs when a substance gains oxygen or loses electrons. **Reduction** occurs when a substance loses oxygen, or gains electrons.
In the following reaction, Iron has been **oxidised** as it has gained oxygen and **lost electrons** to become a positive ion from a neutral atom. Copper sulfate has been **reduced** as it has lost oxygen and **gained electrons** to become a neutral atom from a positive ion

Iron + Copper Sulfate --> Iron sulfate + Copper

Displacement reactions

In a **displacement reaction,** the **more** reactive element takes the place of the **less reactive** element. For example, **Potassium is more reactive than calcium,** so potassium displaces the calcium in calcium chloride

Calcium chloride + Potassium → Potassium chloride + Calcium

$$CaCl_2 + 2K → 2KCl + Ca$$

Acids and alkalis

Acids are compounds that release H^+ ions when in an aqueous form. The three acids are sulfuric, nitric and hydrochloric acid. They have a pH below 7.
Alkalis are compounds that release OH^- when in aqueous form. They have a pH above 7. **Neutral** solutions have a pH of 7. The pH scale is a measure of how acidic or alkaline a substance is. It is a scale from 1 to 14.
Indicators, such as **universal indicator or a pH probe** can be used to determine the pH of a solution.
When an acid and alkali react, **neutralisation can occur.**

Acid + alkali → metal salt + water

Strong acid	1	sulfuric acid, nitric acid, hydrochloric acid
	2	lemon juice cola drinks
	3	vinegar
Weak acid	4	
	5	saliva tea
	6	
Neutral	7	water blood (7.4)
Weak alkali	8	
	9	toothpaste milk of magnesia
	10	
	11	
	12	
Strong alkali	13	drain cleaner
	14	sodium hydroxide potassium hydroxide

Metal extraction

Metals that are **more reactive** than carbon are extracted using a process called **electrolysis.**
Metals that are **less reactive** than carbon are extracted by reduction with carbon
Metals that are **unreactive** are found as pure metals and are mined from the Earth's crust.

Reactions of acids

Reactions of acids with metals - Acids react with **metals** to form metal salts and **hydrogen gas.**
Reaction of acids with metal oxides and hydroxides - Acids react with **metal hydroxides/oxides** to form metal salts and **water**
Reaction of acids with metal carbonates - Acids react with **metal carbonates** to form metal salts, **water** and **carbon dioxide**

Key terms

Acid   alkali   base   crystallisation   displacement   metal   neutralisation   ore   oxidation   pH   reactivity

Chemical Changes 02
Knowledge Organiser

Reactivity series

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		Lithium		
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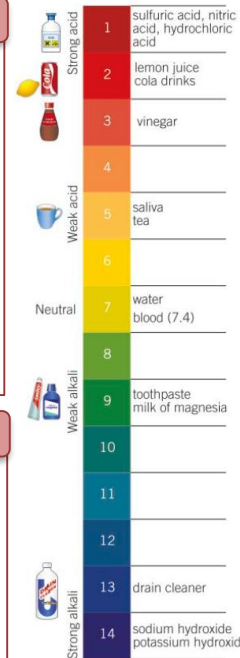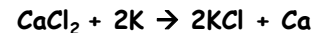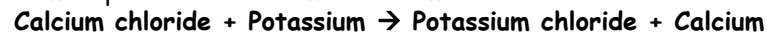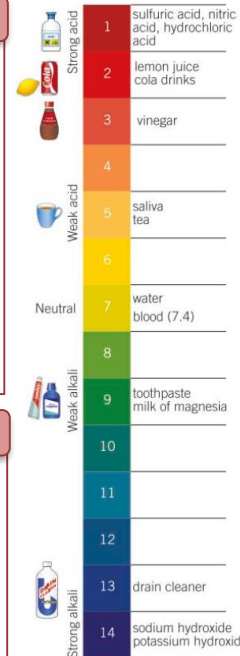
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Acid   alkali   base   crystallisation   displacement   metal   neutralisation   ore   oxidation   pH   reactivity

Health and Communicable Disease
Knowledge Organiser – Year 10 – Science

Communicable disease

A communicable disease is one caused by pathogens that can be passed from organism to organism. A pathogen is a microorganism that causes a disease. Examples of pathogens are: bacteria, fungi, viruses and protists.

Viruses live and reproduce rapidly inside an organism's cells. This can damage or destroy the cells.
Bacteria reproduce rapidly inside organisms and may produce toxins that damage tissues and cause illness.

Pathogens can be spread in the air, water or by direct contact.

Viruses

	Spread by	Symptoms	Prevention and treatment
measles	inhalation of droplets that are produced by infected people sneezing and coughing	• fever • red skin rash • complications can be fatal	• painkillers to treat the symptoms • young children are vaccinated to immunise them against measles
HIV	Exchange of body fluids such as: • sexual contact • blood when drug users share needles	• flu-like symptoms at first • virus attacks the body's immune cells, which can lead to AIDS – when the immune system is so damaged that it cannot fight off infections.	• antiretroviral drugs – are very damaging to the body • barrier methods of contraception, such as condoms • using clean needles
TMV	• direct contact of plants with infected plant material • animal and plant vectors • soil: the pathogen can remain in soil for decades	• mosaic pattern of discolouration on the leaves – where chlorophyll is destroyed • reduces plant's ability to photosynthesise, affecting growth	• removing infected plants

Bacteria

	Spread by	Symptoms	Prevention and treatment
Salmonella	bacteria in or on food being ingested	Salmonella bacteria and the toxins they produce cause • fever • abdominal pains • vomiting • diarrhoea	• poultry are vaccinated against Salmonella bacteria to control spread
Gonorrhoea	direct sexual contact – gonorrhoea is a sexually transmitted disease (STD)	• thick yellow or green discharge from the vagina or penis • pain when urinating	• treatment with antibiotics (many antibiotic-resistant strains have appeared) • barrier methods of contraception

Fungi

	Spread by	Symptoms	Prevention and treatment
Rose black spot	Water and wind	• purple or black spots on leaves, which turn yellow and drop early • reduces plant's ability to photosynthesise, affecting growth	• **fungicides** • affected leaves removed and destroyed

Protists

	Spread by	Symptoms	Prevention and treatment
Malaria	Mosquitos feed on the blood of infected people and spread the protist pathogen when they feed on another person – organisms that spread disease by carrying pathogens are known as vectors	• recurrent episodes of fever • can be fatal	• prevent mosquito vectors breeding • mosquito nets to prevent bites • anti-malarial medicine

Controlling the spread of communicable disease

There are a number of ways to prevent the spread of communicable diseases from one organism to another.

Hygiene
Hand washing, disinfecting surfaces and machinery, keeping raw meat separate, covering mouth when coughing/sneezing.

Isolation
Isolation of infected individuals – people, animals, and plants can be isolated to stop the spread of disease.

Controlling Vectors
If a vector spreads a disease, destroying or controlling the population of the vector can limit the spread of disease.

Vaccination
Vaccination can protect large numbers of individuals against diseases. It cannot be used in plants as they don't have an immune system.

Vaccination involves injecting small quantities of dead or inactive form of a pathogen into the body

↓

This stimulates lymphocytes to produce the correct antibodies for that pathogen

↓

If the same pathogen re-enters the body, the correct antibodies can be produced quickly to prevent infection.

Herd immunity

If a large proportion of a population is vaccinated against a disease, the disease is less likely to spread even if there are some unvaccinated individuals.

Key terms

Bacterium   communicable disease   fungicide   fungus   herd immunity   pathogen   protist   sexually transmitted disease (STD)   toxin   vaccination   vector   virus

Health and Communicable Disease
Knowledge Organiser – Year 10 – Science

Detection and identification of plant diseases

Signs that a plant is diseased:
- stunted growth
- spots on leaves
- areas of rot or decay
- growths
- malformed stems or leaves
- discolouration
- pest infestation

Ways of identifying plant diseases

- gardening manuals and websites
- laboratory testing of infected plants
- testing kits containing monoclonal antibodies

Plant diseases and insects

Plant diseases can also be directly caused by insects.

Aphids are insects that suck sap from the stems of plants. This results in

- reduced rate of growth
- wilting
- discolouration of leaves.

Ladybirds can be used to control aphid infestations as ladybirds larvae eat aphids.

sharp mouthpiece
plant stem
aphid

Plant defences

Physical barriers

- cellulose cell walls – provide a barrier to infection
- tough waxy cuticle on leaves
- bark on trees – a layer of dead cells that can fall off

Chemical barriers

- many plants produce antibacterial chemicals
- poison production stops animals eating plants

Mechanical adaptations

- thorns and hairs stop animals eating plants

- leaves that droop curl when touched to scare herbivores or dislodge insects

- some plants mimic the appearance of unhealthy or poisonous plants to deter insects or herbivores

Health and Communicable Disease
Knowledge Organiser – Year 10 – Science

Non–specific defences

Non-specific defences of the human body against all pathogens include:

Skin
- physical barrier to infection
- produces antimicrobial secretions
- Microorganisms that normally live on the skin prevent pathogens growing

Nose
Cilia and mucus trap particle in the air, preventing them from entering the lungs. Trachea and bronchi produce mucus, which is moved away from the lungs to the back of the throat by the cilia, where it is expelled.

Stomach
Produces strong acid (pH2) that destroys pathogens in mucus, food and drinks.

White blood cells

If a pathogen enters the body, the immune system tries to destroy the pathogen.
The function of white blood cells is to fight pathogens.
There are two main types of white blood cell - lymphocytes and phagocytes.

Lymphocytes fight pathogens in two ways:

Antitoxins
Lymphocytes produce **antitoxins** that bind to the toxins produced by some pathogen (usually bacteria). This *neutralises* the toxins.

Antibodies
Lymphocytes produce antibodies that target and help to destroy specific pathogens by binding to antigens (proteins) on the pathogen's surface's.

1. **Phagocytes** are attracted to areas of infection.
2. The phagocyte surrounds the pathogen and engulfs it.
3. Enzymes that digest and destroy the pathogen are released.

Producing monoclonal antibodies

Monoclonal antibodies are produced from a single clone of cells.

1. Mice are injected to stimulate the production of **lymphocytes** that make specific antibodies.

   Lymphocytes make antibodies but *cannot* divide to form clones

2. Tumour cells are cultured. These cells can divide and grow endlessly.

   Tumour cells *can* divide to form clones

3. The lymphocytes are fused with the tumour cells to create **hybridoma** cells.

   A single hybridoma cell can divide to make a large number of identical cells called a clone.

   All the cloned cells can make the antibody.

4. A large amount of the monoclonal antibody can then be produced, collected, and purified for use.

Use of monoclonal antibodies

Monoclonal antibodies are specific to a single binding site on a specific protein antigen.

This means they can be used to target specific chemicals or cells.

Research

Specific molecules can be located in cells and tissues by using monoclonal antibodies to bind them to a florescent dye.

Treatment

Monoclonal antibodies can deliver toxic chemicals and drugs specifically to cancer cells, limiting their harm to other cells in the body

Diagnostic testing

Monoclonal antibodies can be used to measure the levels of a particular chemical in the blood or to detect pathogens

Pregnancy tests

Pregnant women produce the hormone HCG, which is excreted in their urine.
Monoclonal antibodies can be used to detect HCG in a pregnant woman's urine:

1) Urine is applied to the end of the stick

2) The test stick contains monoclonal antibodies that only bind HCG, attached to a dye.

3) If HCG is present in the urine, the monoclonal antibodies cause a line of dye to appear. This means the pregnancy test is positive.

4) A second line appears in the control zone to show the test is valid, even if the result is negative.

Treating diseases

Antibiotics

- **Antibiotics** are medicines that can kill *bacteria* in the body.
- Specific bacteria need to be treated by specific antibiotics
- Antibiotics have greatly reduced deaths from infectious bacterial diseases, but antibiotic-resistant strains of bacteria are emerging.

Treating viral diseases

- Antibiotics *do not* affect viruses.
- Drugs that kill viruses often damage the body's tissues.
- Painkillers treat the symptoms of viral diseases but do not kill pathogens.

Discovering and developing new drugs

New drugs are extensively tested and trailed for

- Toxicity – is it harmful?
- Efficacy – does it work?
- Dose – what amount is safe and effective to give

Stages of clinical trials

Pre-clinical trials
Drug is tested in cells, tissues, and live animals.

Clinical trials
1. Healthy volunteers receive vary low doses to test whether the drugs is safe and effective.
2. If safe, large numbers of healthy volunteers and patients receive the drugs to find the optimum dose.

Peer review
Before being published, the results of clinical trials will be tested and checked by independent researchers. This is called **peer review**.

Double-blind trials
Some clinical trials give some of their patients a placebo drug – one that is known to have no effect.
Double-blind trials are when neither the patients nor the doctors know who has been given the real drug and who has been given the placebo. This reduces biases in the trail.

Key terms

Bacterium communicable disease fungicide fungus herd immunity pathogen prot
sexually transmitted disease (STD) toxin vaccination vector virus

Health and Infectious Disease
Knowledge Organiser

Health

Health is a state of physical and mental well-being.

The following factors can affect health:

- Communicable and non-communicable diseases
- Diet
- Stress
- Exercise
- Life situation

Different types of disease may interact, for example:

- Defects in the immune system make an individual more likely to suffer from infectious diseases
- Viral infection can trigger cancers
- Immune reactions initially caused by a pathogen can trigger allergies, for example skin rashes and asthma
- Severe physical ill health can lead to depression and other mental illnesses.

Cancer

Cancer is the result of changes in cells that lead to uncontrolled growth and division by mitosis.

Rapid division of abnormal cells can form a tumour.

Malignant tumours are cancerous tumours that invade neighbouring tissues and spread to other parts of the body in the blood, forming secondary tumours.

Benign tumours are non-cancerous tumours that do not spread in the body.

Risk Factor	Disease	Effects of risk factor
Diet (obesity) and amount of exercise	Type 2 diabetes	Body does not respond properly to the production of insulin, so blood glucose levels can not be controlled
	Cardiovascular disease	Increased blood cholesterol can lead to CHD
Alcohol	Impaired liver function	Long-term alcohol use causes liver cirrhosis (scarring), meaning the liver cannot remove toxins from the body or produce sufficient bile
	Impaired brain function	Damages the brain and can cause anxiety and depression
	Affected development of unborn babies	Alcohol can pass through the placenta, risking miscarriages, premature births and birth defects
Smoking	Lung disease and cancers	Cigarettes contain carcinogens, which can cause cancers
	Affected development of unborn babies	Chemicals can pass through the placenta, risking premature births and birth. defects
Carcinogens, such as ionising radiation, and genetic risk factors	Cancers	For example, tar in cigarettes and ultraviolet rays from the Sun can cause cancers
		Some genetic factors make an individual more likely to develop certain cancers

Treatment of non-communicable diseases linked to lifestyle risk factors – such as poor diet, drinking alcohol, and smoking – can be very costly, both to individuals and to the Government.

A high incidence of these lifestyle risk factors can cause high rates of non-communicable diseases in a population.

Key terms

artificial heart   benign   carcinogen   cholesterol   coronary heart disease   health   malignant   risk factor   statin   stent   transplant

Health and Infectious Disease
Knowledge Organiser

Communicable disease

A communicable disease is one caused by pathogens that can be passed from organism to organism. A pathogen is a microorganism that causes a disease. Examples of pathogens are: bacteria, fungi, viruses and protists.

Viruses live and reproduce rapidly inside an organism's cells. This can damage or destroy the cells.
Bacteria reproduce rapidly inside organisms and may produce toxins that damage tissues and cause illness.

Pathogens can be spread in the air, water or by direct contact.

Viruses

	Spread by	Symptoms	Prevention and treatment
measles	inhalation of droplets that are produced by infected people sneezing and coughing	• fever • red skin rash • complications can be fatal	• painkillers to treat the symptoms • young children are vaccinated to immunise them against measles
HIV	Exchange of body fluids such as: • sexual contact • blood when drug users share needles	• flu-like symptoms at first • virus attacks the body's immune cells, which can lead to AIDS – when the immune system is so damaged that it cannot fight off infections.	• antiretroviral drugs – are very damaging to the body • barrier methods of contraception, such as condoms • using clean needles
TMV	• direct contact of plants with infected plant material • animal and plant vectors • soil: the pathogen can remain in soil for decades	• mosaic pattern of discolouration on the leaves – where chlorophyll is destroyed • reduces plant's ability to photosynthesise, affecting growth	• removing infected plants

Bacteria

	Spread by	Symptoms	Prevention and treatment
Salmonella	bacteria in or on food being ingested	Salmonella bacteria and the toxins they produce cause • fever • abdominal pains • vomiting • diarrhoea	• poultry are vaccinated against Salmonella bacteria to control spread
Gonorrhoea	direct sexual contact – gonorrhoea is a sexually transmitted disease (STD)	• thick yellow or green discharge from the vagina or penis • pain when urinating	• treatment with antibiotics (many antibiotic-resistant strains have appeared) • barrier methods of contraception

Fungi

	Spread by	Symptoms	Prevention and treatment
Rose black spot	Water and wind	• purple or black spots on leaves, which turn yellow and drop early • reduces plant's ability to photosynthesise, affecting growth	• fungicides • affected leaves removed and destroyed

Protists

	Spread by	Symptoms	Prevention and treatment
Malaria	Mosquitos feed on the blood of infected people and spread the protist pathogen when they feed on another person – organisms that spread disease by carrying pathogens are known as vectors	• recurrent episodes of fever • can be fatal	• prevent mosquito vectors breeding • mosquito nets to prevent bites • anti-malarial medicine

Controlling the spread of communicable disease

There are a number of ways to prevent the spread of communicable diseases from one organism to another.

Hygiene
Hand washing, disinfecting surfaces and machinery, keeping raw meat separate, covering mouth when coughing/sneezing.

Isolation
Isolation of infected individuals – people, animals, and plants can be isolated to stop the spread of disease.

Controlling Vectors
If a vector spreads a disease, destroying or controlling the population of the vector can limit the spread of disease.

Vaccination
Vaccination can protect large numbers of individuals against diseases. It cannot be used in plants as they don't have an immune system.

Herd immunity

If a large proportion of a population is vaccinated against a disease, the disease is less likely to spread even if there are some unvaccinated individuals.

Vaccination involves injecting small quantities of dead or inactive form of a pathogen into the body

↓

This stimulates lymphocytes to produce the correct antibodies for that pathogen

↓

If the same pathogen re-enters the body, the correct antibodies can be produced quickly to prevent infection.

Key terms

Bacterium   communicable disease   fungicide   fungus   herd immunity   pathogen   protist   sexually transmitted disease (STD)   toxin   vaccination   vector   virus

Health and Infectious Disease
Knowledge Organiser

Non–specific defences

Non-specific defences of the human body against all pathogens include:

Skin
- physical barrier to infection
- produces antimicrobial secretions
- Microorganisms that normally live on the skin prevent pathogens growing

Nose
Cilia and mucus trap particle in the air, preventing them from entering the lungs. Trachea and bronchi produce mucus, which is moved away from the lungs to the back of the throat by the cilia, where it is expelled.

Stomach
Produces strong acid (pH2) that destroys pathogens in mucus, food and drinks.

White blood cells

If a pathogen enters the body, the immune system tries to destroy the pathogen.
The function of white blood cells is to fight pathogens.
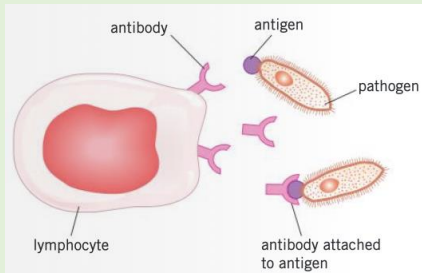There are two main types of white blood cell - lymphocytes and phagocytes.

Lymphocytes fight pathogens in two ways:

Antitoxins
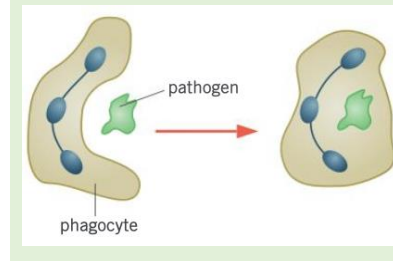Lymphocytes produce **antitoxins** that bind to the toxins produced by some pathogen (usually bacteria). This *neutralises* the toxins.

Antibodies
Lymphocytes produce antibodies that target and help to destroy specific pathogens by binding to antigens (proteins) on the pathogen's surface's.

1. **Phagocytes** are attracted to areas of infection.
2. The phagocyte surrounds the pathogen and engulfs it.
3. Enzymes that digest and destroy the pathogen are released.

phagocyte / pathogen

antibody / antigen / pathogen / lymphocyte / antibody attached to antigen

Treating diseases

Antibiotics
- **Antibiotics** are medicines that can kill *bacteria* in the body.
- Specific bacteria need to be treated by specific antibiotics
- Antibiotics have greatly reduced deaths from infectious bacterial diseases, but antibiotic-resistant strains of bacteria are emerging.

Treating viral diseases
- Antibiotics *do not* affect viruses.
- Drugs that kill viruses often damage the body's tissues.
- Painkillers treat the symptoms of viral diseases but do not kill pathogens.

Discovering and developing new drugs

Drugs were traditionally extracted from plants and microorganisms, for example

- The heart drug digitalis comes from foxglove plants
- The painkiller aspirin originates from willow trees
- Penicillin was discovered by Alexander Fleming from *Penicillium* mould.

Most modern are now synthesised by chemists in laboratories.

New drugs are extensively tested and trailed for

- Toxicity – is it harmful?
- Efficacy – does it work?
- Dose – what amount is safe and effective to give

Stages of clinical trials

Pre-clinical trials
Drug is tested in cells, tissues, and live animals.

Clinical trials
1. Healthy volunteers receive vary low doses to test whether the drugs is safe and effective.
2. If safe, large numbers of healthy volunteers and patients receive the drugs to find the optimum dose.

Peer review
Before being published, the results of clinical trials will be tested and checked by independent researchers. This is called **peer review**.

Double-blind trials
Some clinical trials give some of their patients a placebo drug – one that is known to have no effect.
Double-blind trials are when neither the patients nor the doctors know who has been given the real drug and who has been given the placebo. This reduces biases in the trail.

Key terms

Bacterium   communicable disease   fungicide   fungus   herd immunity   pathogen   protist   sexually transmitted disease (STD)   toxin   vaccination   vector   virus

Inheritance
Knowledge Organiser – Year 10 – Science

Types of reproduction

Sexual	Asexual
Two parents	One parent
Cell division thorough meiosis	Cell division by mitosis
Joining of male and female sex cells (gametes) – sperm and egg in animals, pollen and ovule in plants	No fusion of gametes
Produces non-identical offspring that are genetically different to parents	Produces offspring that are genetically identical to parent (clones)
Results in wide variation within offspring and species	No mixing of genetic information
Advantages: • Produces variation in offspring • If the environment changes, the offspring may have a survival advantage by natural selection due to their genetic variation.	Advantages: • Only one parent needed • Time and energy efficient as do not need to find a mate • Faster than sexual reproduction • Many identical offspring can be produced when conditions are favourable • Successful traits passed on as offspring are identical
Disadvantages • Finding a mate and reproducing is time consuming and requires lots of energy • Much slower than asexual reproduction	Disadvantages • Reduced genetic variation – if the environment changes, the offspring may have a survival disadvantage • Harmful mutations in parent would be passed on to all offspring

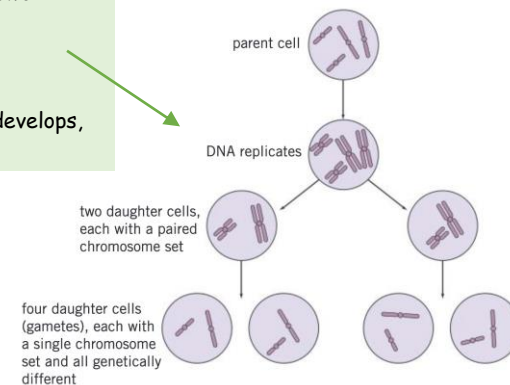Depending on the circumstances, some organisms reproduce by both methods. For example:

• malaria parasites reproduce asexually in human hosts, but sexually in mosquitoes
• many fungi reproduce asexually by spores, but also sexually to give variation.
• many plants produce seeds sexually, but also reproduce asexually by bulb division (daffodils) or runners (strawberry plants).

Meiosis

Meiosis is a type of cell division that makes gametes in the reproductive organs.

Meiosis halves the number of chromosomes in gametes, and fertilisation (joining of two gametes) restores the full number of chromosomes.

The fertilised cell divides by mitosis, producing more cells. As the embryo develops, the cells differentiate.

parent cell

DNA replicates

two daughter cells, each with a paired chromosome set

four daughter cells (gametes), each with a single chromosome set and all genetically different

Genetic inheritance

You need to be able to explain these terms about genetic inheritance:

gamete	Specialised sex cell formed by meiosis
chromosomes	Long molecule made from DNA found in the nucleus of cells
gene	Part of a chromosome that codes for a protein – some characteristics are controlled by a single gene (e.g. fur colour in mice and red-green colour blindness in humans), but most are controlled by multiple genes interacting
allele	Different forms of the same gene
dominant	Allele that only needs one copy present to be expressed
recessive	Allele that needs two copies to present to be expressed
homozygous	When an individual carries two copies of the same allele for a trait
heterozygous	When an individual carriers two alleles for a trait
genotype	Combination of alleles an individual has
phenotype	Physical expression of the genotype – the characteristic shown

Inheritance
Knowledge Organiser – Year 10 – Science

DNA and the genome

Genetic material in the nucleus of a cell is composed of DNA.

DNA is made up of two strands forming a double helix.

DNA is contained in structures called chromosomes.

A gene is a small section of DNA on a chromosome that codes for a specific sequence of amino acids, to produce a specific protein.

The genome of an organism is the entire genetic material of that organism.

The whole human genome has been studied, and this has allowed scientists to:
- Search for genes linked to different diseases
- Understand and treat inherited disorders
- Trace human migration patterns from the past.
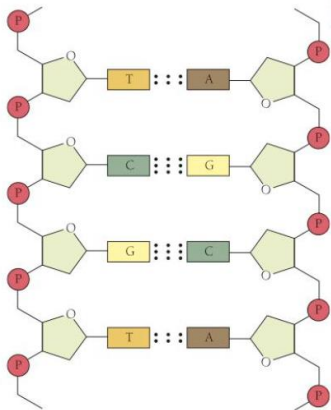
Structure of DNA

DNA is a polymer made from four different nucleotides.

A nucleotide is a molecule made of phosphate, a sugar, and one of four organic bases (A, C, G and T).

A sequence of three bases codes for a particular amnio acid.

The order of the bases determines the order in which amino acids are assembled to produce a specific protein.

In complementary DNA strands, a C base is always linked to a G base on the opposite strand, and a T to an A.

Inherited disorders

Some disorders are due to the inheritance of certain alleles:
- Polydactyly (extra finger or toe) is caused by a dominant allele.
- Cystic fibrosis (a disorder of cell membranes) is caused by a recessive allele.

Embryo screening and gene therapy may alleviate suffering from these disorders, but there are ethical issues surrounding their use.

Protein Synthesis

Proteins are synthesised on the ribosomes using a template of DNA.

Carrier molecules bring amino acids to add to the protein chain in the correct order.

When the protein is complete it folds up to form a specific shape, and this shape allows proteins to do a specific job (as enzymes and hormones, or forming structures).

Non-coding parts of DNA can control the expression of genes by switching them on and off.

Mutations and genetic variability

Mutations occur continuously and change the base code of DNA. In coding DNA they may alter the activity of a protein:
- Most do not alter the appearance of function of the protein the DNA produces.
- A change in DNA structure may change the amino acid order, causing a gene to synthesis a different protein.
- Some mutations alter the shape of the protein, so the protein may no longer fit the substrate binding site, or lose its strength if it is structural.

In non coding DNA, mutations may alter how genes are expressed.

Genetic crosses

A genetic cross is when you consider the offspring that might result from two known parents. Punnett squares can be used to predict the outcome of a genetic cross, for both the genotypes the offspring might have and their phenotypes.

For example, the cross bb (brown fur) x BB (black fur) in mice:

		mother	
		B	B
father	b	Bb	Bb
	b	Bb	Bb

Offspring genotype: 100% Bb
Offspring phenotype: all black fur

Sex determination

Normal human body cells contain 23 pairs of chromosomes-one of these pairs determines the sex of the offspring.

In human females the sex chromosomes are the same (XX) and in males there are different (XY).

A Punnett square can be used to determine the probability of offspring being male or female. The probability is always 50% in human as there are two XX and two XY outcomes.

		mother	
		X	X
father	X	XX	XX
	Y	XY	XY

Key terms

allele   chromosomes   clone   DNA   dominant   double helix   fertilisation   gamete   gene   genetic cross   genome   genotype   homozygous   heterozygous   meiosis   mitosis   phenotype   Punnett square   recessive

Evolution
Knowledge Organiser – Year 10 – Science

Theory of evolution

Evolution is the gradual change in the inherited characteristics of a population over time.

Evolution occurs through the process of natural selection and may result in the formation of new species.

Darwin's work

Charles Darwin proposed the theory of evolution by natural selection after gathering evidence from a round-the-world expedition, experimentation and discussion.

This states that all living species evolved from a common ancestor that first developed more than three billion years ago.

Darwin published this theory in On the Origin of the Species (1859). His ideas were considered controversial and only gradually accepted because
- They challenged the idea that God made all of the Earth's animals and plants
- There was insufficient evidence at the time the theory was published, although much more evidence has been gathered since
- Mechanisms of inheritance and variation were not known at the time.
- Other theories, such as that of Jean-Baptiste Lamarck, were based on the idea that the changes that occur in an organism over its lifetime could be passed on to its offspring. We now know that in the majority of cases this type of inheritance cannot occur.

Process of natural selection

The theory of evolution by natural selection states that:
- Organisms within species show a wide variation in phenotype
- Individuals with characteristics most suited to the environment are more likely to survive and breed successfully
- These characteristics are then passed on to their offspring.

Evidence for evolution

The theory of evolution by natural selection is now widely accepted because there are lots of data to support it, such as
- It has been shown that characteristics are passed on to offspring in genes
- Evidence from the fossil record
- The evolution of antibiotic resistance in bacteria

Speciation

Alfred Russel Wallace independently proposed the theory of evolution by natural selection.
He published joint writings with Darwin in 1858 on the subject, prompting Darwin to publish his book the next year.
Wallace worked worldwide gathering evidence for evolutionary theory.
He is best known for his work on warning colours in animals and for his pioneering work on the theory of speciation.

Speciation in the gradual formation of a new species as a result of evolution. More evidence and work from scientists over time have led to our current understanding of the theory of speciation.
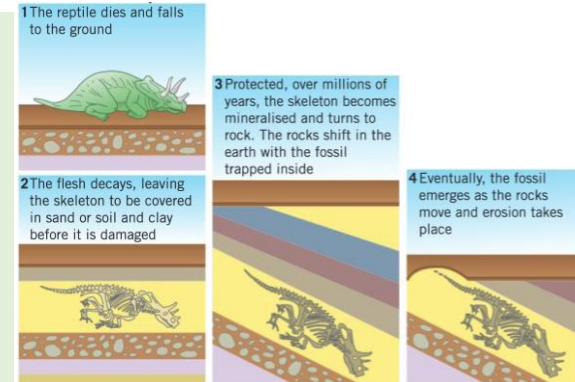1. Two populations of one species are isolated.
2. Natural selection occurs so that the better-adapted individuals reproduce and pass on the genes for these different characteristics
3. The populations have an increasing number of genetic mutations as they adapt to their different environments
4. Eventually the two populations are so genetically different they cannot breed to produce fertile offspring.

Fossils

Fossils are the remains of organisms from millions of years ago, which are found in rocks.
Fossils can be formed from:
- Parts of the organism that do not decay because one or more of the conditions needed for decay are absent
- Hard parts of an organism (e.g. bones) when replaced by minerals
- Preservation of the traces of organisms (e.g. burrows, footprints, and rootlet traces).

1 The reptile dies and falls to the ground

2 The flesh decays, leaving the skeleton to be covered in sand or soil and clay before it is damaged

3 Protected, over millions of years, the skeleton becomes mineralised and turns to rock. The rocks shift in the earth with the fossil trapped inside

4 Eventually, the fossil emerges as the rocks move and erosion takes place

Extinction

Extinction is when there are no remaining individuals of a species still alive.
Factors that may contribute to a species' extinction include:
- new predators
- new diseases
- new competitors
- catastrophic events
- changes to the environment

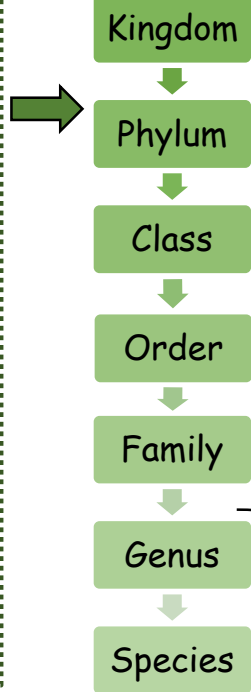| Benefits of the fossil record	Problems with the fossil record
- Can tell scientists how individual species have changed over time - Fossils allow us to understand how life developed over the Earth's history - Fossils can be used to track the movement of a species or its ancestors across the world	- Many early organisms were soft-bodied, so most decayed before producing fossils - There are gaps in the fossil record as not all fossils have been found and others have been destroyed by geological or human activity – this means scientists cannot be certain about how life began on Earth.

Evolution
Knowledge Organiser – Year 10 – Science

Classification of living organisms

Carl Linnaeus developed a system to classify living things into groups, based upon observable characteristics.

New models of classification were proposed as understanding of biochemical processes developed and improvements in microscopes led to discoveries of internal structures.
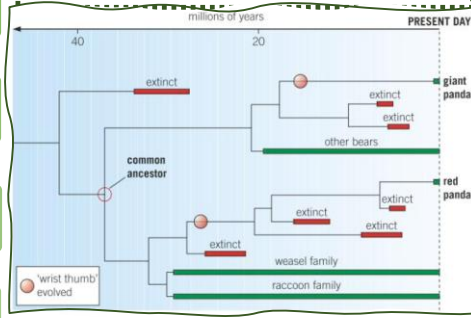
There is now a three-domain system developed by Carl Woese, dividing organisms into:
• Bacteria (true bacteria)
• Archea (primitive bacteria usually living in extreme conditions)
• Eukaryota (including protists, plants, fungi and animals).

Kingdom → Phylum → Class → Order → Family → Genus → Species

Organisms are named by the binomial system of genus and species e.g. **Homo Sapiens**

Homo is our **Genus**
Sapien is our **Species**

Evolutionary Trees

Evolutionary trees use current classification data for living organisms and fossil data for extinct organisms to show how scientists believe organisms are related.
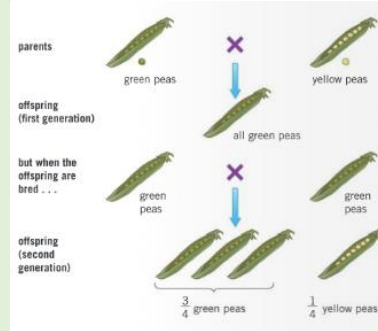

Understanding of genetics

Gregor Mendel development our understanding of genetics by carrying out breeding experiments on plants in the mid-nineteenth century.

For example, he showed that crossing a plant that produces yellow peas and a plant that produces green peas always bred offspring with green peas. But when crossing these offspring, some offspring of later generations might have yellow peas again.

Through experiments like these, Mendel observed that the inheritance of each characteristic is determined by units – later called genes – that are passed on unchanged to offspring and that these genes can be dominant or recessive.

The significance of Mendel's work was not recognised until after his death, because

• Most scientists believed in blended inheritance (e.g. a white flower and a purple flower producing a lilac flower).

• He published his work in an obscure journal so not many people saw it.

• He was a monk and not a scientist.

Resistant bacteria

Bacteria can evolve rapidly because the reproduce very quickly. This has lead to many strains of bacteria developing antibiotic resistance, such as MRSA. The development of antibiotic resistance is evidence for the theory of evolution by natural selection.

The development of new antibiotics is expensive and slow, so is unlikely to keep up with the emergence of new antibiotic-resistant bacteria strains.

To reduce the rise of antibiotic-resistant strains
- doctors should only prescribe antibiotics for serious bacterial infections
- patients should complete their courses of antibiotics so all bacteria are killed and non survive to form resistant strains.
- the use of antibiotics in farming and agriculture should be restricted.

Development of gene theory

Further work by many scientists led to the development of gene theory.

In the late nineteenth century the behaviour of chromosomes during cell division was observed.

In the early twentieth century genes and chromosomes were observed to behave similarly, leading to the idea that genes were located on chromosomes.

In the mid-twentieth century the structure of DNA and mechanism of gene function were determined.
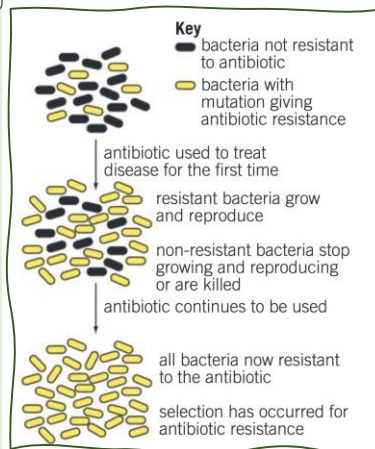
Key terms

Antibiotic resistance   binomial system   evolution   evolutionary tree   extinction   fossil record   natural selection   three-domain system

Variation
Knowledge Organiser – Year 10 – Science

Variation in populations

Differences in the characteristics of individuals in a population are called variation.

Variation may be due to differences in:
- the genes they have inherited, for example eye colour (genetic causes)
- the environment in which they have developed, for example, language (environmental causes)
- a combination of genes and the environment.

Mutation

There is usually a lot of genetic variation within a population of species – this variation arises from mutations.

A mutation is a change in a DNA sequence:
- mutations occur continuously
- very rarely a mutation will lead to a new phenotype
- some mutations may change an existing phenotype and most have no effect
- if a phenotype is suited to an environmental change, it can lead to a relatively rapid change in the species – this is the theory of evolution by natural selection.

Methods of Cloning

Tissues culture
Small groups of cells from part of a plant are used to grow identical new plants. This is important for preserving rare plant species and growing plants commercially in nurseries.

Cutting
An older, simple method used by gardeners to produce many identical plants from a parent plant.

Embryo transplant
Cells are split apart from developing animal embryo before they become specialised, then the identical embryos are transplanted into host mothers.
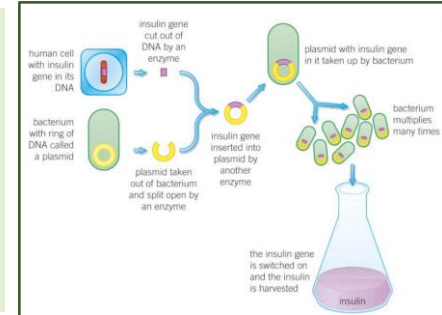
Benefits	Risks
• Large number of identical offspring produced • Quick and economical • Desired characteristics guaranteed	• Limits variation and causes reduction in gene pool • Clones may be vulnerable to diseases/changes in the environment • Ethical considerations around cloning living organisms

Selective Breeding

Selective breeding (artificial selection) is the process by which humans breed plants and animals for particular genetic characteristics.

Humans have been using selective breeding for thousands of years, since breeding crops from wild plants and domesticating animals.

Process of selective breeding:
1. choose parents with the desired characteristics from a mixed population
2. breed them together
3. choose offspring with the desired characteristic and breed them together
4. continue over many generations until all offspring show the desired characteristic.

The characteristic targeted in selective breeding can be chosen for usefulness or appearance, for example
- disease resistance in food crops
- animals that produce more meat or milk
- domestic dogs with a gentle nature
- larger or unusual flowers.

Disadvantages of selective breeding:
- can lead to inbreeding, where some breeds are particularly prone to inherited defects or diseases
- reduces variation, meaning all members of a species could be susceptible to certain diseases.

Genetic Engineering

Genetic engineering is a process that involves changing the genome of an organism by introducing a gene from another organism to produce a desired characteristic.
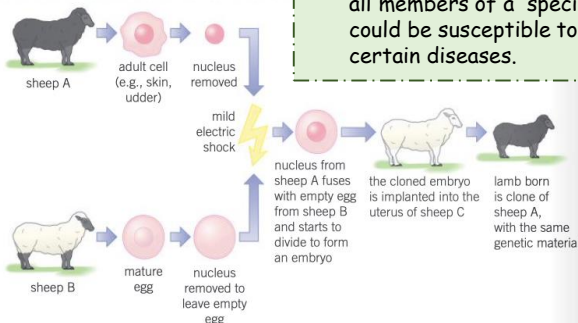
For example:
- Bacterial cells have been genetically engineered to produce useful substances, such as human insulin to treat diabetes.
- Plant crops have been genetically engineered to be resistant to diseases, insects, or herbicides, or to produce bigger and better fruits and higher crop yields. Crops that have undergone genetic engineering are called genetically modified (GM).

There are many benefits to genetic engineering in agriculture and medicine, but also some risks and moral objections.

Benefits	Risks
• Potential to overcome some inherited human diseases • Can lead to higher value of crops as GM crops have bigger yields than normal • Crops can be engineered to be resistant to herbicides, make their own pesticides, or be better adapted to environmental conditions.	• Genes from GM plants and animals may spread to other wildlife, which could have devastating effects on ecosystems • Potential negative impacts on populations of wild flowers and insects • Ethical concerns, for example, in the future people could manipulate the genes of foetuses to ensure certain characteristics • Some people believe the long-term effects on health of eating GM crops have not been fully explored.

Cloning

A clone is an individual that has been produced asexually and is genetically identical to its parent. There are several methods for producing both plant and animal clones, but there are benefits and risks associated with cloning.

Inheritance
Knowledge Organiser

Types of reproduction
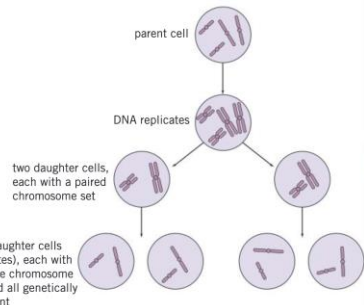
Sexual	Asexual
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Meiosis is a type of cell division that makes gametes in the reproductive organs.

Meiosis halves the number of chromosomes in gametes, and fertilisation (joining of two gametes) restores the full number of chromosomes.

The fertilised cell divides by mitosis, producing more cells. As the embryo develops, the cells differentiate.

parent cell

DNA replicates

two daughter cells, each with a paired chromosome set

four daughter cells (gametes), each with a single chromosome set and all genetically different

DNA and the genome

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DNA is made up of two strands forming a double helix.
DNA is contained in structures called chromosomes.
A gene is a small section of DNA on a chromosome that codes for a specific sequence of amino acids, to produce a specific protein.
The genome of an organism is the entire genetic material of that organism.
The whole human genome has been studied, and this has allowed scientists to:
• Search for genes linked to different diseases
• Understand and treat inherited disorders
• Trace human migration patterns from the past.

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Some disorders are due to the inheritance of certain alleles:
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You need to be able to explain these terms about genetic inheritance:

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Offspring genotype: 100% Bb
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Sex determination

Normal human body cells contain 23 pairs of chromosomes-one of these pairs determines the sex of the offspring.
In human females the sex chromosomes are the same (XX) and in males there are different (XY).
A Punnett square can be used to determine the probability of offspring being male or female. The probability is always 50% in human as there are two XX and two XY outcomes.

		mother	
		X	X
father	X	XX	XX
	Y	XY	XY

Key terms

allele   chromosomes   clone   DNA   dominant   double helix   fertilisation   gamete   gene   genetic cross   genome   genotype   homozygous   heterozygous   meiosis   mitosis   phenotype   Punnett square   recessive

Inheritance
Knowledge Organiser

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- some mutations may change an existing phenotype and most have no effect
- if a phenotype is suited to an environmental change, it can lead to a relatively rapid change in the species – this is the theory of evolution by natural selection.

Genetic Engineering

Genetic engineering is a process that involves changing the genome of an organism by introducing a gene from another organism to produce a desired characteristic.

For example:
- Bacterial cells have been genetically engineered to produce useful substances, such as human insulin to treat diabetes.
- Plant crops have been genetically engineered to be resistant to diseases, insects, or herbicides, or to produce bigger and better fruits and higher crop yields. Crops that have undergone genetic engineering are called genetically modified (GM).

Selective Breeding

Selective breeding (artificial selection) is the process by which humans breed plants and animals for particular genetic characteristics.
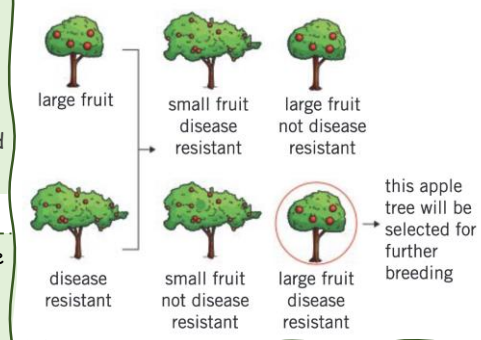Humans have been using selective breeding for thousands of years, since breeding crops from wild plants and domesticating animals.

Process of selective breeding:
1. choose parents with the desired characteristics from a mixed population
2. breed them together
3. choose offspring with the desired characteristic and breed them together
4. continue over many generations until all offspring show the desired characteristic.
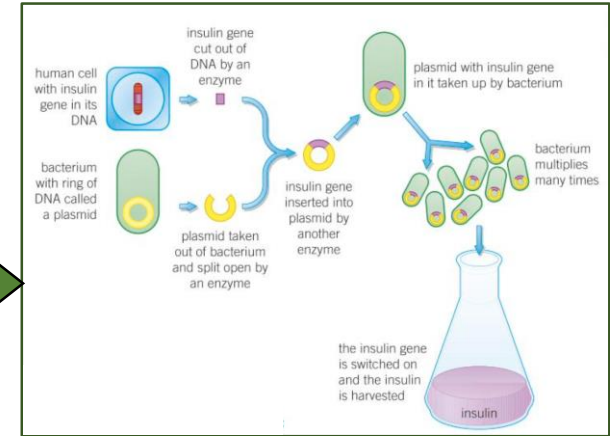
Disadvantages of selective breeding:
- can lead to inbreeding, where some breeds are particularly prone to inherited defects or diseases
- reduces variation, meaning all members of a species could be susceptible to certain diseases.

The characteristic targeted in selective breeding can be chosen for usefulness or appearance, for example
- disease resistance in food crops
- animals that produce more meat or milk
- domestic dogs with a gentle nature
- larger or unusual flowers.

There are many benefits to genetic engineering in agriculture and medicine, but also some risks and moral objections.

Benefits	Risks
• Potential to overcome some inherited human diseases • Can lead to higher value of crops as GM crops have bigger yields than normal • Crops can be engineered to be resistant to herbicides, make their own pesticides, or be better adapted to environmental conditions.	• Genes from GM plants and animals may spread to other wildlife, which could have devastating effects on ecosystems • Potential negative impacts on populations of wild flowers and insects • Ethical concerns, for example, in the future people could manipulate the genes of foetuses to ensure certain characteristics • Some people believe the long-term effects on health of eating GM crops have not been fully explored.

Inheritance
Knowledge Organiser

Theory of evolution

Evolution is the gradual change in the inherited characteristics of a population over time.

Evolution occurs through the process of natural selection and may result in the formation of new species.

Process of natural selection

The theory of evolution by natural selection states that:
- Organisms within species show a wide variation in phenotype
- Individuals with characteristics most suited to the environment are more likely to survive and breed successfully
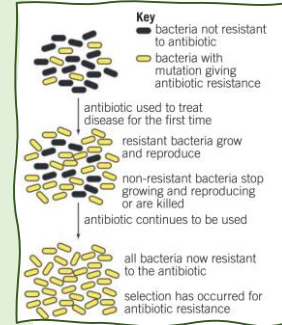- These characteristics are then passed on to their offspring.

Resistant bacteria

Bacteria can evolve rapidly because the reproduce very quickly. This has lead to many strains of bacteria developing antibiotic resistance, such as MRSA. The development of antibiotic resistance is evidence for the theory of evolution by natural selection.

The development of new antibiotics is expensive and slow, so is unlikely to keep up with the emergence of new antibiotic-resistant bacteria strains.

To reduce the rise of antibiotic-resistant strains
- doctors should only prescribe antibiotics for serious bacterial infections
- patients should complete their courses of antibiotics so all bacteria are killed and non survive to form resistant strains.
- the use of antibiotics in farming and agriculture should be restricted.

Key
- bacteria not resistant to antibiotic
- bacteria with mutation giving antibiotic resistance

antibiotic used to treat disease for the first time

resistant bacteria grow and reproduce

non-resistant bacteria stop growing and reproducing or are killed

antibiotic continues to be used

all bacteria now resistant to the antibiotic

selection has occurred for antibiotic resistance

Fossils

Fossils are the remains of organisms from millions of years ago, which are found in rocks.
Fossils can be formed from:
- Parts of the organism that do not decay because one or more of the conditions needed for decay are absent
- Hard parts of an organism (e.g. bones) when replaced by minerals
- Preservation of the traces of organisms (e.g. burrows, footprints, and rootlet traces).

Evidence for evolution

The theory of evolution by natural selection is now widely accepted because there are lots of data to support it, such as
- It has been shown that characteristics are passed on to offspring in genes
- Evidence from the fossil record
- The evolution of antibiotic resistance in bacteria

Benefits of the fossil record	Problems with the fossil record
• Can tell scientists how individual species have changed over time • Fossils allow us to understand how life developed over the Earth's history • Fossils can be used to track the movement of a species or its ancestors across the world	• Many early organisms were soft-bodied, so most decayed before producing fossils • There are gaps in the fossil record as not all fossils have been found and others have been destroyed by geological or human activity – this means scientists cannot be certain about how life began on Earth.

1 The reptile dies and falls to the ground

2 The flesh decays, leaving the skeleton to be covered in sand or soil and clay before it is damaged

3 Protected, over millions of years, the skeleton becomes mineralised and turns to rock. The rocks shift in the earth with the fossil trapped inside

4 Eventually, the fossil emerges as the rocks move and erosion takes place

Organisms are named by the binomial system of genus and species e.g. **Homo Sapiens**

Homo is our **Genus**
Sapien is our **Species**

Classification of living organisms

Kingdom → Phylum → Class → Order → Family → Genus → Species

Carl Linnaeus developed a system to classify living things into groups, based upon observable characteristics.
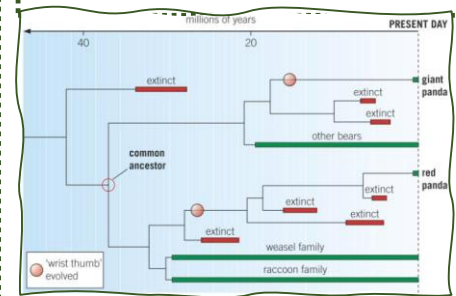
New models of classification were proposed as understanding of biochemical processes developed and improvements in microscopes led to discoveries of internal structures.

There is now a three-domain system developed by Carl Woese, dividing organisms into:
- Bacteria (true bacteria)
- Archea (primitive bacteria usually living in extreme conditions)
- Eukaryota (including protists, plants, fungi and animals).

Evolutionary Trees

Evolutionary trees use current classification data for living organisms and fossil data for extinct organisms to show how scientists believe organisms are related.

millions of years   PRESENT DAY
40   20
extinct
giant panda
extinct
extinct
other bears
common ancestor
red panda
extinct
extinct
extinct
extinct
weasel family
'wrist thumb' evolved
raccoon family

Extinction

Extinction is when there are no remaining individuals of a species still alive.
Factors that may contribute to a species' extinction include:
- new predators
- new diseases
- new competitors
- catastrophic events
- changes to the environment

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

States of matter – what form a substance can exist as.

Solid – regular arrangement of **vibrating** particles with strong forces of attraction. Fixed shape and volume.

Liquid – random arrangement of slowly moving particles which have weak forces of attraction. Takes the shape of the container. Fixed volume.

Gas – random arrangement of quickly moving particles which have negligible (no) forces of attraction. Volume can be changed (gases can be compressed). No fixed shape – fills container.

Melting – changing state from solid to liquid.

Evaporating / boiling / vaporisation – liquid to gas.

Condensation – gas to liquid.

Freezing / solidifying – liquid to solid.

Sublimation – solid to gas.

Meting point – the **temperature** at which a solid becomes a liquid.

Boiling point – the **temperature** at which a liquid becomes a gas.

Freezing point – the **temperature** at which a liquid becomes a solid.

Density – the amount of mass in a given volume. Density = mass ÷ volume.

Latent heat – the energy transferred to or from a substance when it changes state.

Specific latent heat – the energy required to change the state of 1kg of a substance without an increase in temperature.

Specific Heat Capacity – the energy required to change the temperature of 1kg of a substance by 1ºC.

Density required practical

Density is the mass per unit volume of any object. It is calculated by dividing the mass of an object by its volume.
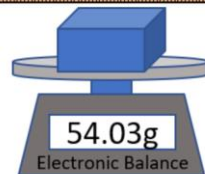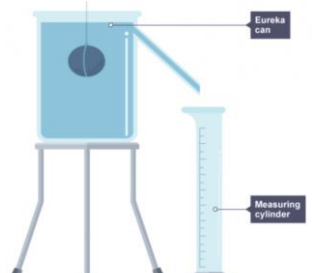
Density = mass / volume
(kg/m³)   (kg)   (m³)

Regular object (e.g. cube) – use a ruler to measure length, width, height. Multiply these 3 values together for volume. Use electronic scales to find mass. Use equation to calculate density.

Irregular object. – use electronic scales to find mass. Submerge object under water in a displacement can. The volume of the water displaced is the volume of the object (EUREKA!). Use equation to calculate density.

Liquid – Measure the volume of the liquid in a measuring cylinder. Use electronic scales to find the mass of the empty cylinder and then the cylinder and the liquid. Subtract to find the mass of the liquid. Use the density equation to calculate the density.
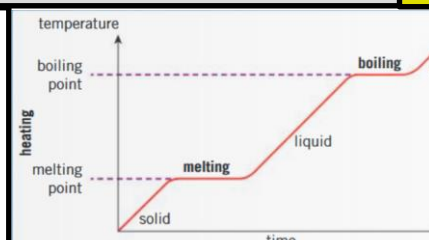
Changing state:
In the graph showing the change in temperature of a substance being heated or cooled, the flat horizontal section shows when the substance is changing state.
The energy transfers taking place during a change in state do not cause a change in temperature but do change the internal energy of the substance.

Specific Heat Capacity– the energy required to change the temperature of 1kg of a substance by 1ºC.

Energy = mass X SHC X temperature change

Energy	(J)
Mass	(kg)
SHC	(J/kgºC)
Temperature	(ºC)

Specific latent heat – the energy required to change the state of 1kg of a substance without an increase in temperature.
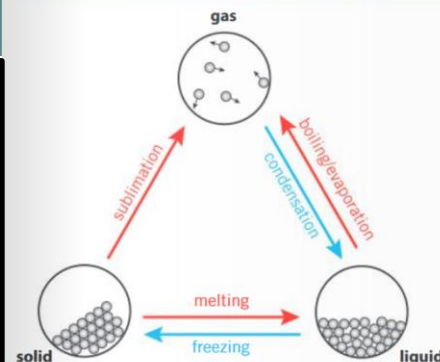Specific latent heat of fusion – solid to liquid
Specific latent heat of vaporisation – liquid to gas

Energy for change of state = mass x SLH

Energy	(J)
Mass	(kg)
SLH	(J/kg)

Changing state:
Red arrows – more energy (hotter). Forces of attraction getting weaker.
Blue arrows – less energy (colder). Forces of attraction getting stronger.

Gas Pressure – produces a force at right angles to the wall of the container.
For a fixed mass of gas at a constant temperature:

pressure X volume = constant

Pressure (Pa; pascals)
Volume   (m³)

Work is the transfer of energy by a force.
Internal energy is the total kinetic and potential energy of all the particles in a system.

Doing work on a gas increases the internal energy of a gas, so temperature increases.

Particle motion in a gas is random (i.e. particles move in different directions at a range of speeds)

The temperature of a gas is related to the average kinetic energy of the molecules.

Keywords

Alpha particle– composed of two protons and two neutrons.

Atomic number- the number of protons (which equals the number of electrons) in an atom. It is sometimes called the proton number.

Electron- tiny negative charged particles that move around the nucleus of an atom.

Energy level- specific energy values of electrons in an atom.

Ionisation- a process in which atoms become charged.

Irradiated- an object that has been exposed to ionising radiation.

Isotope- atoms with the same number of protons and different numbers of neutrons.

Mass number- the number of proton and neutrons in a nucleus.

Neutron- uncharged particles of the same mass as protons. The nucleus of an atom consists of protons and neutrons.

Nuclear model- Rutherford's model of the atom where the mass is in the centrally located positively charged nucleus.
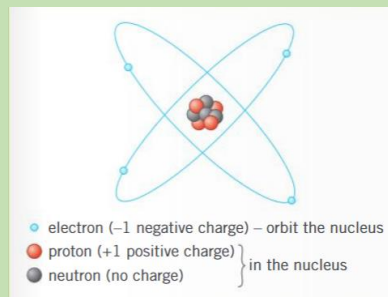
Orbit- moving around in a circular path.

Plum pudding model- J. J. Thomson's model of the atom that had a positively charged cloud with negatively charged electrons spread throughout. The model was called the plum pudding model because the positive medium was like a pudding and the electrons were like the plums or fruit.

Proton- positively charged particles with an equal and opposite charge to that of an electron.

Modern model of an atom
The model of the atom we have today was developed over time with the help of evidence from experiments.

- electron (–1 negative charge) – orbit the nucleus
- proton (+1 positive charge) } in the nucleus
- neutron (no charge) } in the nucleus

Future experiments may change our understanding and lead us to change this model.

Dalton's model
John Dalton thought the atom as a solid sphere that could not be divided into smaller parts. His model did not include protons, neutrons and electrons.

Plum pudding model
Scientists' experiments resulted in the discovery of charged sub-atomic particle. The first to be discovered were electrons.

The discovery of electrons led to the plum pudding model. A cloud of positive charge with negative electrons embedded in it.
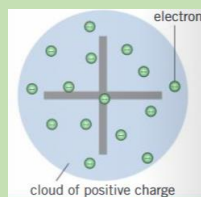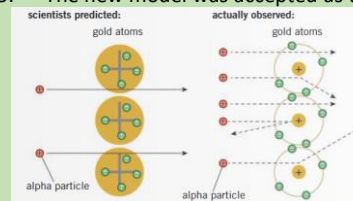

In the plum pudding model the electrons are the plums, and the positive charge is the rest of the cake.

The scattering experiment
Ernest Rutherford designed an experiment to test the plum pudding model.
1. Scientists fired small positively charged particles (alpha particles) at a piece of gold foil only a few atoms thick.
2. They expected the alpha particles to pass straight through the foil.
3. Instead a small number of alpha particles bounced ack and some were deflected.
4. This was evidence suggested that the positive charge and the mass of the atom must be concentrated in a very small space at the centre called the nucleus.
5. The new model was accepted as the old model was not supported by the evidence.

Nuclear model
Scientists replaced the plum pudding model with the nuclear model. They suggested that electrons orbit the nucleus, but not at set distances, and that the mass of the atom was concentrated in the charged nucleus.

Bohr's model
Niels Bohr improved the nuclear model and calculated that electrons must orbit the nucleus at fixed distances. The orbits are called shells o energy levels. These calculations agreed with experimental results.
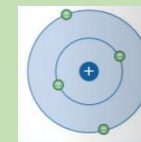
Protons
Later experiments provided evidence that the positive charge of a nucleus could be split into smaller particles with the opposite charge to electrons. The positive charged particles are called **protons**.

Neutrons
James Chadwick carried out experiments that provided evidence for particles without a charge. This is the neutron and found in the nucleus.

Nucleus
- Has a radius about 10,000 times smaller that the radius of the atom.
- Contains protons and neutrons.
- Is where most of the mass of an atom is concentrated.

Electrons
- Orbit the nucleus at different fixed distances called energy levels.
- Can gain energy by absorbing electromagnetic radiation. This causes them to move into a higher energy level.
- Can lose energy by emitting electromagnetic radiation. This causes them to move to a lower energy level.

Element symbols
Mass number- number of protons and neutrons added together.
Atomic umber – number of protons.

Knowledge Organiser Radioactivity

Ionisation
Atoms can become charged when they lose or gain electrons. This process is called ionisation.
- A positive ion is formed if an uncharged atom loses one or more electrons.
- A negative ion is formed if an atom gains one or more electrons.

Radioactive decay
Atoms with an unstable nucleus emit radiation. When nuclear radiation is given out the atomic nuclei become more stable. It is a random process. The radiation can knock electrons out of atoms in a process called ionisation.

Activity and count rate
The activity of a radioactive source is the rate of decay of an unstable nucleus, measured in becquerel (Bq).
1Bq= 1 decay per second
Detectors, e.g a Geiger- Muller tube, record a count rate (number of decays detected per second).

Half-life
The half-life of a radioactive source is the time
- For half the number of unstable nuclei in a sample to decay
OR
- For the count rate or activity of a source to halve.
The half- life of a source can be found from a graph of its count rate or activity against time.

The time taken for the activity to halve is 18 years. This is the half-life of this substance.
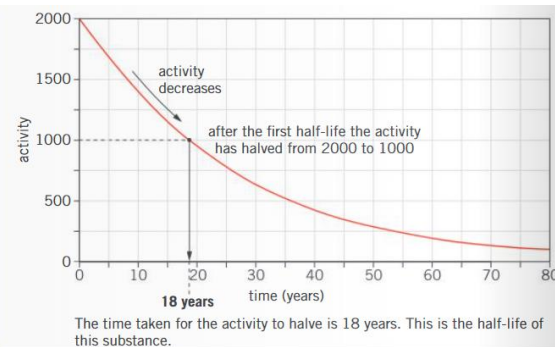
Type of radiation	Change in the nucleus	Ionising power	Range in air	Stopped by
α alpha particle (two protons and two neutrons)	nucleus loses two protons and two neutrons	highest ionising power	travels a few centimetres in air	stopped by a sheet of paper
β beta particle (fast-moving electron)	a neutron changes into a proton and an electron	high ionising power	travels $\approx 1\,m$ in air	stopped by a few millimetres of aluminium
γ gamma radiation (short-wavelength, high-frequency electromagnetic radiation)	some energy is transferred away from the nucleus	low ionising power	virtually unlimited range in air	stopped by several centimetres of thick lead or metres of concrete

Half-life
To find the reduction in activity after a given number of half –lives:
1. Calculate the activity after each half life.
2. Subtract the final activity from the original activity.
Net decline as a ratio = reduction in activity/ original activity

Ionising radiation
Living cells can be damaged or killed by ionising radiation.
The risk depends on the half life of the source.
Inside the body alpha radiation is very dangerous, it is the most ionising. Outside the body it affects only the skin and eyes as it is the least penetrating.
Background radiation- natural examples are rocks and cosmic rays. Man made examples are nuclear weapons and accidents.

Irradiation versus contamination
Irradiation- when an object is exposed to ionising radiation. Protect by shielding or moving away from the source.
Contamination- When atoms of a radioactive material are on an object. Object remains exposed to radiation as long as it is contaminated.

Nuclear equations
Alpha emission. An alpha particle is made of two protons and two neutrons. So when an unstable atom emits an alpha particle the atomic number decreases by 2 and the mass number goes down by 4.

$$^{228}_{90}\text{Th} \longrightarrow {}^{224}_{88}\text{Ra} + {}^{4}_{2}\alpha$$

Beta emission. A beta particle is a high energy electron from the nucleus. A neutron changes into a proton and electron, which is instantly emitted, this is the beta particle. The atomic number goes up by 1 and the mass number is unchanged. The charge of the nucleus is increased, and the mass of the nucleus is unchanged.

$$^{40}_{19}\text{K} \longrightarrow {}^{40}_{20}\text{Ca} + {}^{0}_{-1}\beta$$

PHYSICS SEPARATES ONLY
Nuclear radiation in medicine
Gamma emitting tracers are injected or swallowed by a patient. Gamma cameras can then create an image showing where the tracer has gone. The tracer must have a short half- life for safety, to limit the patients' dose.
Control or destruction of unwanted tissue. Narrow beams of gamma radiation can be focused on tumours. Gamma is used as it can penetrate the body.

PHYSICS SEPARATES ONLY
Nuclear fission- when a large unstable nucleus absorbs an extra neutron and splits into smaller nuclei of roughly equal size.
During fission gamma radiation and energy is released.
Two or three fission neutrons are released and go on to cause a chain reaction.
The reaction is controlled by control rods which can absorb neutrons.
Spontaneous fission is rare and occurs when the nucleus splits without absorbing a neutron.
Two fissionable isotopes Uranium 235 (most common fuel in nuclear reactors) and plutonium 239.
Nuclear Fusion- when two light nuclei join together and make a heavier one. Energy is released. This takes place in stars/ the sun.