Biology Topic 6: Inheritance, variation and evolution

1.Keywords	
Mitosis	A type of cell division which create two identical daughter cells
Meiosis	A type of cell division the create 4 unique gametes
Gametes	Sex cells eg sperm + egg and pollen + ovum
Sexual reproduction	Reproduction involving the fusion of gametes. Make unique offspring that resemble both parents
Asexual reproduction	Reproduction involving only one parent. No gametes fuse. Offspring are identical to parent
DNA	Deoxyribose nucleic acid. Polymer made of 2 strands forming a double helix. Contains the instructions for an organism.
Chromosomes	Long strands of DNA found in the nucleus. Humans have 23 pairs
Gene	A section of DNA which codes for a protein
Genome	All the genes of an organism

2. Meiosis
1. DNA replication: chromosome number doubles
2. Cell divides: two cells now
3. Those cells divide: four gametes now with half the number of chromosomes

3. Genetic inheritance	
Allele	Different forms of the same gene. eg hair colour
Dominant	When only one copy of the allele is needed to show in the offspring
Recessive	When the allele only shows when there are two copies
Homozygous	Two copies of the same allele
Heterozygous	Two different alleles
Genotype	The set of genes in our DNA
Phenotype	The outward appearance a set of genes displays

4. Inherited disorders	
Inherited disorders	Disorders that are caused by inheriting faulty genes from parents
Polydactyly	A dominant inherited disorder which causes extra fingers or toes to form
Cystic fibrosis	A recessive inherited disorder which causes sticky mucus to block air ways

5. Sex determination	
No of chromosomes in a human	23 pairs (22 normal, 1 pair of sex)
Male	XY (50% chance)
Female	XX (50% chance)
Sperm	Can hold Y or X chromosome so determine gender of embryo

6. Variation	
Variation	Changes within a population. Caused by mutation
Genetic variation	Changes due to inheriting different alleles of genes
Environmental variation	Changes due to the effect the environment has

7. Evolution	
Evolution	The change in the inherited characteristics of a population due to natural selection. May result in a new species
Natural selection	The process where the organism best adapted to the environment survives and passes on their characteristics
Species	A group of organisms with similar features which can breed to make fertile offspring

Stages of evolution
1. Population shows variation due to their genes
2. Environment changes
3. Some individuals are best adapted and live longer
4. These can breed and produce more offspring
5. Over a long period of time the offspring dominate the population

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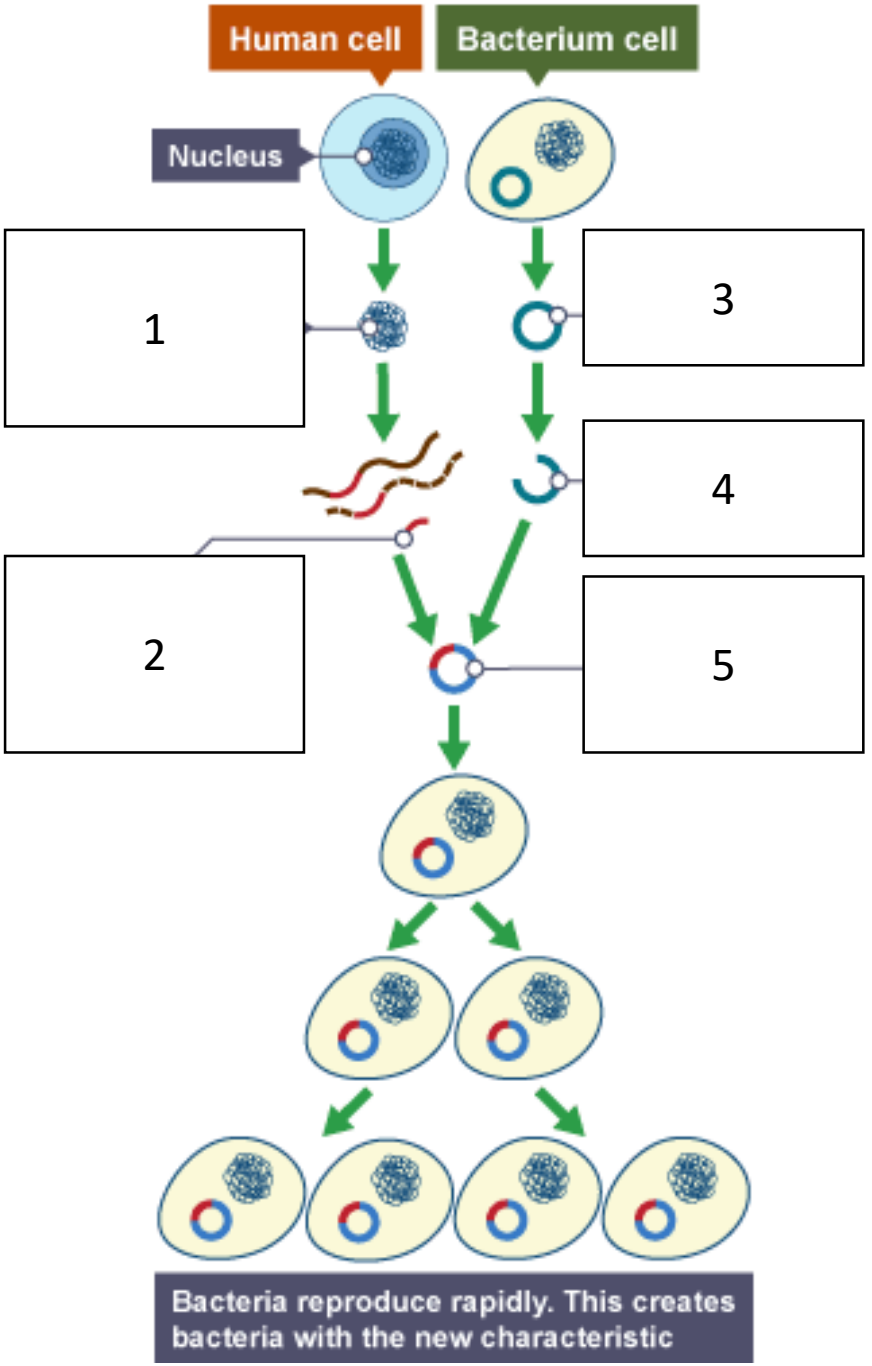
9. Genetic engineering	
Genetic engineering	The process of changing the genome by adding a desirable gene from another organism
GM crops	Genetically modified crops that are resistant to disease or grow bigger crops. Controversial to some

10. Process of genetic engineering (HT ONLY)	
1	DNA containing desired gene removed from cell
2	Enzyme cuts out gene
3	Plasmid taken from bacteria
4	Plasmid cut by same enzyme
5	Plasmid and human gene joined by an enzyme



11. Fossils	
Fossil	Remains of a plant or animal that were alive millions of years ago. Found in rocks. Normally only the hard parts
Fossil formation	• Parts of organisms that have not decayed because one or more of the conditions needed for decay are absent • Parts of the organism are replaced by minerals as they decay • Preserved traces of organisms, such as footprints
What they tell us	Early life was simple As the fossils get newer the life becomes more complex
Why do we not have a fossil for every living thing	• Early life forms were soft bodied so not fossils formed • Geological activity destroyed fossils

12. Extinction	
Extinction	When an entire species has died
Causes of extinction	1. Disease 2. New predators 3. Famine 4. Natural disaster (meteor, volcano)

13. Resistant bacteria	
MRSA	A type of bacteria that has evolved to be resistant to antibiotics
How to prevent antibiotic resistance	1. Not prescribing antibiotic for viral and non-threatening infections 2. Completing the course of antibiotic given 3. Restricting the use of agricultural antibiotics

14. Classification of organisms	
Carl Linnaeus	Invented the groups we classify organisms into 1. Kingdom 2. Phylum 3. Class 4. Order 5. Family 6. Genus 7. Species
Binomial name	The official name of all organism consisting of genus and species
3 domain system	
Archaea	Primitive bacteria normally found in extreme environments
Bacteria	True bacteria
Eukaryotes	Plants, animals, fungi and protists

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3. Advantages of reproduction (TRIPLE ONLY)	
Advantages sexual	Advantages asexual
Causes variation	Only need 1 parent
If environment changes natural selection can occur	Energy and time efficient (fast)
Humans can selectively breed organisms for beneficial characteristics	Lots of offspring can be produced when conditions are good
Organisms that can use both	• Malaria • Fungi • Plants

4. DNA structure (TRIPLE ONLY)	
Nucleotide	The monomer of DNA. Consists of a sugar, phosphate and a base
Base	One of 4 different chemicals that make the triplet code. A G T C
Triplet code	3 bases in a row give a code for a specific amino acid

5. Protein synthesis and gene expression (HT TRIPLE ONLY)	
Pairing of nucleotide bases	A → T T→A G → C C→G
Transcription	When the DNA is read and converted into messenger RNA (mRNA)
Translation	When the mRNA is read by ribosomes and use to build the amino acid sequence
Transfer RNA (tRNA)	Carries the correct amino acid to the ribosome for the mRNA triplet code
Coding DNA	DNA which codes for a protein, a gene
Non-coding DNA	DNA which does not code for a protein. Can be involved in turning on or off genes.
Mutation	A change to the DNA sequence. Most are harmless but some can stop proteins working correctly

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11. Selective breeding	
Selective breeding	The ancient practice of artificially selecting animals and plants to breed together to create certain characteristics
Inbreeding	The consequence of too much selective breeding. Can lead to disease or defects
Outcomes of selective breeding	• Disease resistance in crops • Increased meat and milk production • Domestication of pets • Large unusual flowers

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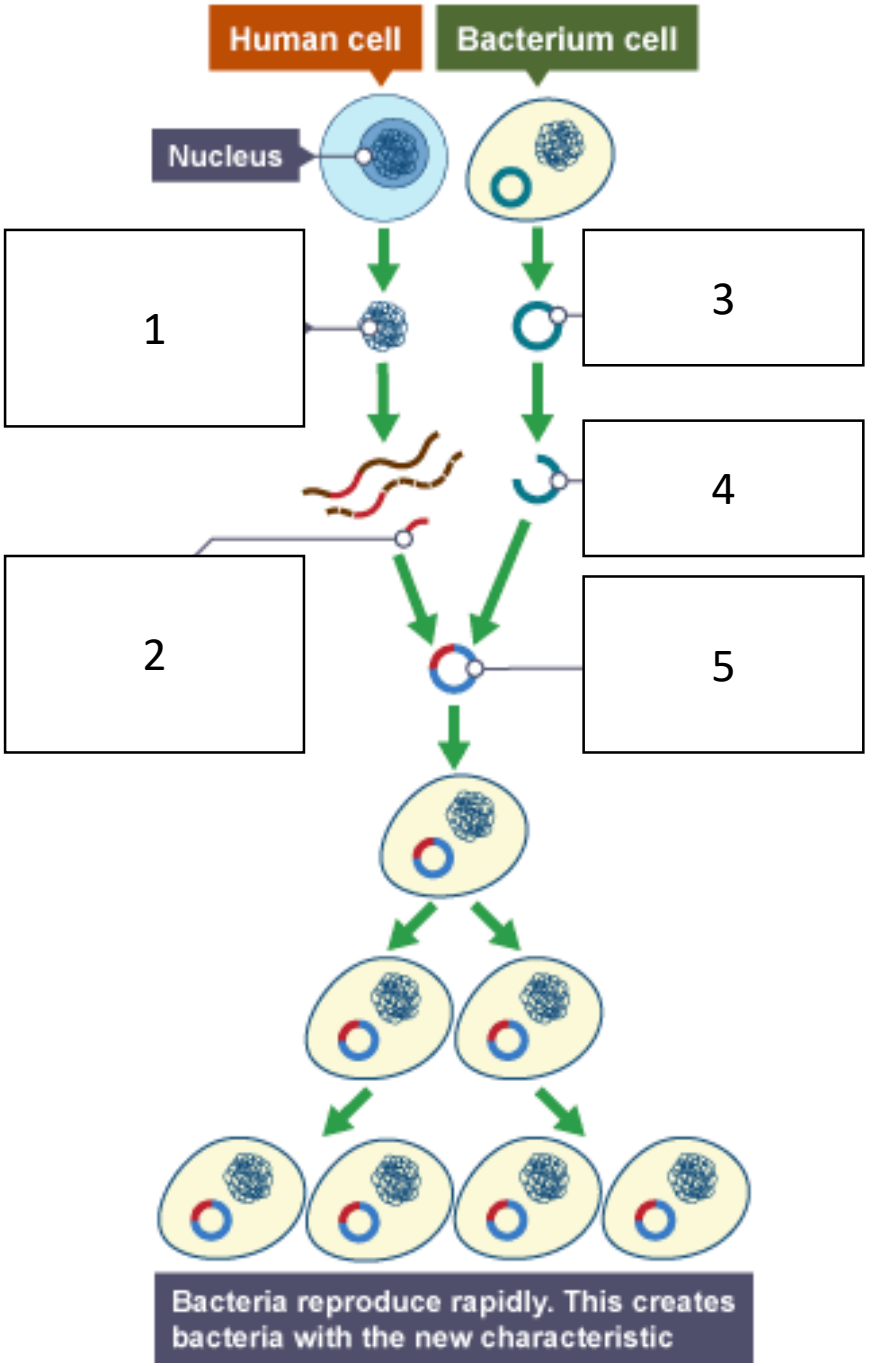
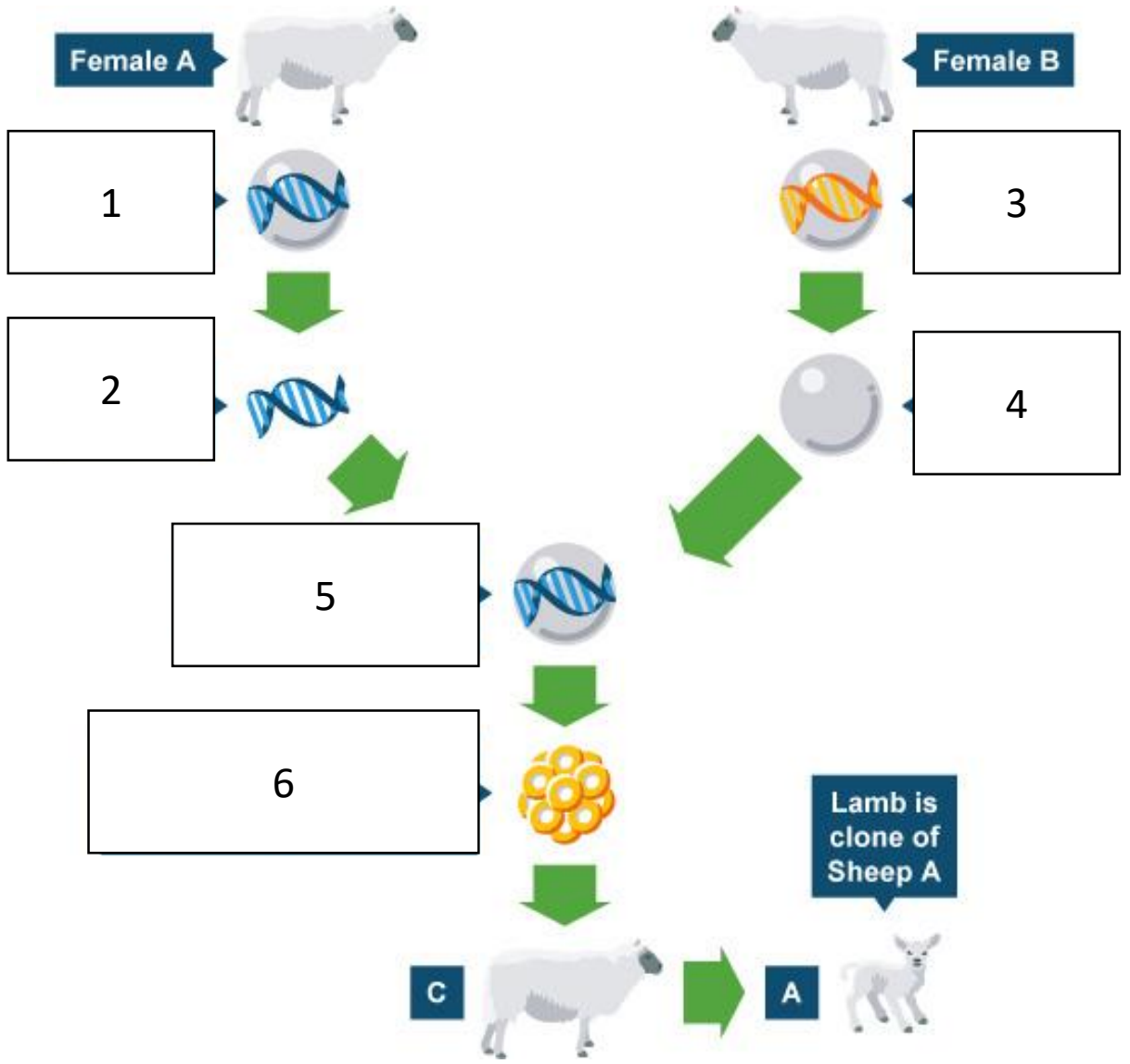


14. Cloning (TRIPLE ONLY)	
Tissue cloning	Using groups of cells from a plant to grow a identical new plants
Cuttings	Old fashioned simple method of growing a new plant from part of an old plant
Embryo transplant	Splitting apart unspecialised animal cells from an embryo and transplanting them into host mother
Adult cell cloning	
1	Body cell taken from Sheep A
2	DNA removed
3	Egg taken from Sheep B
4	Nucleus removed
5	DNA and cell fused with electric shock
6	Cell develops into embryo and implanted into surrogate (c)



15. Theory of evolution (TRIPLE ONLY)	
Charles Darwin	Proposed the theory of evolution in his book 'on the origins of species'
Darwin's theory took a long time to be accepted because:	• It challenged the idea that God made all creatures • There was not enough evidence at the time • Mechanism of inheritance was not understood for another 50 years.
Jean-Baptiste Lamarck	Had a different theory about inherited characteristics. He believed they were acquired through the life of the parents. He was wrong
Alfred Russell Wallace	Independently came up with the idea of evolution and natural selection at the same time as Darwin. Worked on the idea of speciation
Speciation	Formation of a new species as a result of evolution

16. Understanding genetics (TRIPLE ONLY)	
Mid 19th century	Gregor Mendel a monk who carried out breeding experiments on plants. Discovered the inheritance of characteristics as 'units'
Late 19th century	Chromosomes observed
Early 20th century	Chromosomes linked to inheritance. Genes discovered.
Mid 20th century	Structure of DNA discovered and the way genes code for proteins.
Today	Antibiotic resistance provides real time evidence of evolution in action

17. Fossils	
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Mnemonic Device

Kingdom	• King
Phylum	• Phillip
Class	• Came
Order	• Over
Family	• For
Genus	• Good
species	• Soup

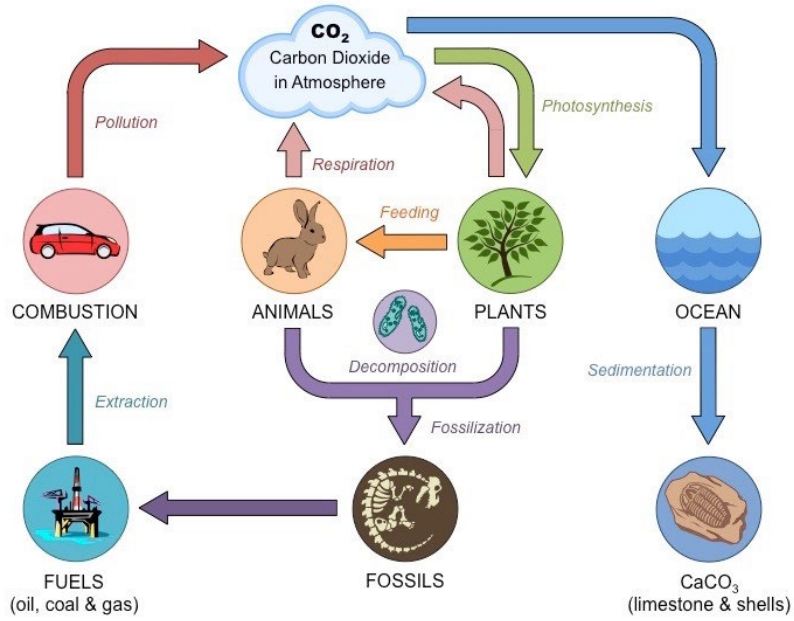
Biology Topic 7: Ecology

1. Keywords	
Ecosystem	The interaction of a community of living organisms with their environment
Biotic	Living factors
Abiotic	Non-living factors
Interdependence	Different species rely on each other for survival within an ecosystem
Adaptations	Features that help an organism survive in a particular habitat
Habitat	Natural environment of a particular organism
Competition	The process by which organisms try to gain raw materials over each other. Plants compete for space, light water and mineral ions Animals compete for shelter, food, water and mates
Biodiversity	The variety of all the living organisms within the earth or ecosystem. A good thing

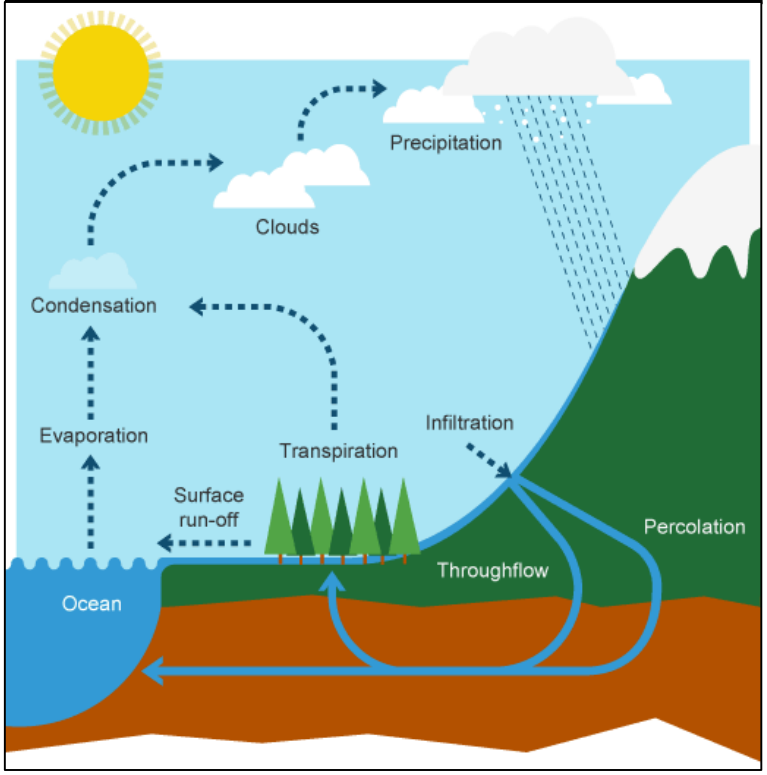
2. Biotic and abiotic factors	
Biotic factors	Abiotic factors
• availability of food • new predators arriving • new pathogens • one species outcompeting another so the numbers are no longer sufficient to breed.	• light intensity • Temperature • moisture levels • soil pH and mineral content • wind intensity and direction • carbon dioxide levels for plants • oxygen levels for aquatic animals

3. Levels of organisation	
Producer	An organism that makes its own food by photosynthesis. They are the starting point of all food chains
Consumer	Organism that eats something
Predator	Consumer that hunts
Prey	Consumer that is hunted
Transect	Sampling method which samples at regular spaces along a strip to measure the variation of a species
Quadrat	Sampling technique where a metal square is placed randomly in an area to determine an estimate of the population of a species
Mean	Average. Add up the values and divide by the number of results used
Mode	The most common value
Median	The value that is half the range of results

4. The carbon cycle



5. The water cycle



6. Waste management

Pollution type	Examples
Water	Sewage
	Fertilisers
	Toxic chemicals
Air	Smoke
	Acidic gases (SO_2)
Land	Landfill
	Toxic chemicals

7. Impact of pollution

Destruction of peat bogs	Reduction in biodiversity Burning the peat releases carbon dioxide
Deforestation to make room for agriculture and biofuels	Reduction in biodiversity Reduces ability to absorb carbon dioxide
Global warming	Extreme weather Famine

8. Maintaining biodiversity

1. breeding programmes for endangered species
2. protection and regeneration of rare habitats
3. reintroduction of field margins and hedgerows in agricultural areas
4. reduction of deforestation and carbon dioxide emissions by some governments
5. recycling resources rather than dumping waste in landfill.

Chemistry Topic 8: Chemical analysis

1. Keywords	
Pure substance	A single element or compound not mixed with any other substance. They have a specific melting and boiling point
Melting point	The temperature at which a solid turns to a liquid
Boiling point	The temperature at which a liquid turns to a gas
Formulation	A mixture that has been designed as a useful product eg fuels, cleaning agents, medicines and fuels
Chromatography	Use to separate mixtures and identify substances
Rf	$\frac{distance\ moved\ by\ substance}{distance\ moved\ by\ solvent}$

2. Identification of common gases		
Gas	Test	Observation
Hydrogen	Burning splint	Squeaky pop
Oxygen	Glowing splint	Relights
Carbon dioxide	Limewater	Goes cloudy
Chlorine	Damp Litmus paper	Bleached (goes white)

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3. Flame tests (TRIPLE ONLY)	
Metal ion	Colour
Lithium (Li^+)	Crimson
Sodium (Na^+)	Yellow
Potassium (K^+)	Lilac
Calcium (Ca^{2+})	Orange-red
Copper (Cu^{2+})	Green
Flame emission spectroscopy: A sample is put in a flame and the light given out passed through a spectroscope that can identify the ions in the sample	

4. Metal hydroxides (TRIPLE ONLY)	
Metal ion	Observation with addition of sodium hydroxide
Aluminium (Al^{3+})	White precipitate which dissolves in excess
Calcium (Ca^{2+})	White precipitate
Copper (Cu^{2+})	Blue precipitate
Iron II (Fe^{2+})	Green precipitate
Iron III (Fe^{3+})	Brown precipitate

5. Testing for negative ions (TRIPLE ONLY)		
Negative ion	Reagent	Observation
Carbonate	Add carboxylic acid	Fizzes releasing Carbon dioxide
Halide	Add silver nitrate	Cl^- = white precipitate Br^- = cream precipitate I^- = yellow precipitate
Sulfate	Add Barium Chloride	White precipitate

Chemistry Topic 9: Chemistry of the atmosphere

1. Composition of the earths atmosphere now	
79%	Nitrogen
20%	Oxygen
1%	Other gases including CO_2

2. Evolution of the atmosphere		
Time	Atmosphere	reason
4 billion years a go	Nitrogen, Carbon dioxide and water vapour (like mars)	Volcanic eruptions
	Nitrogen, Carbon dioxide decreases	Earth cools and water vapour condenses. Carbon dioxide dissolves into the oceans
2.7 billion years ago	Increasing oxygen decreasing carbon dioxide	Photosynthesising organisms evolved
	Reducing oxygen to modern levels	Animals evolved and began respiring the oxygen

3. Climate change	
Greenhouse gases	Gases which increase the temperature of the atmosphere Eg Carbon dioxide, methane, water vapour
Greenhouse effect	When excess greenhouse gases absorb and radiate IR radiation back to the earth warming it
Man-made climate change	The leading theory that human activities are causing an increase in global temperature
Carbon footprint	Total amount of carbon dioxide emitted over the life of a product, service or event
Global dimming	Particulates block the light from the sun slightly, reducing global temperature
Acid rain	Gases dissolve in rain causing damage to buildings, statues, lakes and trees

4. Atmospheric pollutants from combustion		
Pollutant	Source	Effect
Carbon dioxide	All combustion	Global warming
Carbon monoxide	Incomplete combustion	Toxic, breathing problems
Carbon particle (Soot)	Incomplete combustion	Breathing problems, global dimming
Sulphur dioxide	Burning sulphur, impurities in fossil fuels	Acid rain
Oxides of nitrogen	Vehicle engines	Acid rain

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Chemistry Topic 10: Using resources

1. Keywords	
Finite resources	Resources that will run out
Renewable resources	Resources that can be re-grown or will not run out
Sustainable development	Building things with depleting natural resources
Potable water	Water that is safe to drink
Pure water	Water without anything added to it Eg 100% H_2O
Desalination	Removing salt by distillation or reverse osmosis
Sterilisation	Killing bacteria and microbes (eg chlorine, ozone or UV)
Distillation	Evaporation followed by condensation, uses a lot of energy
Reverse osmosis	A process using membranes to remove the salt. Uses a lot of energy
Effluent	Liquid waste sewage discharged into rivers and seas
Sludge	Solid sewage waste. Dried and used as fertiliser or burned to generate electricity
Life cycle assessments (LCAs)	A way of assessing the impact of the production transport use and disposal of a product on the environment

2. Waster water treatment		
	Name	Description
1	Screening	Solid waste and grit removed by a metal grid
2	Primary treatment	Sediments are allowed to settle out from the mixture
3	Secondary treatment	Bacteria feed on the remaining organic waste. The tank has air bubbled through it so aerobic respiration can occur
4	Final treatment	Bacteria allowed to settle out. Water is sterilised and ready to drink

3. Alternative methods of extracting metals (HT ONLY)	
Phytomining	1. Plants absorb metal compounds 2. Plants are harvested and burnt 3. Ash contains metal compounds
Bioleaching	1. Bacteria absorb metal compounds 2. Bacteria excrete a solution of metal called Leachate 3. Electrolysis can extract the metal

Physics topic 6: Waves

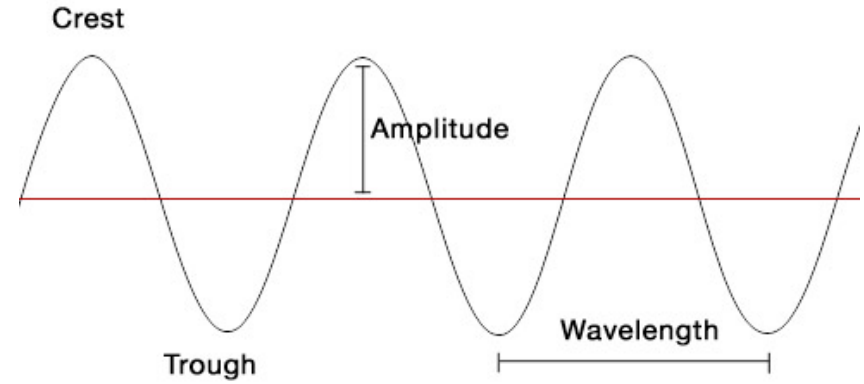
1. Keywords	
Transverse wave	A wave where the vibration is perpendicular to the direction of travel
Longitudinal wave	A wave where the vibrations are parallel to the direction of travel
Mechanical wave	A vibration that travels through a substance (e.g. sound)
Frequency	The number of wave fronts passing a fixed point every second (measured in Hz)
Period	The time for one complete wave
Ultrasound	Sound above 20,000Hz
Superposition	When two waves meet and affect each other
Reflection	When waves bounce off a surface
Echo	Reflection of sound that can be heard

2. Period and frequency

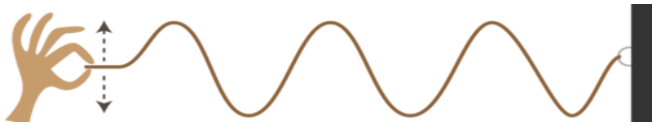
$$T = \frac{1}{f}$$

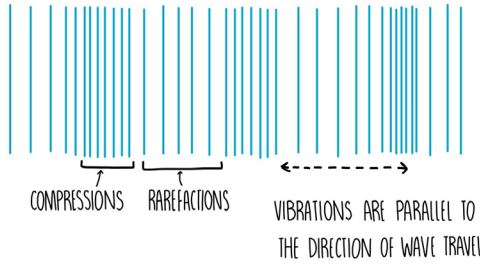
T	Period (s)
f	Frequency (Hz)

3. Comparing types of wave



Transverse wave





Longitudinal wave

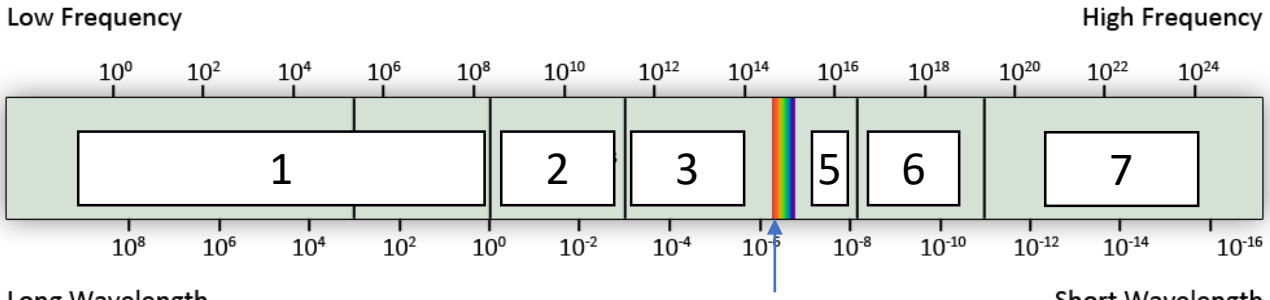
Comparing waves:	Light wave	Mechanical wave
Type of wave	Transverse	Longitudinal
Can they travel through a vacuum?	Yes	No. Mechanical waves can only pass through a solid, liquid or gas
Can they be reflected?	Yes. By smooth shiny surfaces	Yes. By smooth surfaces
Can they be absorbed?	Yes. By dark surfaces	Yes. Rough surfaces absorb sound
Can superposition occur?	Yes	Yes

4. Wave equation

$$v = f\lambda$$

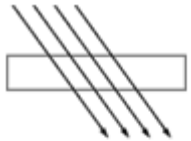
v	Wave speed (m/s)
f	Frequency (Hz)
λ	Wave length (m)

5. The electromagnetic spectrum



	Name	Notes
1	Radio	Produced by oscillations in circuits (HT)
2	Microwaves	
3	Infrared	Thermal energy
4	Visible	
5	Ultra violet	Skin damage
6	X rays	Cause cancer
7	Gamma rays	Cause cancer

6. The properties of EM waves on materials (HT ONLY)	
1	Transmit
2	Specular Reflection
3	Diffuse Reflection
4	Absorb
5	Refract



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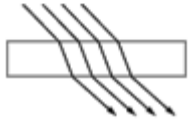

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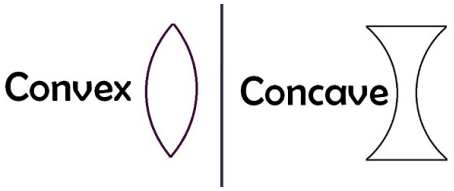
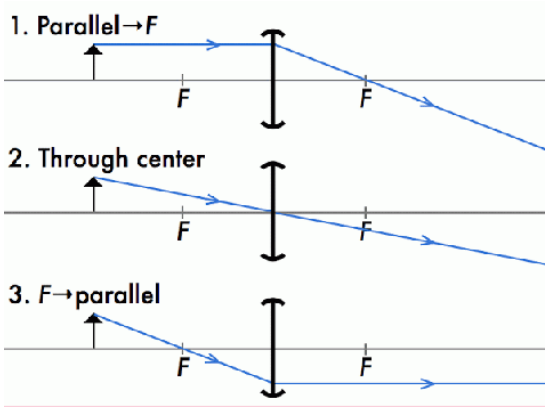
7. Uses of EM waves	
Name	Use
Radio	Radio and TV
Microwaves	Satellite communication, cooking food
Infrared	Electric heaters, cooking food, infra-red cameras
Visible	Fibre optic communication
Ultra violet	Energy efficient lamps, sun tanning
X rays	Imaging bones
Gamma rays	Radiotherapy, medical imaging





Physics topic 6: Waves

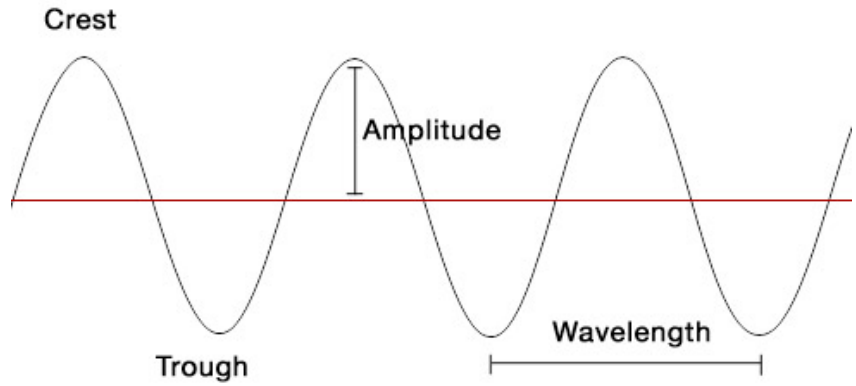
1. Keywords	
Transverse wave	A wave where the vibration is perpendicular to the direction of travel
Longitudinal wave	A wave where the vibrations are parallel to the direction of travel
Mechanical wave	A vibration that travels through a substance (e.g. sound)
Frequency	The number of wave fronts passing a fixed point every second (measured in Hz)
Period	The time for one complete wave
Ultrasound	Sound above 20,000Hz
Superposition	When two waves meet and affect each other
Reflection	When waves bounce off a surface
Echo	Reflection of sound that can be heard

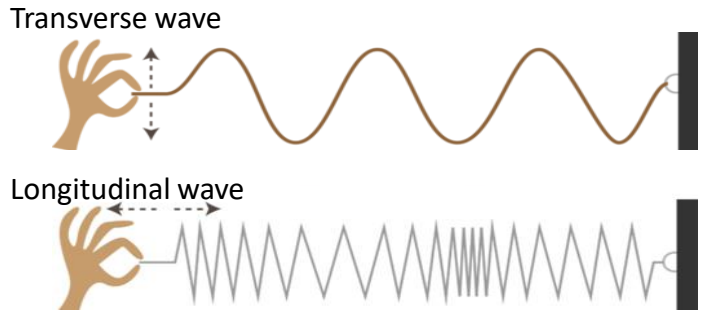
2. Period and frequency

$$T = \frac{1}{f}$$

T	Period (s)
f	Frequency (Hz)

3. Comparing types of wave





Comparing waves:	Light wave	Mechanical wave
Type of wave	Transverse	Longitudinal
Can they travel through a vacuum?	Yes	No. Mechanical waves can only pass through a solid, liquid or gas
Can they be reflected?	Yes. By smooth shiny surfaces	Yes. By smooth surfaces
Can they be absorbed?	Yes. By dark surfaces	Yes. Rough surfaces absorb sound
Can superposition occur?	Yes	Yes

4. Wave equation

$$v = f\lambda$$

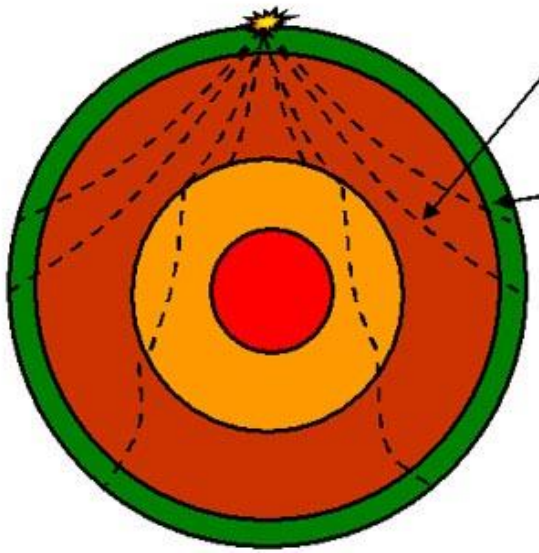
v	Wave speed (m/s)
f	Frequency (Hz)
λ	Wave length (m)

5. Uses of ultrasound (HT PHYSICS ONLY)

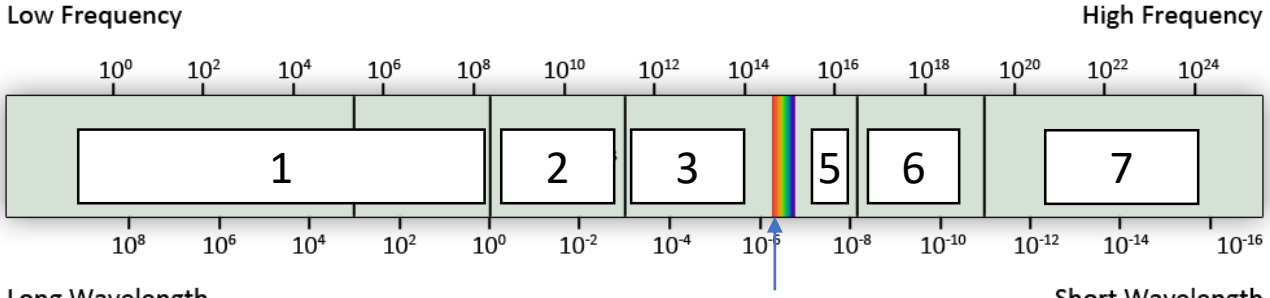
Use	How it works
Cleaning jewellery	The vibrations of the wave shake the dirt lose
Scanning the human body	The waves are partially reflected at different tissue boundaries
Industrial imaging	The waves can detect flaws in metal castings as they are partially reflected by cracks
Physiotherapy	Energy from the wave is absorbed by body tissue and relieves pain

6. Seismic waves produced by earthquakes (HT PHYSICS ONLY)

1	S waves	Transverse	Only travel through solid
2	P waves	Longitudinal	Travel through the earth and are refracted when they pass through different density medium

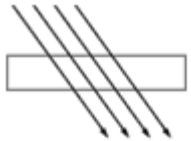


7. The electromagnetic spectrum



	Name	Notes
1	Radio	Produced by oscillations in circuits (HT)
2	Microwaves	
3	Infrared	Thermal energy
4	Visible	
5	Ultra violet	Skin damage
6	X rays	Cause cancer
7	Gamma rays	Cause cancer

8. The properties of EM waves on materials (HT ONLY)	
1	Transmit
2	Specular Reflection
3	Diffuse Reflection
4	Absorb
5	Refract



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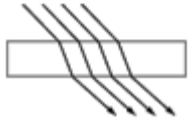
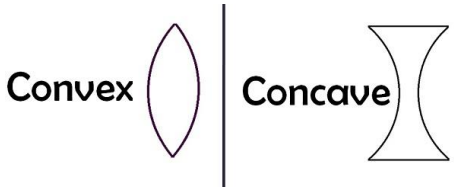
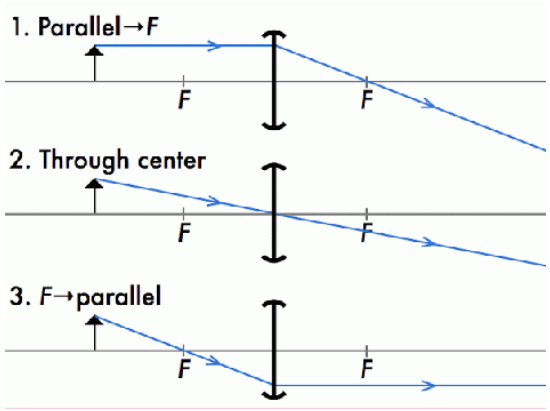


5

9. Uses of EM waves	
Name	Use
Radio	Radio and TV
Microwaves	Satellite communication, cooking food
Infrared	Electric heaters, cooking food, infra-red cameras
Visible	Fibre optic communication
Ultra violet	Energy efficient lamps, sun tanning
X rays	Imaging bones
Gamma rays	Radiotherapy, medical imaging





10. Lenses (physics only)
$$magnification = \frac{image\ height}{object\ height}$$

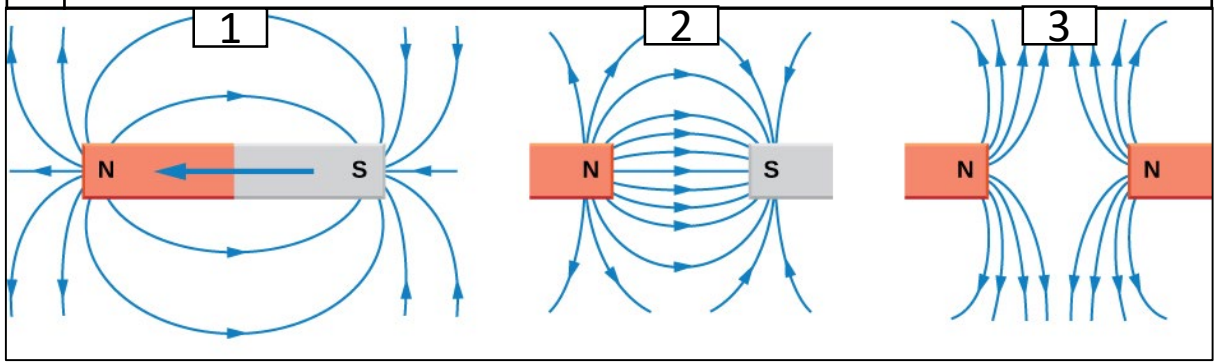
11. Black body radiation (physics only)	
emit	give out
absorb	Take in
Black body	An object that absorbs all the radiation shone on it. It is the best possible emitter

12. Perfect black bodies and radiation	
1	The intensity of black body radiation depends on temperature
2	The hotter the object the more radiation is emitted
3	The hotter the object the greater the increase in the proportion of shorter wavelengths
	White hot is hotter than red hot

Physics topic 7 Magnetism and electromagnetism

1. Keywords	
Permanent magnet	A material which is always magnetic
poles	the place where the magnetic force is strongest north and south (many field lines)
Magnetic field lines	The lines that show the direction of magnetic force. The closer the stronger the force is. Arrows go from north to south poles
Induced magnet	A material that becomes a magnet when placed in a magnetic field
Magnetic material	A material that can be attracted to a magnet (iron, steel, cobalt and nickel)
Electromagnet	A magnet which works when an electric current flows. A solenoid with an iron core
Solenoid	A coil of wire that can become an electromagnet
Compass	Shows the direction of a magnetic field. Used to plot a magnetic field
Current	The conventional current runs from + to - .
Magnetic flux density (B)	The strength of the magnet lines per m^2 (measured in T (tesla))

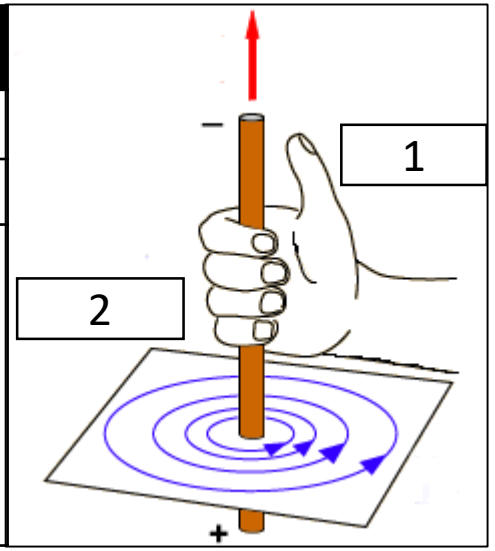
2. Magnetic field lines and force	
1	Magnetic field lines on a magnet
2	Magnetic field lines of attraction between opposite poles
3	Magnetic field lines of repulsion between like poles



3. Electromagnetic field on a wire	
1	Direction of current
2	Direction of magnetic field

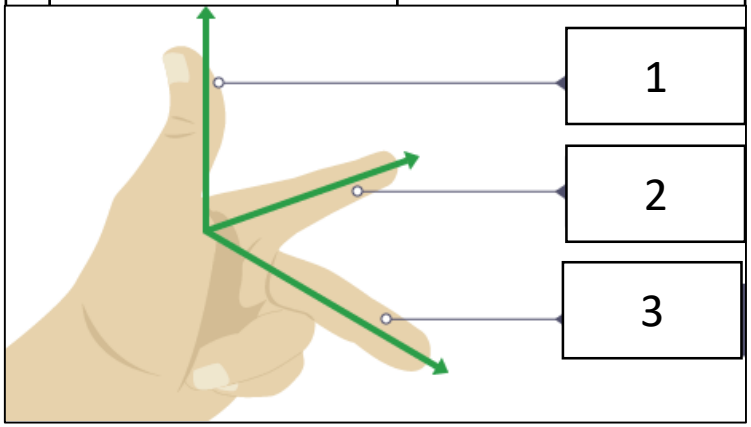
The strength of the magnetic field depends on:
A: The current
B: The distance from the wire.

Shaping the wire into a solenoid makes the field stronger



4. Fleming's left-hand rule (HT ONLY)

	Which finger	What it means
1	Thumb	Movement/Force
2	First finger	Field (north to south)
3	Second finger	Current (+ to -)



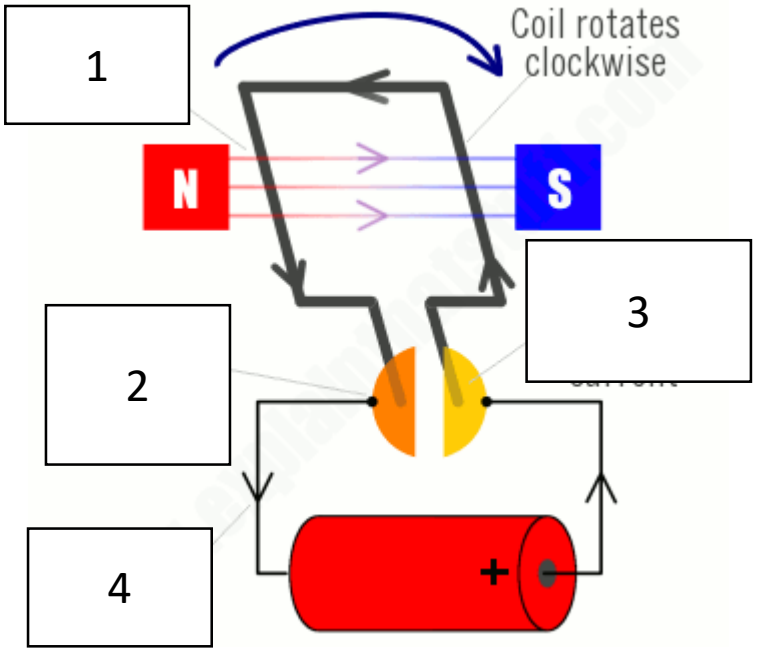
5. Factors that affect the size of the force on the conductor (HT ONLY)

$$F = BIl$$

F	Force (N)
B	Magnetic flux density (Tesla, T)
I	Current (A)
l	Length (m)

6. Electric motors (HT ONLY)

1	Magnetic field
2	Brushes carry current to commutator
3	Commutator reverses current
4	Electric current



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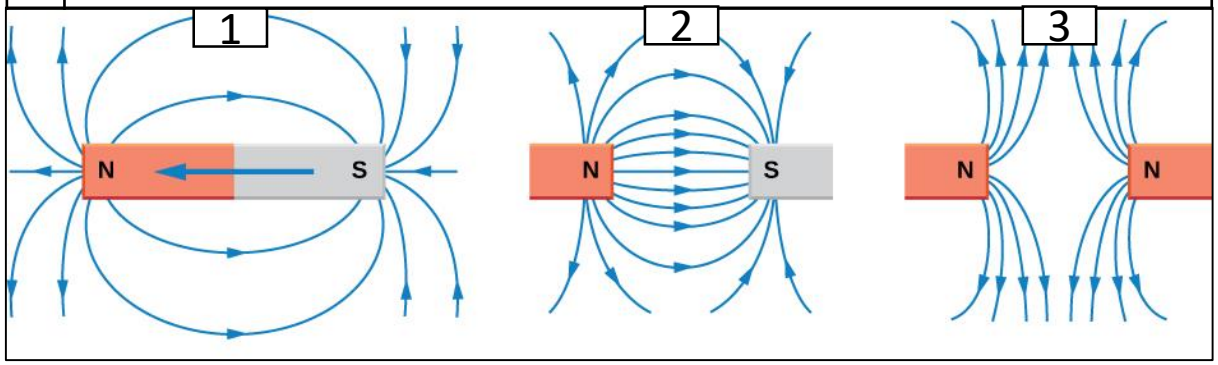

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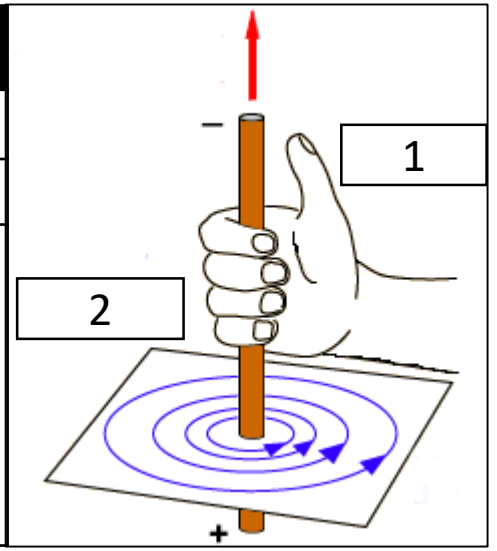

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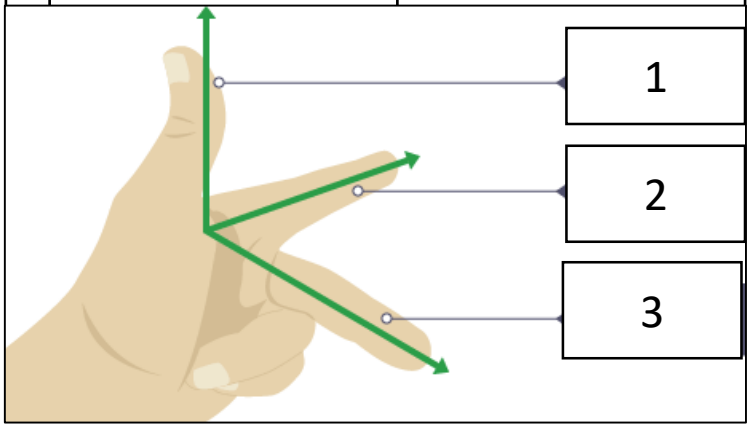

5. Factors that affect the size of the force on the conductor (HT ONLY)

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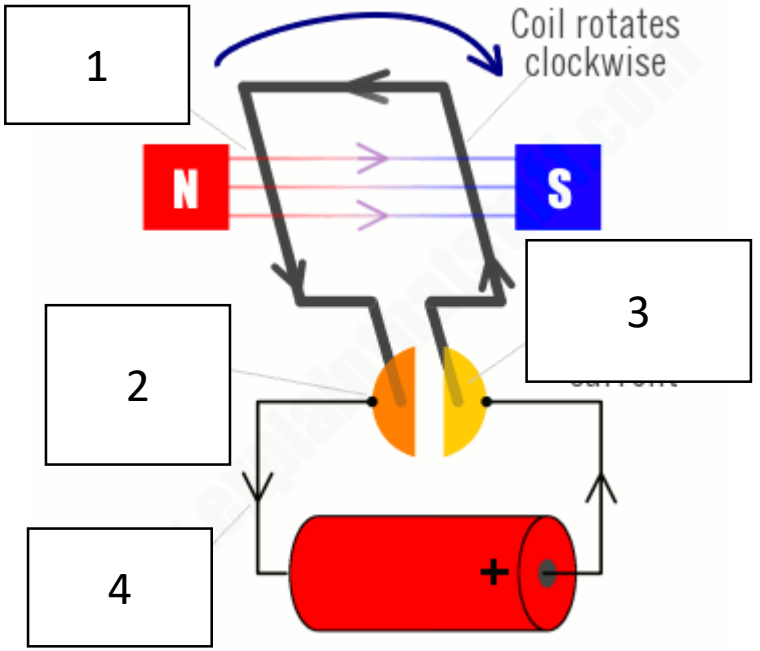
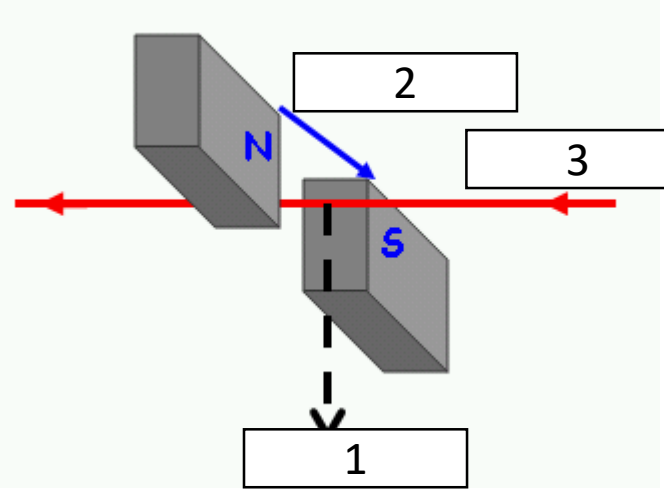


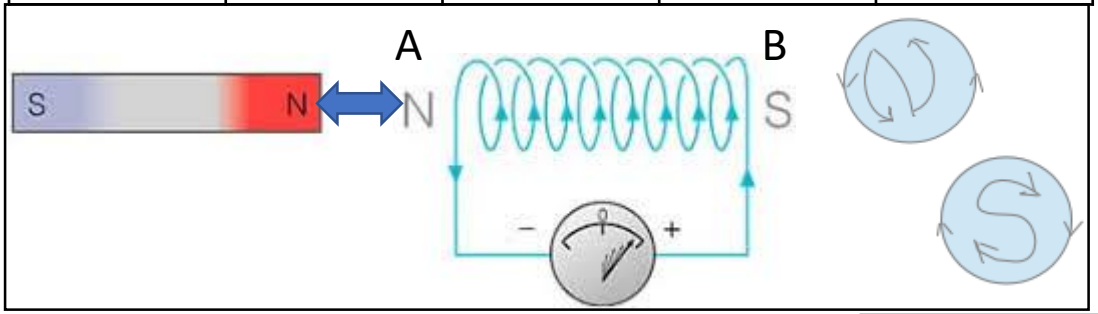
7. The generator effect (PHYSICS HT ONLY)

1	Force moves wire
2	Wire cuts magnetic field
3	Current is induced in wire



8. Factors that affect the size and direction of induced current/potential difference (PHYSICS HT ONLY)

Magnetic pole	Pushed in or pulled out	Direction of current	Induced polarity of A	Magnet and coil
North	In	Anticlockwise	North	Repel
North	Out	Clockwise	South	Attract
South	In	Anticlockwise	South	Repel
South	Out	Clockwise	North	Attract



9. Using the generator effect (PHYSICS HT ONLY)

Alternator	Generates alternating current
Dynamo	Generates direct current
Microphones	Convert pressure variations in sound into electric current

10. Transformers (PHYSICS HT ONLY)

Vp	Potential difference across primary coil (Volts)
n_p	Number of turns in primary coil
Ip	Current in primary coil (Amps)
Vs	Potential difference across secondary coil (Volts)
n_s	Number of turns in secondary coil
Is	Current in secondary coil (Amps)

Work out voltage change:

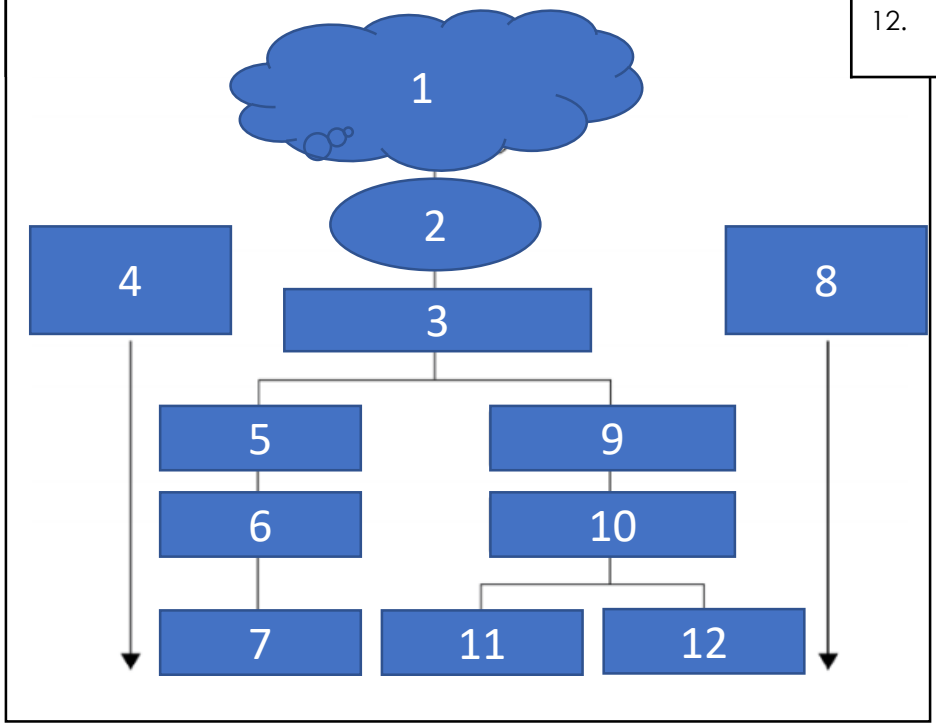
$$\frac{V_p}{V_s} = \frac{n_p}{n_s}$$

Work out power output:

$$V_p I_p = V_s I_s$$

Physics topic 8: Space physics (TRIPLE ONLY)

1. Life cycle of a star			
1. **Cloud of gas (nebula):** Begins to collapse due to gravity and heat up			
2. **Protostar:** formed as fusion begins			
3. **Main sequence star:** Stable star when gravity is balanced by expansion. Hydrogen fuses into Helium			
4.	For Stars about the same size as the Sun:	8.	For Stars much bigger than the Sun:
5.	**Red giant:** fuses Helium into heavier elements	9.	**Red super giant:** fuses Helium into heavier elements
6.	**White dwarf:** Collapsed star becomes white hot	10.	**Supernova:** Red super giant collapses causing a cataclysmic explosion forming the heaviest elements
7.	**Black dwarf:** Collapsed star cools	11.	**Neutron star:** Extremely dense core left from supernova
		12.	**Black hole:** If neutron star is huge enough it collapses so no light can escape



2. Orbital motion	
Satellite	A natural or man made object that orbits a planet
Orbit	gravity continuously pulling an object around (object always falls)
Velocity	Continual changes even though speed does not
Stable orbit	If distance reduces speed must increase

3. Red shift	
Definition	When an object moves away from an observer the light colour becomes redder.
Observation	The further the object is the greater its red shift
Conclusion	That the universe is expanding from a central point
The Big Bang	Theory used to explain the red shift evidence. The idea of the universe was created by a hot and dense singularity exploding outwards

Knowledge Organiser: Language Paper 1: 19th Century Fiction Reading and Imaginative Writing

Module Overview: You will read a variety of unseen 19th Century fiction texts and will practise comprehension, analysis, evaluation and comparison.

AO1: Identification	**AO2: Analysis**	**AO4: Evaluation**	**AO5/6: Writing and SPaG**
Identify and select key information	Explaining how language / structural devices are used.	Exploring how and why a text is effective.	Use of ideas, language and structure. Accurate and effective SPaG.

Assessment Overview: 45 minutes – Writing – You will consolidate the reading skills, but the assessment will focus on the imaginative writing skills

Revising Questions 1-4: Unseen 19th century text			**Q5/Q6: Imaginative Writing: Choice of two questions, you will answer one**	
Q1/2: (3) AO1	**Q3: (6 marks)** AO2	**Q4: (15 marks)** AO4	A05 **(24 marks)**	AO6 **(16 marks)**
Find and copy key quotes from the text. 5 minutes	Identify key quotes Analyse language devices Analyse structural choice Analyse word choices 20 minutes	Embed short, concise quotes Link back to key word in question Explain what writer was trying to do and how they've done it Refer to writers' choices 30 minutes	Communicate clearly, effectively and imaginatively, selecting and adapting tone, style and register for different forms, purposes and audiences. Organise information and ideas, using structural and grammatical features to support coherence and cohesion of texts.	Candidates must use a range of vocabulary and sentence structures for clarity, purpose and effect, with accurate spelling and punctuation.

Key Terms:	**Key Vocabulary**	**Story Structure**
Perspective: How the characters view and process what's happening within the story. **Semantic Field:** a group of words that belong together through a similar theme/topic. **Mood:** atmosphere or emotions **Motif:** unifying element can be a repeated image, theme, symbol, character, subject, or detail. **Voice:** Expresses the narrator or author's emotions, attitude, tone and point of view through artful **Tone:** how a piece of writing makes a reader feel towards a subject **Atmosphere:** the mood of a story.	**Plot:** the series of events that make up a story **Setting:** where a story or event takes place. Authors can describe a setting to include geographic location, time, weather, and environment. **Persona**: the person who is understood to be speaking **Genre**: share a certain style, form or content. Protagonist: the main character of a story. **Character**: Are the people, animals, or creatures in a story. Characters can think, feel, or act. **Isolated:** the act of keeping apart from others. **Gothic:** Writing designed to incite fear or to explore the supernatural. **Realism:** Writing to explore the realities of everyday life.	**Exposition:** Sets up the story providing any contextual background the reader needs, but most importantly it contains the inciting moment. This incident sets the story in motion. An incident forces the protagonist to react. It requires resolution, producing narrative tension. **Rising Action:** this is the challenges that the protagonist faces as they attempt to resolve the inciting incident **Climax:** This is the turning point of the story. It is the point of the highest tension. **Falling Actions**: The falling action is that part of the story in which you're moving away from the climax and heading to the conclusion. **Denouement:** This is the resolution of the story where conflicts are resolved and loose ends tied up.

<table>
<tr><th colspan="2">Structure Devices</th><th>Word Classes</th></tr>
<tr>
<td>Order of ideas: Thinking about what the writer started/finished with; why they saved something until last or shared it early on.
Paragraph length: Is it particularly long/short?
Sentence length: As above.
Simple sentence: A sentence with only one subject and one verb: The cat sat on the chair.
Compound sentence: Two main clauses joined with a connective that both make sense independently: The cat sat on the chair and the man sat on the floor.
Complex sentence: A sentence with a main clause and a subordinate clause: The cat, who was spoilt, sat on the chair whilst the man sat on the floor.</td>
<td>Imperative sentence: A command or instruction
Interrogative sentence: A legitimate question
Declarative sentence: A simple statement
Exclamatory sentence: An exclamation to show anger/shock/excitement
Punctuation: Consider how these devices have been used
Juxtaposition: Two opposite ideas used close by one another
Repetition: Using the same words, phrase or ideas more than once
Main Clause: The main part of a sentence; makes sense on its own.
Subordinate Clause: A clause which does not make sense on its own.</td>
<td>Noun: Name of person, place, thing
Adjective: Describes noun
Determiner: Gives information about the noun: the/a/every/some
Abstract Noun: An idea/concept love/anger
Concrete Noun: Something you can touch/hold
Verb: Doing word
Adverb: Describes verb
Modal Verb: Gives information about the verb: should/could/might
Imperative Verb: A command
Pronoun: In place of noun I/he/it/they
Preposition: Tells you where something is on/over/under
Conjunction: A connective and/or/but/although
Superlative: The most extreme version tallest/smallest</td>
</tr>
<tr><th colspan="3">Figurative Language Devices</th></tr>
<tr><td colspan="3">Alliteration: Repeated letter/sound
Triple emphasis: List of three words / sentence structures to create imagery
Imagery: Description which creates a clear picture
Hyperbole: Exaggeration of an image
Oxymoron: Two opposite words used side-by-side to describe one thing
Metaphor: A comparison without ‘like’ or ‘as’ – saying something is something else
Simile: A comparison with ‘like’ or ‘as’
Semantic Field: A range of vocabulary which all shares a similar theme.
Personification: Giving something inanimate human qualities
Onomatopoeia: A word to reflect a sound pop/bang/crash
Idiom: Non-literal phrase we recognise: raining cats and dogs
Euphemism: Polite way of saying something: the man had passed away
Litotes: Play down something negative: My dog is not the friendliest</td></tr>
</table>

GCSE ART & DESIGN HT1-6 KNOWLEDGE ORGANISER

ASSESSMENT OBJECTIVE 3

REFLECTIVE RECORDING: RECORDING IDEAS, OBSERVATIONS & INSIGHTS RELEVANT TO INTENTIONS AS WORK PROGRESSES

METHODS OF RECORDING

OBSERVATIONAL DRAWING	DRAWING FROM LOOKING AT IMAGES OR OBJECTS
FIRST HAND OBSERVATION	DRAWINGS MADE FROM OBJECTS DIRECTLY IN FRONT OF YOU
SECOND HAND OBSERVATIONS	DRAWING FROM LOOKING AT IMAGES
PHOTOGRAPHS	USING A CAMERA OR SMARTPHONE TO RECORD IMAGES- ARE CLASSED AS FIRST HAND OBSERVATIONS
SKETCHES	BASIC SKETCHES AND DOODLES CAN ACT AS A STARTING POINT, AID IN DEVELOPING AN IDEA OR HELP YOU PLAN OUT COMPOSITIONS

STAGES OF DRAWING

BASIC SHAPES > ACCURATE SHAPES > DETAIL > TONE

ANNOTATION

★ DESCRIBES WRITING NOTES, USING IMAGES AND EXPLAINING YOUR THOUGHTS TO SHOW THE DEVELOPMENT OF YOUR WORK.

STEP 1: DESCRIBE

- WHAT IS THIS AN IMAGE OF?
- WHAT HAVE YOU DONE?
- WHAT WAS THE PURPOSE OF THE PIECE FOR?

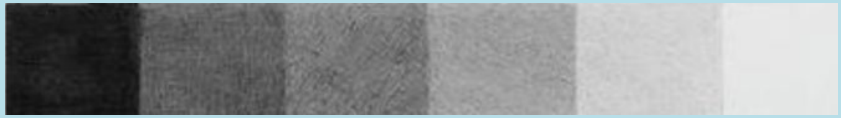
STEP 2: EXPLAIN

- HOW WAS THIS WORK MADE?
- HOW DID YOU PRODUCE PARTICULAR EFFECTS?
- HOW DID YOU DECIDE ON COMPOSITION?

STEP 3: REFLECT

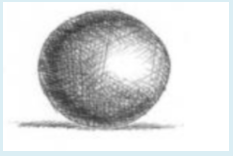
- WHY DID YOU USE THESE SPECIFIC METHODS?
- WHY ARE SOME AREAS BETTER THAN OTHERS?
- WHY MIGHT YOU DO THINGS DIFFERENTLY NEXT TIME?
- HOW WILL YOUR WORK DEVELOP IN RESPONSE?

APPLY TONE TO CREATE A **GRADUAL TRANSITION** FROM DARK TO LIGHT:



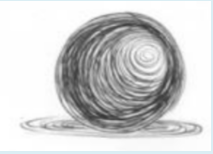
★ PRODUCE A RANGE OF TONES BY VARYING THE PRESSURE AND LAYERING
★ CONSIDER USING SOFTER PENCILS FOR DARKER SHADES
★ APPLY TONE USING A SOFT CIRCULAR MOTION TO CREATE A SMOOTH COVERAGE
★ ADD DETAIL/INTEREST BY APPLYING TONE USING MARK-MAKING TECHNIQUES

ALTERNATIVE TECHNIQUES TO ADD TONE:



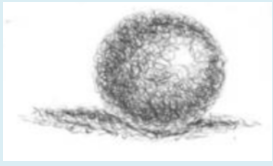
CROSS-HATCHING

HATCHING

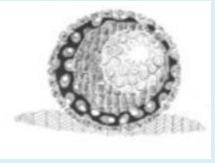


CONTOUR LINES

STIPPLING



SCRIBBLE LINES



PATTERN

PERFORMING THEATRE – COMPONENT 2 – eduqas GCSE DRAMA

Remember:

The Component is externally assessed by an Examiner. It counts for 20% (60 marks in total).

Important Things!

Remember: Read your text, decide on your interpretation of the character and artistic intention. Be confident – full marks can be achieved in the Component.

YOUR DRAMA:

After deciding on the play you want to perform:

Remember: Read the whole play in order to understand the style, the playwright's intention, the period involved before analysing and interpreting your role.

Style: The style of the play - Naturalistic, Realistic, Absurd, Symbolic, Brechtian, Physical Theatre.

The Playwright's Intention: Discuss contemporary themes, e.g. mental health, family problem, anorexia, drugs. Discuss a historical theme, e.g. War and its impact on society?

Period: Historical, Political, Cultural

Research: Go online, look at Youtube clips and write rough notes.

ACTING ELEMENT:

Remember: Groups of 2 to 4

Time:

- groups of 2 actors – 5 to 10 minutes
- groups of 3 actors – 7 to 12 minutes
- groups of 4 actors – 9 to 14 minutes

You must: Perform two sections 10 minutes long that are key parts of the text.

You must: Perform a text that contrasts with the play you're studying for Component 3.

The play must: Be written by a different playwright, in different historical period and with different themes to the text in Component 3.

Why? To give you new experiences, and to be able to enjoy and challenge yourselves to learn and interpret different texts.

CHARACTERISATION:

Remember the criteria:

You will be marked on your physical skills, vocal skills, interaction, interpretation, communication with the audience and individual contribution.

Also remember:

Your artistic intention must be written and submitted to the examiner before or on the day of the examination.

Once you know your text, you will need to focus on your character. Remember to use a range of practice techniques that will help you develop your role and create the rounded character: The Red Chair, Role on the Wall, Improvisation, Mime Work, The Missing Scene, Emotional Memory, The Magic If.

During the rehearsal periods, develop your vocal and physical skills:

VOICE: pronunciation, emphasis, pauses, tone and tempo, accent, pitch, constructiveness, highlights.

MOVEMENT: gesture, body posture, walk, position on the stage, characters' territories.

INTERACTION: distance, proximity, back turned, eye-rolling, facial response, moving away, approaching, physical gestures.

Discuss with your group what your stage shape will be, what type of set will be needed, stage equipment and props. It is also a good idea to use sound to create a mood and atmosphere either at the beginning, between scenes or at the end. You will need to carefully consider the costume, hair and make-up suitable for your role. Remember that you need consistent rehearsals and a full dress rehearsal before your final performance.

Year 11 BTEC Dance- Spring Subject Term Knowledge Organiser

Component 3: Responding to a Brief

Objective

- Understand how to respond to a brief
- Select and develop skills and techniques in response to a brief Apply skills and techniques in a workshop performance in response to a brief
- Evaluate the development process and outcome in response to a brief

Responding to a brief

- Starting points that can be investigated and explored practically to generate ideas to
- inform the response to the brief and the given stimulus:
- a theme: concept such as distance or a key word such as discovery
- an issue: social, health or safety issues
- a prop: an umbrella, an apple, a dustbin
- time and place: a beach in winter, night time in a hospital, early morning in the park
- existing repertoire: a play, a composition, choreography, that can be investigated and
- explored to inform the response.

Students will be given a brief and stimulus to create performance material as a performer. In groups consisting of a minimum of three and a maximum of seven performers, will respond to the stimulus and create a workshop performance that communicates ideas and creative intentions to a target audience of their choice.

Key words

Improvisation
Movement techniques
Solo or small-group
Ensemble
Stimulus
Intention
Target audience

Skills and techniques, such as:

o physical
o vocal
o musicality
o interpretative
o stylistic
o interaction with the group
o interaction in performance
o refining ideas
o communicating design ideas e.g. pitch, presentation.

Success

The contribution made by students has a significant impact on the group dynamic and the delivery and communication of ideas through performance. Students are able to reflect on and review the process and outcome with awareness and insight.

Year 10 HT3 Knowledge Organiser for BTEC Sport— Component 3

Exercise Intensity

Aerobic endurance = It is the ability of the cardio-respiratory system to efficiently supply nutrients and oxygen to working muscles during sustained physical activity.

Muscular strength = The maximum force a muscle or muscle group can produce. (Measured in N or KG)

Muscular endurance = It is the ability of a muscle or group of muscles to keep contracting over a period of time against light to moderate load.

Flexibility = Having an adequate range of motion in all joints of the body. It is the ability to move a joint through its complete range of movement.

Speed = The ability to perform a movement or cover a distance in a short period of time = distance/time taken.

Body composition = This is the relative ratio of fat mass to fat free mass (vital organs, muscle, bone) in the body

Components of Fitness — Skill

Balance = The ability to maintain your centre of mass over a base of support. A performer may need static or dynamic balance.

Agility = The ability of a sports performer to quickly and precisely move or change direction without losing their balance.

Coordination = The smooth flow of movement needed to perform a task efficiently and accurately. It often involves being able to use 2 or more body parts together.

Reaction Time = The time taken for a sports performer to respond to a stimuli and the start their response.

Power = The work done in a unit of time. It is the ability to apply a combination of strength and speed. Power = Force (kg) x Distance (m)/time (min or s)

Keywords

Cardio-Respiratory = The heart and blood vessels working with the lung and the airways to carry oxygen to the muscle.

Contracting = This is when the muscles shortens to create a movement Accelerative

Speed = Gradually increasing your speed Pure Speed = Your maximum speed.

Endurance = The ability to prolong the amount of time near maximum speed Static

Balance = Balancing without moving Dynamic Balance = Balancing when moving

Stimuli = Something which causes a response or movement

Year 10 HT3 Knowledge Organiser for BTEC Sport—
Unit 1 Fitness for Sport and exercise

Exercise Intensity

Measuring Heart Rate

1. Sit Down
2. Locate your radial with your index and middle finger
3. Don't use your thumb—it has its own pulse
4. Count the beats from 30 seconds and times it by 2 to find your BPM

Training Zones

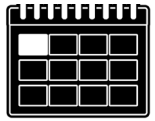
Speed Zone = 95% to 100% of MHR
Anaerobic Training Zone = 85% to 95% of MHR
Aerobic Training Zone = 60% to 85% of MHR

The Borg Scale - Rate of Perceived Exertion (RPE)

The Borg scale is used to predict or estimate the Heart Rate of an individual.
Practice by the individual is needed to make their predictions as accurate as possible
The individual rates themselves from 7 to 20 on the scale.
They then times this by 10 to get an estimated HR
RPE x 10 = HR (BPM)

Basic Principles of Training

We apply principles of training to our training programmes so that we make it affective and make sure it aids progression.



The Basic Principles of Training

Frequency = How often we train Increasing the number of days
Intensity = How hard we train Increasing the number or reps
Time = How long we train Increasing the time we train
Type = How we train selecting the correct training method

The FITT principle is part of the Additional Principle of PROGREESIVE OVERLOAD.

This is the gradual increase of a training load, when done correctly it will progressively increase Frequency, Intensity, Time and Type to develop fitness gains

Key terms

Heart Rate (HR) = The amount your heart beats in 1 minute (BPM)
Maximum Heart Rate (MHR) = The maximum your heart will beat in 1 minute, 220 - Age = MHR
RPE = Rate of Perceived Exertion (How hard we think we have worked)

Year 11 Subject Term Knowledge Organiser: Business Studies

Key Terms: Paper 1
Short-term sources:
- Overdraft
- Trade credit

long-term sources:
- Personal savings,
- Venture capital,
- Share capital,
- Loans
- Retained profit
- Crowd funding.

Key Terms: Paper 2
- **internal sources:** Retained profit
- Selling assets

External sources:
- Loan capital
- Share capital, including stock market flotation)

Sources of Finance

Overdraft
+ Good for emergencies so that you can continue to pay your bills
+ Quick and easy to arrange
- Interest

Trade Credit
+ No interest
+ Helps with cashflow as you can sell the goods before you have to pay for them
- Can't guarantee that you will be given it by a supplier

Benefit of Short Term sources of Finance
Good for emergencies so you can continue to pay your bills.

Personal Savings:
+ No interest
- Mightn't have enough savings to cover what you need
- If you spend it now you can't use it in emergencies

Venture Capital :
+ No interest
+ Get help and advice from an expert
- Have to give away a percentage of your profits
- Mightn't be able to make all the decisions

Share Capital
+ No interest
- Have to give away a percentage of your profits
- Mightn't be able to make all the decisions

Selling Assets (e.g. machinery you don't use anymore)
+ No interest
+ Don't have to give away a % of your profits
- Once you have sold the asset you can't use it any more

Loan
+ Don't have to give away a percentage of your profit
+ Can get the money quickly
- Interest
- No guarantee that you will get the loan

Retained profit
+ No interest
- Mightn't have enough profit to cover what you need
- If you spend it now you can't use it in emergencies

Crowd Funding
+ No interest
+ Can promote the product and its benefits while trying to raise the money
- Have to give away a percentage of the profits.
- If you don't raise all the money you may have to give it back

Year 11 Subject Term Knowledge Organiser: Business Studies

Sources of Finance

WAGOLL: for Bank Loan and Overdraft
Explain a disadvantage of using ……. as a source of finance
One of the drawbacks of is that there is interest to pay. Interest is additional money on top of the amount borrowed that has to be paid back. This increases the outgoings of a business as costs are higher. If costs are higher than profit is lower. Therefore the business will have less money to spend on improving the business such as …….

WAGOLL: for An advantage for ALL other Sources of Finance Explain a disadvantage of using ……. as a source of finance
One of the advantages of is that there is No interest to pay. Interest is additional money on top of the amount borrowed that has to be paid back. This decreases the outgoings of a business as costs are lower. If costs are lower than profit is lower. Therefore the business will have more money to spend on improving the business such as …….

Animal Farm KNOWLEDGE ORGANISER

Context – *Animal Farm* was written by George Orwell in 1945.

George Orwell – George Orwell was the writing name of Eric Blair (1903-1950). He was outspoken in his support of democratic socialism, and spoke out frequently against totalitarianism and social injustice. He wrote a wide range of fiction, poetry, literary criticism and polemical journalism, although without doubt his two most famous works are *Animal Farm* (1945) and *Nineteen Eighty-Four* (1949).

The Russian Revolution – The revolution was the movement that removed the reigning Tsarist autocracy from power and led to the rise of the Soviet Union. The Bolsheviks, led by Vladimir Lenin, were able to overthrow the provisional government and establish their own federal government, creating the world's first socialist republic. Eventually they became reconstituted as the Communist Party.

Nicholas II– Tsar Nicholas II was the last emperor of Russia. Tsar Nicholas was deemed to be a poor ruler – the country lost key battles against Japan and Germany during his reign, costing large military casualties and financial losses. There were also gross inequalities: Nicholas lived in luxury while thousands of unemployed peasants struggled to survive. Tsar Nicholas was eventually overthrown by the Bolsheviks and was executed in July 1917.

Jospeh Stalin –Following the death of Lenin in 1924, Stalin rose to power through discreetly canvassing, manipulating and intimidating others, sidelining other potential leaders such as Victor Trotsky. Under Stalin, the Soviet Union became more autocratic and totalitarian: he oversaw mass repressions, hundreds of thousands of executions and millions of non-combatant deaths. He has hence become known as one of the most significant and vilified figures of the 20th Century.

Karl Marx and Communism– Karl Marx was a German philosopher from the 19th Century, who rejected capitalism. He instead believed in the introduction of a system in which wealth was communal and labour was shared. He believed this would produce a fairer, more stable way of life. Whilst he lived a long time before the Russian Revolution (and in a different country) his theories formed the foundations for what became Communism.

Life in the Communist Soviet Union – The working class in the Soviet Union were supposed to be the country's ruling class under the doctrines from which their socialism was derived, and yet they grew increasingly repressed throughout the progression of the USSR's existence. It is generally accepted that the standard of living decreased, working conditions deteriorated, and personal freedoms were significantly violated.

Main Characters – Consider what Orwell intended through his characterisation of each of the below…

Napoleon – Napoleon is the pig who emerges as the leader of Animal Farm after the rebellion. Napoleon's character is based on Joseph Stalin – the leader of the communist Soviet Union. Napoleon is cunning, treacherous, lazy and selfish. He uses Squealer (propaganda) and the dogs (military force) to exert power over others. He has no real talents, rather he is a corrupt opportunist.	**Snowball** – Snowball is one of the other leading pigs, who challenges Napoleon for leadership of the farm after the rebellion. He represents Leon Trotsky. He is intelligent and passionate, yet he does not resort to the same levels of cunning and manipulation as Napoleon. Despite largely winning the support of the animals on the farm, Snowball is driven from the farm by Napoleon's forces.
Napoleon Quote: "To the prosperity of The Manor Farm!" (10.32)	**Snowball Quote:** "liberty is worth more than ribbons" (2.7)
Boxer– Boxer is a cart-horse, who demonstrates incredible strength, work ethic, and loyalty. He represents those in the working classes who were hugely overworked. Boxer completes the most work on the farm, and is admired by others for his physical accomplishments and mental grit. His downfall is his slow wit, which ensures that he is unable to think for himself and is easily manipulated.	**Squealer –** Squealer represents the Soviet propaganda machine. He is a pig who is an exceptionally gifted and persuasive speaker, and is utilised to spread positivity about Napoleon, and negativity about Napoleon's competition. He uses false statistics to suggest that the farm thrives under Napoleon, and twists the truth to ensure that the pigs retain political and social control.
Boxer Quote: "Napoleon is always right" (5.22)	**Squealer Quote:** "It is for YOUR sake that we … eat those apples." (3.14)
Old Major – Old Major is a prize-winning boar whose vision of a place in which the animals work for themselves serves as the inspiration for the rebellion. He is based on both Karl Marx and Vladimir Lenin, who inspired communism. Old Major is well-respected, articulate, and persuasive. He is a clear leader who the other animals listen to. When he dies, Napoleon and Snowball are left to struggle for control over the animals.	**Benjamin** – Benjamin is a long-lived donkey who refuses to feel enthused by the rebellion. Some say he represents the aged people of Russia, who remained cynical of the revolution. Benjamin is seen by the other animals as a pessimist, however his prediction that life will remain unpleasant regardless of who is in charge proves correct. He is the only animal who appears able to understand the atrocities that are taking place, yet he refuses to openly oppose the pigs.
Old Major Quote: "my message to you, comrades: Rebellion!" (1.11)	**Old Major Quote:** "None of you has ever seen a dead donkey"(5.22)

Themes – A theme is an idea or message that runs throughout a text.

The Corruption of Socialist Ideals – *Animal Farm* is famous for being a stinging critique of the development of Soviet communism. Although Orwell strongly believed in the socialist ideals upon which the revolution was built, he abhorred the ways in which these values had been repeatedly manipulated by those who rose to power. The gradual disintegration of the seven commandments visually depicts this.

Class – *Animal Farm* demonstrates through its allegory the means by which human beings seek to maintain and reestablish class structures. The novella shows how the oppressed who are able to stand united in the face of adversity often generate their own class divisions over time after the enemy is eliminated. This is evident in the slow rise of the pigs to fill the void left by Mr Jones.

Naivety – *Animal Farm* is not only told from the viewpoint of those in power, but also from the viewpoint of those who are oppressed. Orwell makes clear that these types of situations are formed not only because of the strategies of the oppressors, but also the naiveté of the people who do not have the education or the position to know better. For example, Boxer believes everything that he is told.

Religion – An idea of heaven (Sugarcandy Mountain) is promised to the animals by Moses (the raven) at some points throughout *Animal Farm*. Moses is derived from the name of the bible character who brought the word of God to the people. The thought of an evergreen, beautiful afterlife awaiting them drives the animals on to work harder, and so the pigs use Moses to their benefit.

Scene-by-Scene Summary – Alongside key quotations from each scene.

Chapter I	A drunk Mr Jones stumbles to bed, forgetting to lock up his farm buildings. The animals thus convene in the big barn to hear Old Major's speech. He blames their short and miserable lives on man, and incites rebellion. He teaches them a song: Beasts of England.	*Weak or strong, clever or simple, we are all brothers. No animal must ever kill any other animal. All animals are equal.* 
Chapter II	Old Major dies in his sleep, and the other animals prepare for rebellion. The pigs (the cleverest animals) prepare the others, teaching them animalism, which they don't all fully understand. The Rebellion occurs, and Jones is driven from the farm. The farm is renamed 'Animal Farm' and seven commandments are made.	*"Never mind the milk, comrades!" cried Napoleon, placing himself in front of the buckets. "That will be attended to. The harvest is more important.* 
Chapter III	The animals labour in the fields throughout the summer. Boxer works hardest. There is a flag-raising ceremony each Sunday – Snowball and Napoleon often clash. Snowball spends time trying to educate the animals. Napoleon takes a group of puppies to 'educate' in a loft. When it is noted the pigs have been eating the apples and milk, Squealer persuades the animals that it is best.	*Milk and apples (and this has been proved by Science, comrades) contain substances absolutely necessary to the well-being of a pig. We pigs are brain-workers.* 
Chapter IV	The news of Animal Farm has spread to neighbouring farms (through the birds), where animals have begun singing Beasts of England. Jones and other farmers thus launch an attack, however they are easily beaten by the animals. Boxer and Snowball fight heroically and are awarded medals as a result. Only a single sheep is lost, who is given a hero's burial. Snowball tells Boxer not to feel guilt for a human's death.	*"Who will believe that I did not do this on purpose?" "No sentimentality, comrade!" "War is war. The only good human being is a dead one."* 
Chapter V	Mollie is tempted away from the farm by a red-faced man who feeds her. Snowball and Napoleon grow increasingly hostile towards one another. As Snowball announces plans for a new windmill, Napoleon unleashes his dogs, which attack Snowball and chase him off the farm. The animals are anxious about this, but Squealer's passionate defence and the growl of the dogs is enough to assure them that 'Napoleon is always right.'	*"One of them all but closed his jaws on Snowball's tail, but Snowball whisked it free just in time. Then he put on an extra spurt and, with a few inches to spare, slipped through a hole in the hedge and was seen no more."* 
Chapter VI	The animals work at a rapid pace to build the windmill, and their rations are cut. It is announced that the farm is now trading with humans, to the shock of the animals. It begins that the pigs have begun amending the commandments to suit their own interests. A storm destroys the windmill, yet Napoleon blames the destruction on the 'traitor Snowball.'	*"Comrades," he said quietly, "do you know who is responsible for this? Do you know the enemy who has come in the night and overthrown our windmill? SNOWBALL!"* 
Chapter VII	Snowball is blamed for more and more failures, which the humans attribute to planning errors. Hens eggs are now sold, which makes the hens rebel. Napoleon holds a meeting in which several animals are murdered by the dogs for their apparent treasons against the farm. It is revealed 'Beasts of England' may no longer be sung.	*One Sunday morning Squealer announced that the hens, who had just come in to lay again, must surrender their eggs. Napoleon had accepted… a contract for four hundred eggs a week."* 
Chapter VIII	More of the commandments appear to change, but the animals are persuaded that this is not the case. Napoleon has now taken the title of 'Leader' and has multiple other honours. Trading with humans intensifies. A further battle with humans takes place, with the windmill destroyed, several animals killed, and Boxer injured. The pigs begin drinking alcohol.	*"He called the animals together and told them that he had a terrible piece of news to impart. Comrade Napoleon was dying!"* 
Chapter IX	Animal Farm is named a republic and Napoleon unanimously named the president. Moses the raven returns and speaks of Sugarcandy Mountain. Boxer grows frailer and one day collapses. The pigs announce that he will be taken to hospital, but Benjamin reads on the van that he is in fact being taken to a slaughterhouse. Squealer announces that he died at the hospital, and that the van had only just been bought by the hospital.	*"Boxer!" cried Clover in a terrible voice. "Boxer! Get out! Get out quickly! They're taking you to your death!"* 
Chapter X	Years pass by. Many animals die and few can remember the rebellion. Only the pigs seem richer, yet all animals remain proud of being on Animal Farm. The pigs begin walking on two legs. Humans come over for a meeting and commend how hard the pigs make the animals work, for so little rations. The name Animal Farm is returned to 'Manor Farm.' The animals can no longer differentiate between people and pigs.	*"Somehow it seemed as though the farm had grown richer without making the animals themselves any richer…" "All animals are equal, but some animals are more equal than others."* 

The Power of Persuasion		Features of Allegory
Rhetorical Questions	Old Major uses this type of question to make the animals think deeply: *"Now, comrades, what is the nature of this life of ours?"*	**Writer's Values** – The writer normally holds strong political or moral views about a topic, e.g. Orwell didn't like how the Soviet Union had realised communism. 
List of Three	Old Major does this to build an argument: *our lives are miserable, laborious, and short.*	**Surface Level Story** – There must be a literal story that works on a surface level, e.g. The story of the animals taking over a farm and then some of the animals disputing power.
Dishonesty	Squealer uses lies and deception to convince the animals: *Many of us actually dislike milk and apples. I dislike them myself!*	**Symbolic Level Story** – There must also be a deeper, more symbolic meaning to the story, e.g. The Russian Revolution and subsequent duel for authority. 
Repetition	Squealer uses repetition to emphasise points: *Jones would come back! Yes, Jones would come back!*	**Polarising Relationships** – There needs to be oppositional views in the story in order for the reader to reflect on morals e.g. the views of Benjamin vs. the other animals during the revolution.

CHANGING CLIMATE

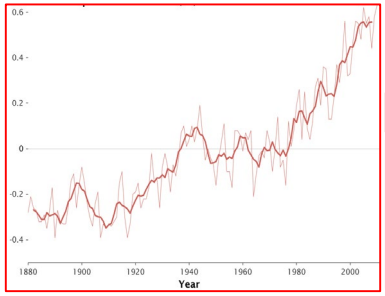
What is Climate Change?

Climate change is a large-scale, long-term shift in the planet's weather patterns or average temperatures. Earth has had tropical climates and ice ages many times in its 4.5 billion years.

Quaternary geological period

The quaternary period is the last 2.6 million years. During this period temperatures have always fluctuated. The cold 'spikes' are the glacial periods, whereas the warm points are the interglacial periods.

Today's temperature is higher than the rest of the period. Despite alternate cold and warm moments within this period, global temperatures have increased above average in the past 100 years. This current trend is what's become know as global warming.

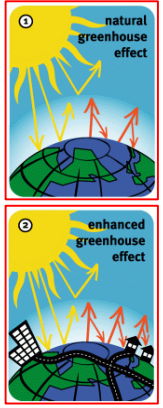


Natural Greenhouse Effect

The Earth is kept warm by a natural process called the Greenhouse Effect. As solar radiation hits the Earth, some is reflected back into space. However, greenhouse gases help trap the sun's radiation. Without this process, the Earth would be too cold to support life as temperature would average as -18°C instead of +15°C.

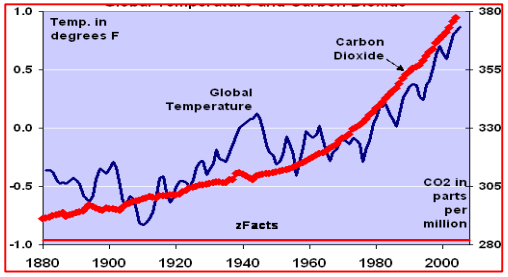
Enhanced Greenhouse Effect

Recently, there has been an increase in humans burning fossil fuels for energy. These fuels (gas, coal and oil) emit extra greenhouse gases. This is making the Earth's atmosphere thicker, therefore trapping more solar radiation but causing less to be reflected. As a result, our Earth is becoming warmer.



Linking CO_2 and Global temperatures

The rate of carbon dioxide and increase in global temperatures is strong. Scientist agree that this increase is cause by human activity.



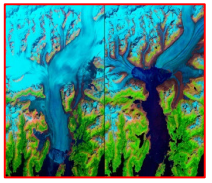
Evidence for climate change

Earth's temperature has changed over the last 2.6 million years. Scientist know this by collecting a range of evidence that is trapped or stored in the environment around us.

Geological fossil evidence	Plants and animals fossils/remains which favour certain environmental conditions have been found in contractionary conditions, thus suggesting periods of a warmer and colder time. E.g. Mastodon in USA.
Ocean Sediment	Layers of sediment that has built up over time have provided scientist trapped oxygen isotopes. Scientist have used them to calculate and understand that atmospheric temperature have indeed changed.
Ice Cores	Ice cores are made up from different layers that each represents a different historical time. By exploring the water molecules of these cores, scientist have calculated fluctuating temperatures of the atmosphere.
Historical records	Historical records from ancient cave paintings, diaries and written observations have provide evidence of climate change through personal accounts from the people through them.

Retreat of the Columbia Glacier, Alaska, USA

Located in southern Alaska, it flows 50km to the sea. The glaciers has been retreated by 16km and has lost half of its thickness in the last 30 years. Scientist believed this is due to global warming, which if continued will contribute towards continued sea level rises.



Past Evidence: The Little Ice Age (1300-1870)

The Little Ice Age was a period of cooling that occurred after the Medieval Warm Period in parts of Europe and North America. Impacts included…

1. Price of grain increased and vineyards become unproductive.
2. Sea ice engulfed Iceland and the sea force around parts f the UK. Frost Fairs were held on rivers such as the River Thames.
3. People suffered from the intense cold winters as food stock were limited.

Greenhouse Gases

Most greenhouse gases occur naturally. Some greenhouse gases have greater potential to increase global warming than occurs as different gases trap and absorb different amounts of radiation.

Carbon dioxide	Accounts for 60% of the enhanced greenhouse gases. It is produced by burning fossil fuels through producing electricity, industry, cars and deforestation.
Methane	Accounts for 15% of the enhanced greenhouse gases. 25x more efficient than Carbon dioxide. Produce from landfills, rice and farm animals.
Halocarbons	Human made and makes a tidy proportion of all greenhouse gases. 15000x more efficient at trapping radiation than Carbon dioxide. Produced from air-conditioning, refrigerators and aerosols.
Nitrous Oxide	Accounts for 6% of the enhanced greenhouse effect. 250x more efficient than Carbon dioxide. Produced from fertilisers and car exhausts.

Recent Evidence for climate change.

In the past 100 years, scientists have become pretty good at collecting accurate measurements from around the world. These measurements have suggested a trend that the climate is yet again changing.

Global temperature data	Evidence collected by NASA suggests average global temperatures have increased by more than 0.6°C since 1950.
Ice sheets and glaciers	Evidence from maps and photos have shown many of the world's glaciers and ice sheets are melting. E.g. the Arctic sea ice has declined by 10% in 30 years.
Sea Level Change	Evidence from the IPCC has shown that the average global sea level has risen by 10-20cms in the past 100 years. This is due to the additional water from fresh water ice and thermal expansion of the ocean due to higher temperatures.

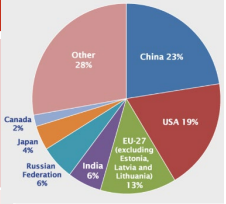
Evidence of natural change

Climate change has occurred in the past without human ever being present. This suggests that there are natural reasons for the climate to change.

Milankovitch cycle	Milutin Milankovitch argued that climate change was linked to the way the Earth orbits the Sun, and how it wobbles and tilts as it does it. There are three ideas that are thought to change climate.
	1. **Eccentricity**: Changes in the shape of Earth's orbit.
	2. **Obliquity**: Changes in how the Earth tilts on its axis.
	3. **Precession**: The amount the Earth wobbles on its axis.
Sun Spots	Dark spots on the Sun are called Sun spots. They increase the amount of energy Earth receives from the Sun.
Volcanic Eruptions	Volcanoes release large amounts of dust containing gases. These can block out sunlight and results in cooler global temperatures.

Whose responsible?

LIDCs	Countries in Africa, such as Kenya, emit low levels of carbon dioxide. This is due to these countries not being industrialised or having a population wealthy enough to consume lots of energy
EDCs	Countries such as China and India are increasingly more industrialised and therefore are emitting more carbon dioxide. These increasing population sizes and steadily increasing wealth mean more energy is being consumed.
ACs	Countries such as the USA and UK are industrialised with a wealthier population that enjoy lifestyles which required a large consumption of energy.



Not what is seems

Although China is responsible for the highest amount of carbon emission, 1.4 billion people do live there. However, per person, the USA (320 million) actually contributes far more CO_2 emissions.

Global impacts of climate change

The impact of rising temperatures is affecting the world socially, economically and environmentally in several potential problematic ways.

Extreme Weather	Climate is causing more unpredictable and severe weather events. This includes more frequent and powerful tropical storms; more extreme heatwaves and lasting droughts. E.g. Typhoon Haiyan 2013
Rising sea levels	Sea levels have risen by 20 cm since 1901. due to thermal expansion, melting glaciers and ice caps. Some coastal countries are now disappearing such as the Maldives in the Indian Ocean.
Food supply	Warmer temperatures and changing rainfall will make it harder to produce a reliable source of food to sustain a rising global population. E.g. In 2011, Russia banned crop exports after a incline in yield.
Plants and Animals	About a quarter of animals and plants on Earth could become extinct. With warmer temperatures and changing rainfall environments will no longer be able to provide for the world's fragile ecosystems.
Disease and Health	Warmer temperatures will increase the spread of infectious diseases like malaria. In addition, more frequent floods could cause more waterborne disease such as dysentery.
Water Supply	People need freshwater to drink but with 1 billion people predicted to not have excess to enough water by 2025 due to climate change, this might cause several social, economic and environmental problems. E.g. fishing, irrigation and sanitation.
Climate refugees	Climate refugees are people who are forced to leave their home due to the impact of climate change. This can be due to sea level rises or extreme weather conditions such as drought.

Rising Sea Levels: Tuvalu

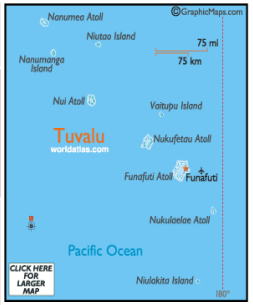
Tuvalu is a group of tiny islands in the South Pacific. Most islands are low-lying with the highest point being 4.5m above sea level. Population is 11,000 people and the economy relies mainly from exporting copra.

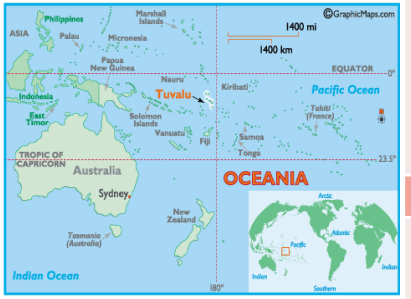
Impacts from climate change

Social	Economic	Environmental
- Water supply due to droughts becoming more common. - Wells are becoming polluted by seawater. - High tides are starting to threaten homes and roads.	- Increased levels of salinization affecting soil for agriculture. - Coastal erosion is destroying productive farmland. - Main runway threaten by flooding.	- Ocean acidification is reducing fish stocks around the island. - Warmer temperatures are destroying fragile ecosystems such as coral reefs.

Management

- Campaigning internationally for a reduction in carbon emissions.
- Migration to safer islands off the coast of New Zealand.
- Low sea walls have been constructed to prevent erosion and flooding.
- Japan supporting coral reef restoration by introducing new species to damaged reefs.





Climate change management: Paris Agreement 2015

Paris climate conference involved 195 countries making a legally binding global climate deal. This agreement objective is to limit global warming to below 2°C. The aims of this objective are…

- Limit emissions to pre-industrial levels.
- Meet every 5 years to set new targets.
- Communicate plans to the public.
- Provide support to developing countries at reducing emissions.

Extreme Weather: Brazilian Drought 2014

Brazil is a EDC in the continent of South America. Its population is 204 million. In 2014 it faced a record breaking dry season that resulted in serve drought conditions. Scientist believe that deforestation may have contributed in changing the climate.

Impacts from climate change

Social	Economic	Environmental
- Drought caused a reduction in the production of hydroelectric power. - Major cities faced water shortages.	- Shortage of water affected industrial production. - Coffee industry was severely affected due to the lack of rainfall.	- As reservoir levels dropped, levels of pollution increased. This damaged natural ecosystems and killed fish.

Management

- Introduction of water rationing and recycling more water.
- Repair leaking pipes to decrease water waste.
- Introduction of more natural gas to sustain energy demands.

Impacts of climate change on the UK.

The UK's climate is also changing. It is expected to…

- **Increase in average temperature.**
- **Have warmer, but wetter winters.**
- **Have warmer and drier summers.**

However, not all the impacts to the UK will be negative, there are clear benefits for a changing climate.

Negative impacts of climate change for the UK

Coastal Flooding

- Vulnerable low lying areas could flood homes and infrastructure.
- Increase of coastal erosion.
- Damage to the economy.

Extreme Rainfall

- Increase in extreme flash floods.
- Flood damage to homes and businesses.
- Soil contaminations on farmland.

Water Shortages

- Farmers will find it difficult to irrigate land.
- Water restrictions, with London being worst affected.

Extreme Heat

- Warmer weather can increase health problems.
- Infectious diseases such as malaria might spread.

Positive impacts of climate change for the UK

Tourism

- More people likely to take holidays within the UK.
- The economy could be boosted: helping to create new jobs.
- More outdoor events could become common.

Environment

- New wetlands from coastal flooding could become established.
- New wildlife and plants could be drawn to the UK'.

Farming

- Agriculture productivity may increase under warmer conditions.
- Farmers could potentially grow new foods used to warmer climates.

Industry

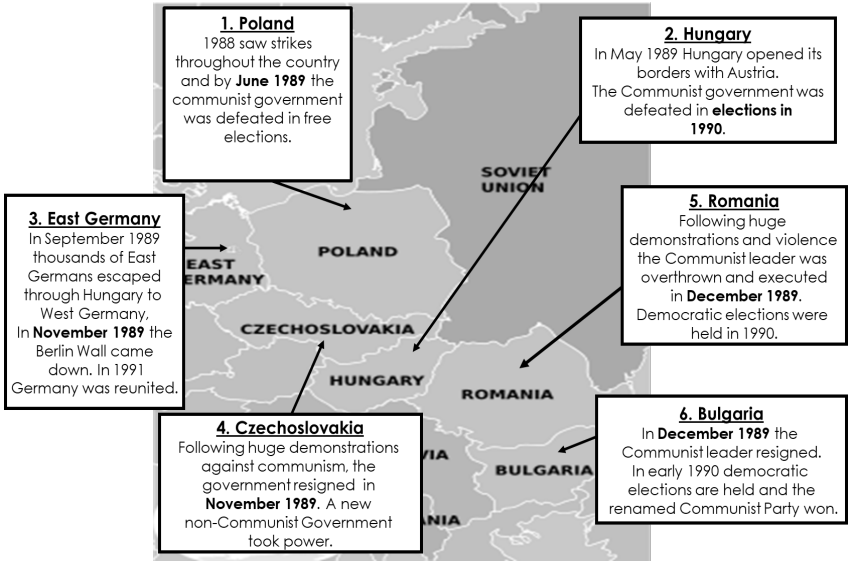
- Heating cost will fall.
- Construction industry will be boosted by the need to build sea defences.
- New designs produced to cope with conditions.

Year 11 History Term 1 Knowledge Organiser: The end of the Cold War, 1970–91

Key People

Leonid Brezhnev	Leader of the USSR 1964-1982
Richard Nixon	President of the USA 1969-1974
Jimmy Carter	President of the USA 1977-1981
Mohammed Taraki	Leader of Afghanistan 1978-1979
Hafizullah Amin	Leader of Afghanistan March - Dec 1979
Babrak Kamal	Leader of Afghanistan 1979-1986
Ronald Reagan	President of the USA 1981-1989
Mikhail Gorbachev	Leader of the USSR 1985-1991

The End of Soviet Control



Key Words

Détente	relaxation. When a strained relationship gets better. A thaw.
Treaty	a legal, formal agreement between countries.
Summit	a meeting of important people, usually to ease tensions.
Ratified	when something is signed, voted on or made into law.
Sanctions	a threatened consequence for breaking a law or rule. Economic sanctions means refusing to trade with a country.
Boycott	refusing to participate, or buy from an organisation, as a protest.
Doctrine	a rule or principle. Something that should be followed.
ICBM	intercontinental ballistic missile
SLBM	submarine launched ballistic missile
Warhead	a bomb or explosive device carried by a missile
MIRV	a missile that carries multiple warheads or bombs.
ABM	anti-ballistic missile. Can shoot other missiles down.
MAD	mutually assured destruction
NUTS	Nuclear utilization target selection. A strategy that suggests a nuclear war is winnable by one side.
SDI	strategic defense initiative – the Star Wars policy.
Strategic weapons	Weapons that can be fired at an enemy from a distance.
Mujahideen	Islamic guerrilla fighters.
Perestroika	Russian term for economic and political restructuring.
Glasnost	Russian term for openness and end to censorship.

1972 SALT 1 → 1975 Helsinki Conference → 1979 Soviet invasion of Afghanistan → 1980 Carter Doctrine → 1985 Geneva Summit → 1986 Reykjavik Summit → 1987 INF Treaty → 1989 Fall of the Berlin Wall → 1991 End of Soviet Union

1.3 1.3.1 Networks and topologies Network types

What is a network?

A network is a group of interconnected devices that share an internet connection.

How is a networked computer different to a standalone computer?

A stand-alone computer is a device that is not connected to a network.

Network types:

- LAN (Local Area Network)
- WAN (Wide Area Network)

LAN	WAN
What does it stand for? Local Area Network	**What does it stand for?** Wide Area Network
How does it work? It's a network that covers a small geographical area.	**How does it work?** It's a network that covers a large geographical area.
Infrastructure It uses network hardware and cables owned by the individual/organisation	**Infrastructure** It uses additional transmission media owned by other companies such as telephone lines.
Who uses a LAN? Schools, homes and any business that works in a small building or site.	**Who uses a WAN?** It can be a collection of different LAN's. The best example is the Internet.

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1.3 1.3.1 Networks and topologies Network models

Network models:

- Client-server network
- Peer-to-peer network.

Factors that affect network performance:

- Number of users using the network. It uses more bandwidth.
- Distance from the router.
- Interference from physical objects.
- Choice of transmission cable (e.g. fibre optic)
- Streaming videos in HD.
- The use of a VPN (Virtual Private Network)
- Wi-Fi frequency may need to be changed.

Client-server	Peer-to-peer
Where are files stored? In a centralised location such as the server.	**Where are the file stored?** It's decentralised. Stored on the individual's computer.
Backing up data All data is backed up in a centralised location. (i.e. a server)	**Backing up data** Peer-to-peer may need to perform their own backups.
Updates/Installation Upgrades can be done centrally and not on individual computers.	**Updates/Installation** Upgrades would need to be performed on each computer.
Hardware File servers to store/retrieve files. Web servers to access the world wide web.	**Hardware** Router to connect to the network and access the internet,

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1.3 1.3.1 Networks and topologies Network hardware

Switch	Router
Creates networks	Connects to other networks
Inspects MAC addresses	Inspects IP addresses
Re-broadcasts data packets to the correct recipient.	Forwards data packets onto the intended recipient once IP address have been inspected.
Reduces security issues and unnecessary traffic.	It can exchange data outside of it's own network.

Different types of network hardware

Switch
Network hardware that allows you to create networks is responsible for re-directing data packets to the intended recipient.

Router
Hardware that allows you to connect to other networks by inspecting the IP address.

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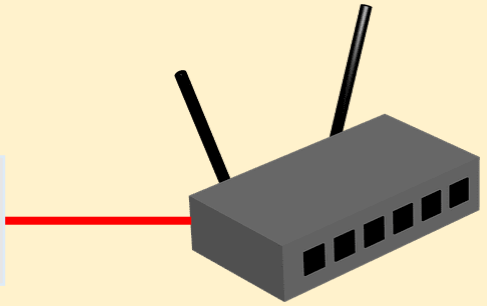
1.3 1.3.1 Networks and topologies Network hardware

Different types of network hardware

What is a Wireless Access Point?
Hardware that relays data from a wired network to a wireless device. It's used to extend the coverage of a network so users can access the network from longer distances.

Network interface controller
A chip that allows the computer to connect to a network. Each NIC contains a MAC address.



MAC address	IP address
It uses hexadecimal numbers and 6 bytes long.	It uses denary numbers and is 4 bytes long.
MAC address is fixed to one device and doesn't change.	Can be changed / are allocated as needed
Configured in hardware.	Configured in software.
Uniquely identifies a device on a network.	Not unique to one individual device or network.
MAC addresses are only used within the LAN	Used for routing across a WAN / internet

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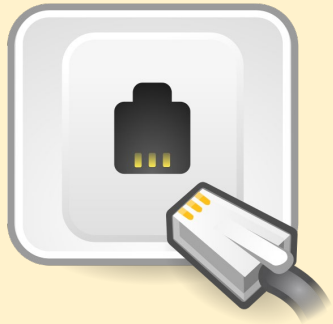
1.3 1.3.1 Networks and topologies Modes of connection

Transmission media

What is transmission media?
This is the technology used to transmit data from sender to receiver, usually in the form of a cable. On the right are some common modes of connection.



Ethernet	Bluetooth	Wi-Fi
It's a protocol	It's a protocol	It's a protocol
Wired form of data transmission.	Wireless form of data transmission.	Wireless form of data transmission.
Fast at transmitting data	Short transmission range.	Not as fast as a wired connection.

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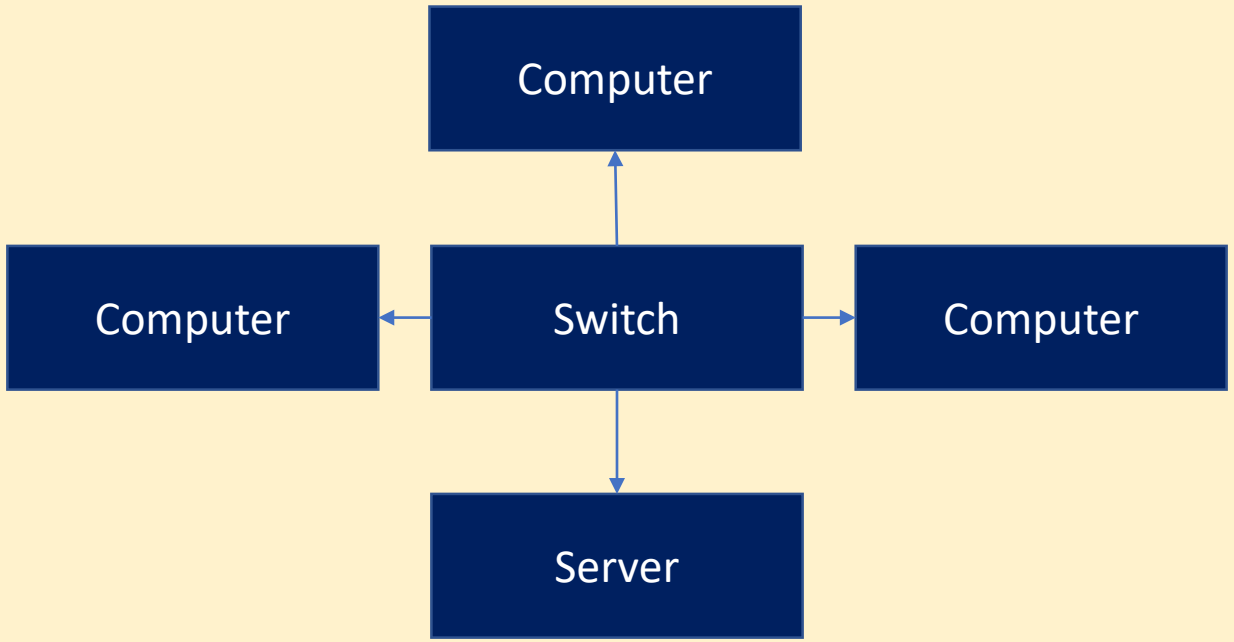
1.3 1.3.1 Networks and topologies
Star network

What is a star network?

- It consists of a central device, typically a switch for all other nodes in the network.
- Each node in the network is connected directly to the central switch.
- This means that every node has a dedicated point-to-point connection to the central switch.

Advantages

- All connected to central switch
- Easy to add new devices
- Easy to troubleshoot and isolate faults
- Network continues to run if one device fails.



Disadvantages

- Higher latency - data must pass through the central switch, causing delay.
- Limited cable length
- More expensive due to the more hardware needed.
- Single point of failure - if the central switch fails, the entire network is down.

1.3 1.3.1 Networks and topologies Mesh network

What is a mesh network?

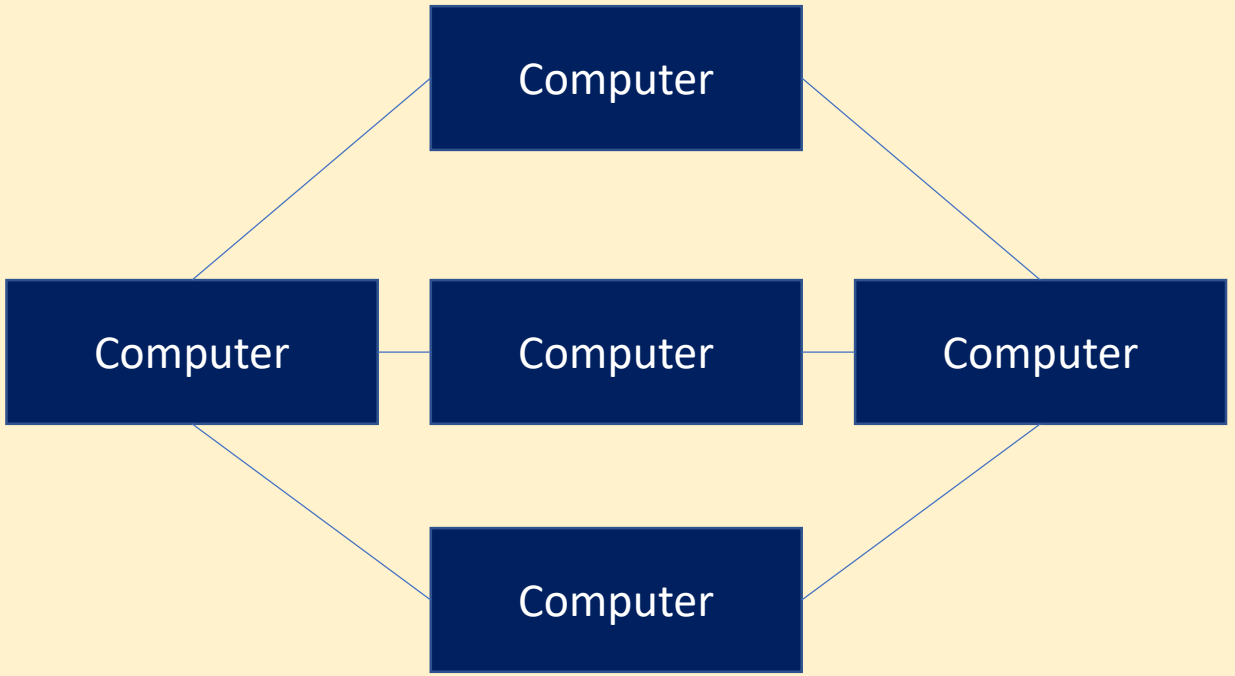
- Each node in the network acts as a router, forwarding data packets to other nodes in the network.
- When a node sends data, it selects the best path to the destination node based on factors such as network congestion, signal strength, and node availability.

Advantages

Data can be transmitted more effectively because every node acts as a router.

If one node fails, data can still be transmitted through alternative paths.

New nodes can be added to a mesh network without disruption.



Disadvantages

Increased network latency because using multiple paths is complex.

The bandwidth available to each node may be limited, which can impact performance.

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1.3 1.3.1 Networks and topologies Network protocols

What is a standard?

We communicate with each other in our native language and this is exactly how computers communicate with each other and this is known as standards.

What is a network protocol?

- When standards are used by computers to communicate over a network, it has to follow a number of protocols.
- Each protocol is responsible for transmitting data in a different way.

Network protocols

HTTP
Used to access web pages.

HTTP
Used to access web pages that require communications to be encrypted.

FTP
Used to transfer files between client and server.

TCP
Breaking down data into packets ready to be transmitted.

IP
Identifying the IP address of the source and the receiver of the data packets.

SMTP
Used to send email messages over a network.

IMAP
Used to receive emails that are stored on the server.

POP
Used to receive emails that are stored on a device, deleted from the server.

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1.3 1.3.1 Networks and topologies Network protocols

What is the TCP/IP stack?

It's a model that describes how data is transmitted over networks. The TCP/IP stack uses a four-layer model.

How do layers work?

- Each layer builds on the functionality provided by the layers below it, and provides a set of services to the layers above it.
- For example, the TCP is provided with the data that allows the Internet layer to assign the IP addresses required.

Why use layers?

- Each layer is it's own module (like a subprogram) which makes it easier to add, modify, or replace individual protocols without affecting the entire system.
- Allows for the expansion of networks to accommodate more users and devices, and to handle increased traffic.
- Any errors that occur will only be exclusive that that layer and will not interrupt any other layers.

TCP/IP Stack

Application layer
HTTP/HTTPS
SMTP/IMAP/POP
FTP

Transport layer
TCP

Internet layer
IP

Data link layer
Wi-Fi/Ethernet

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Module 8 - Environment

Ce qui est important pour moi / What's important to me

Ce qui est important pour moi, c'est …	*What's important to me is …*
l'argent (m)	*money*
le sport	*sport*
la musique	*music*
ma famille	*my family*
ma santé	*my health*
mes amis	*my friends*
mes animaux	*my animals*
mes études	*my studies*

Ce qui me préoccupe / What concerns me

Ce qui me préoccupe, c'est …	*What concerns me is …*
l'environnement	*the environment*
l'état (m) de la planète	*the state of the planet*
le racisme	*racism*
la cruauté envers les animaux	*cruelty to animals*
la faim	*hunger*
la guerre	*war*
l'injustice (f)	*injustice*
la pauvreté	*poverty*
la violence	*violence*

Quel temps fera-t-il? / What will the weather be like?

Il y aura …	*There will be …*
de la pluie	*rain*
de la neige	*snow*
du vent	*wind*
du tonnerre	*thunder*
des averses	*showers*
des éclairs	*lightning*
des éclaircies	*sunny intervals*
Il fera …	*It/The weather will be …*
beau	*nice/good*
mauvais	*bad*
chaud	*hot*
froid	*cold*
frais	*chilly*
Le temps sera …	*The weather will be …*
ensoleillé	*sunny*
nuageux	*cloudy*
orageux	*stormy*

Les problèmes environnementaux / Environmental problems

Le plus grand problème environnemental, c'est …	*The biggest environmental problem is …*
le changement climatique	*climate change*
le manque d'eau potable	*the lack of drinking water*
la disparition des espèces	*the extinction of species*
la destruction des forêts tropicales	*the destruction of the rainforests*
la surpopulation	*overpopulation*
les incendies	*fires*
Les arbres nous donnent de l'oxygène et nous les coupons tous les jours.	*Trees give us oxygen, and every day we cut them down.*
Beaucoup de personnes n'ont pas accès à cette ressource vitale.	*Lots of people don't have access to this vital resource.*
On détruit la planète	*We are destroying the planet*

Les problèmes environnementaux

Le plus grand problème environnemental, c'est …
- le changement climatique
- le manque d'eau potable
- la disparition des espèces
- la destruction des forêts tropicales
- la surpopulation
- la pollution de l'air
- la sécheresse
- les inondations
- les incendies

Les arbres nous donnent de l'oxygène et nous les coupons tous les jours.

Beaucoup de personnes n'ont pas accès à cette ressource vitale.

On détruit la planète.

C'est très inquiétant.

C'est catastrophique.

Environmental problems

The biggest environmental problem is …
- *climate change*
- *the lack of drinking water*
- *the extinction of species*
- *the destruction of the rainforests*
- *overpopulation*
- *air pollution*
- *drought*
- *flooding/floods*
- *fires*

Trees give us oxygen, and every day we cut them down.

Lots of people don't have access to this vital resource.

We are destroying the planet.

It's very worrying.

It's catastrophic.

Que doit-on faire pour sauver notre planète?

On doit/On peut …
- recycler
- trier les déchets
- faire du compost
- consommer moins d'énergie
- éteindre les appareils électriques et la lumière
- mettre un pullover au lieu d'allumer le chauffage
- faire des achats responsables
- utiliser du papier recyclé
- acheter des produits verts et des produits bio
- voyager autrement
- utiliser les transports en commun
- aller au collège à vélo
- réutiliser
- refuser les sacs en plastique
- avoir une bouteille d'eau au lieu de prendre un gobelet jetable
- économiser l'eau
- boire l'eau du robinet
- prendre une douche au lieu de prendre un bain
- tirer la chasse d'eau moins fréquemment
- fermer le robinet en se lavant les dents
- installer des panneaux solaires

What should we do to save our planet?

You/We should/can …
- *recycle*
- *separate the rubbish*
- *make compost*
- *consume less energy*
- *turn off electrical appliances and the light*
- *put on a jumper instead of turning on the heating*
- *make responsible purchases*
- *use recycled paper*
- *buy green and organic products*
- *travel differently*
- *use public transport*
- *go to school by bike*
- *reuse*
- *turn down plastic bags*
- *have a bottle of water instead of taking a disposable cup*
- *save water*
- *drink tap water*
- *take a shower instead of a bath*
- *flush the toilet less frequently*
- *turn off the tap while brushing your teeth*
- *install solar panels*

THEMES: Christian Practises

Key terms

Evangelism	Telling others about Christianity with the view to convert them.
Baptism	Being cleansed of original sin and being welcomed in the church.
Prejudice	Judging people to be inferior or superior without any reason behind it.
Eucharist	Taking the body and blood to remember Jesus' sacrifice.
Practises	Things people do.
Denomination	A group within a group.
Sacrament	Events through which people can eb blessed by God.
Liturgical	Formal, structured worship.
Non-Liturgical	Informal, unstructured worship.

Crucial Commands:

Describe:Say in detail what something or someone is like, and the impact it has. E.g. Describe the meaning of the word Omnibenevolent.

Explain: Say why something or someone is important, and the impact it has. E.g. Explain why Jesus' death is important to Christians.

Discuss: Write about at least two points of view and explain why these points of view are valuable or not. E.g. "The most important Christian belief is Jesus' resurrection" (15 marks)

What is worship

- Worship derives from the word 'Worth-ship'. Referring to how much worth (love and devotion) you give to God.

1. **Liturgical worship** = church service that follows a set structure and pattern.
2. **Non-liturgical worship** = church service that does not follow a set text or ritual.

Worship can also be split into Charismatic or Private worship. Worship can be to praise God, give thanks, forgiveness, to strengthen a relationship etc.

Baptism

- Infant baptism = is for babies and young children.
- Believers' baptism = people who are old enough to make the decision to be baptised.

Why are people baptised? To become a member of the Church, to be cleansed of sin, follow in Jesus' footsteps

Believer's Baptism	Infant Baptism
Attend baptism classes	`Parents make promises
Gives a brief testimony	Removes original sin

"Get up, be baptised and wash your sins away" Acts 22:16

Missionary work

Mission = vocation or calling to spread the faith.

The Great Commission Jesus instructs his disciples to go and spread the gospels and make disciples of others through baptism. "Go and make disciples of all nations."

Missionary work:
Aims of missionary work is to persuade people to accept Jesus as their Saviour. Alpha is an example of evangelism in the UK. It is an introductory course to Christianity for those that are interested.

The Sacraments

Christianity and Easter

Easter and Christmas are both Holy Days in the life of a Christian. Christmas celebrates the birth of Jesus Christ, and Easter celebrates the resurrection of Christ into Heaven.

The interesting question when discussing these practises are whether that is what makes the religion popular or is it just a cultural practise? Is the UK Christian?

PEE paragraph structure

Point – "Some people argue…"

Example – "Evidence for this can be found in…"

Explain – "This is significant because…"

***You also need to include quotes with Sources of Authority, discuss strong/ weak arguments and most importantly evaluate the IMPACT your point has on individuals, groups or societies!**

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LAS FIESTAS

Special events

Christmas in Spain

Festivals

Christmas and New Year

Mi cumpleaños – my birthday **El cumpleaños de mi madre…** – my mum's birthday **Navidad/ (el) día de Navidad** – Christmas/(on) Christmas day **La Nochebuena** – Christmas Eve **La Nochevieja** – New year's Eve **Pascua/ El Domingo de Pascua** – Easter/ Easter Sunday **El día de Reyes** – 6th January	**abro/abrimos/abren regalos** – I/we/they open presents **busco/buscamos/buscan huevos de chocolate** – I/we/they look for chocolate eggs **canto/cantamos/cantan villancicos** – I/we sing Christmas carols **como/comemos/comen dulces navideños/ doce uvas/ pavo** – I/we eat Christmas sweets/ 12 grapes/ turkey **me acuesto/nos acostamos/se acuestan muy tarde** – I/we/they stay up very late **me levanto/nos levantamos/se levantan muy temprano** –I/we/they get up very early **rezo/rezamos/rezan** – I/we/they pray **voy/vamos/van a la iglesia/mezquita** – I/we/they go to church/mosque
En España – In Spain	**Santa no es tan popular como en Inglaterra** – Santa isn't as popular as in England **los Reyes Magos traen los regalos el 6 de enero** – the 3 kings bring the presents on 6th January **mucha gente va a la Misa de Gallo la Nochebuena** – lots of people go to midnight mass on Christmas Eve **la gente come las doce uvas a medianoche la Nochevieja para tener buena suerte** – people eat 12 grapes at midnight on NYE for good luck **se come la cena de Navidad en Nochebuena** – they eat Christmas dinner on Christmas eve

Pavo trufado de Navidad – turkey stuffed with truffles

Polvorones – almond biscuits

Turrón – nougat usually containing almonds

Roscón de Reyes – traditional cake. Usually contains a coin

La fiesta que me interesa más es el Día de los Muertos	The festival that interests me most is the Day of the Dead
que se celebra en México en noviembre.	which is celebrated in Mexico in November.
Es una fiesta para recorder los seres queridos muertes	It's a festival to remember dead loved ones
y la gente decora las tumbas y las casas	and the people decorate graves and houses
con áltares, velas y flores.	with altars, candles and flowers.
La gente ve desfiles y lleva disfraces y	People watch processions and wear costumes
me parece una fiesta con mucha tradición.	and it seems like a very traditional festival.
Además, siempre he soñado con ir a España	Also, I've always dreamed of going to Spain
para ver una corrida de toros	to watch a bullfight
sin embargo pienso que es un poco anticuado	however I think that it's a bit old fashioned
y mucha gente dice que es una tradición cruel.	And lots of people say it's a cruel tradition

A model text on festivals

Festivals

La fiesta de… – the festival of…

Esta tradición antigua – this old tradition

se celebra en… – is celebrated in…

España – Spain

México – Mexico

muchos países hispanohablantes – in lots of Spanish speaking countries

Inglaterra – English

donde – where

se queman figuras de madera – wooden figures are burnt
se construyen hogueras – bonfires are built
se disparan fuegos artificiales – fireworks are set off
se lanzan huevos/tomates – eggs/tomatoes are thrown

las calles se llenan de… – the streets are filled with…

niños – children
jóvenes – young people
familias – families

la gente – the people

come manzanas de caramelo – eat toffee apples
decora las casas/las tumbas – decorate houses/graves
con flores/velas – with flowers/candles
prepara linternas/áltares – prepare lanterns/altars
ve desfiles – watch processions
lleva disfraces – wear costumes
lleva un pañuelo rojo – wear a red scarf
huye de un grupo de toros – run away from a group of bulls

un hombre – a man

lucha contra un toro – fights a bull

LAS FIESTAS

It's a great idea to know about these festivals as it's a common topic in all exams! (They're also really interesting!)

El Día de Muertos

31st October - 2nd November: Mexico

Día de Muertos is a festival that celebrates the memory of deceased loved ones. It isn't a day of sadness but a day of remembrance and celebration. The people believe the spirits come and join them to celebrate.

The people create altars to invite the spirits to come back for a visit and graves are decorated with brightly painted skulls, candles, flowers and food such as sugar skulls or "pan de muerto".

Sometimes there are parades and people dress as brightly coloured skeletons.

ofrendas - altars	pan de muerto - sweet bread bun
calacas - skeletons	las tumbas - graves
calaveras - skulls	velas - candles

A video explaining Día de Muertos

La Tomatina

Last Wednesday in August: Buñol, Spain

La Tomatina is basically a big tomato fight! On the last Wednesday in August, at around 10am, a large ham is hung at the top of a tall greased pole and the objective it to be the first person to get to the top, usually while also being blasted with water.

As soon as the ham is retrieved, the first pistol goes off and the tomato fight starts! Approximately 150,000 tomatoes are thrown and the fight must stop as soon as the second pistol fires.

It's said to have originated in 1945 when two farmers got into an argument at the mark and started throwing tomatoes at each other.

El palo jabón - greased pole
Un jamón - a ham
Una lucha - a fight

A video explaining La Tomatina

Los sanfermines

6th July - 14th July: Pamplona, Spain

This week long festival commemorates the patron saint of Pamplona, Saint Fermín.

The most famous part of the festival is the running of the bulls which takes place every day at 8am. The route is only 825 metres and usually lasts around 4 minutes and ends at the town's bull ring. There have been 16 deaths since 1910.

Every afternoon there is a bullfight with 6 of the bulls from the running in the morning. Despite debate across Spain about the ethics of bullfights, these are usually sold out every day.

El encierro - the bullrun	la corrida - the bullfight
El torero - the bullfighter	peligroso - dangerous
Un pañuelo - a scarf	

A video explaining the festival

Inti Raymi

24th June: Cusco, Peru

Inti Raymi is a festival from Peru's Inca history, worshipping their sun god "Inti" and to celebrate the new year in the Andes. Originally it was filled with colourful parades and processions and also animal sacrifices to ensure a good harvest for the following year but it was banned by the Spanish after Peru was conquered as it wasn't a Catholic festival.

It was reinstated in 1944 and now indigenous actors play the roles of Sapa Inca (the Sun King) and his wife. The Sun King delivers a speech praising the sun before being carried by pallbearers with woven aya huma masks in a golden chariot to the ruinous temple of Sacsayhuamán. A procession follows the chariot, with actors playing the roles of Incan nobles, priests and town folk. Local women layer the path with exotic flowers and sweep the route to keep it free of evil spirits. There is a fake sacrifice of a llama (no animals are hurt) and the future of the next season's crop is read in the (fake) blood by the Sun King.

Colorido - colourful	una procesión - a procession
Indígena - indigenous	un dios - a god
Un sacrificio - a sacrifice	un discurso - a speech
Fue prohibido - it was banned	la cosecha - the harvest
Católico - Catholic	el templo - the temple

A video showing Inti Raymi

Key questions

¿Has experimentado algún fiesta española/latina? - Have you experienced a Spanish/Latin American festival?

¿Qué piensas de las fiestas españolas/latinas? - What do you think of Spanish/Latin American festivals?

¿Qué fiesta española/hispánica te interesa más? - Which Spanish/Latin American festival interests you most?

¿Qué pasa durante...? - What happens during...?

Year 11 Mathematics Knowledge Organiser (Term 3 – Unit 68-72)

Similar shapes – Length (MW – 144)

Always divide 2 corresponding values to find the scale factor then

- Multiply by it to find a larger value
- Divide by it to find a smaller value

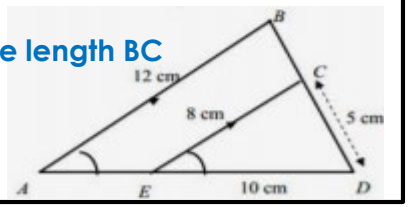
Example

To calculate the length BC

$SF = \frac{12}{8} = 1.5$

5 x 1.5 = 7.5

7.5 – 5 = 2.5cm



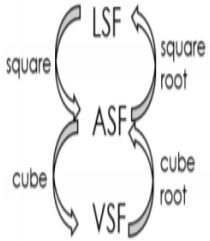
Similar shapes – lengths, area and volumes (MW 200)

When a problem involves length, area and volume you may have to change the scale factor.

LSF = length scale factors

ASF = area scale factors

VSF = volume scale factor



Describing Transformations (MW – 182)

Give the following information when describing each transformation: Look at the number of marks in the question for a hint of how many pieces of information are needed. If you are asked to describe a 'transformation', you need to say the **name of the type of transformation** as well as the other details.

Example

- Translation, Vector

- Rotation, Direction, Angle, Centre

- Reflection, Equation of mirror line

- Enlargement, Scale factor, Centre of enlargement

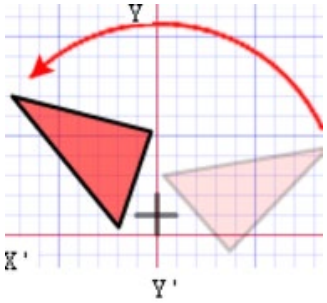
Rotation (MW – 49)

The size does not change, but the **shape is turned around a point**.

Use tracing paper.

Example

Rotate Shape A 90° anti-clockwise about (0,1)



Enlargement (MW – 148)

The shape will get **bigger or smaller**.

Multiply each side by the **scale factor**.

Example

Scale Factor = 3 means

'3 times larger = multiply by 3'

Scale Factor = ½ means

'half the size = divide by 2

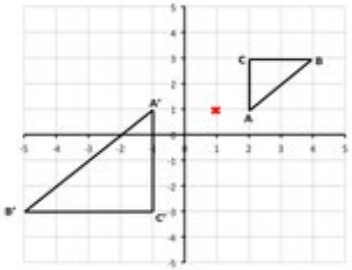
Negative Scale Factor Enlargements (MW – 148)

Negative enlargements will **look like they have been rotated**.

$SF = -2$ will be rotated, and also twice as big.

Example

Enlarge ABC by scale factor -2, centre (1,1)



Reflection (MW – 48)

The size does not change, but the shape is '**flipped**' like in a **mirror**.

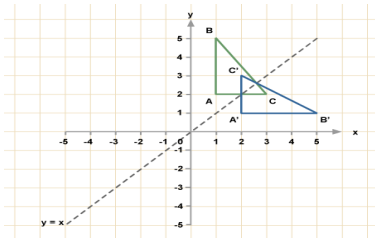
Line x =? is a **vertical line**.

Line y =? is a **horizontal line**.

Line $y = x$ is a **diagonal line**.

Example

Reflect shape C in the line $y = x$



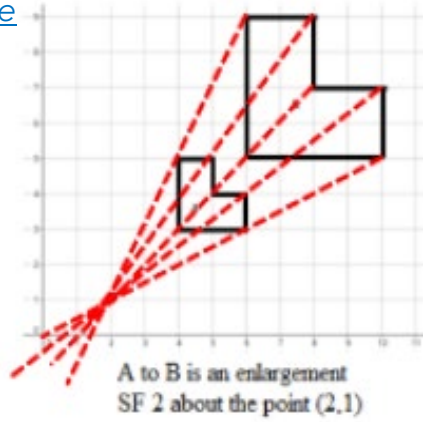
Finding the Centre of Enlargement (MW – 181a)

Draw **straight lines** through **corresponding corners** of the two shapes.

The centre of enlargement is the point **where all the lines cross over**.

Be careful with negative enlargements as the corresponding corners will be the other way around.

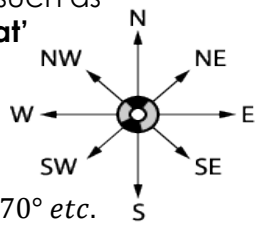
Example



Year 11 Mathematics Knowledge Organiser (Term 3 – Unit 39/40/41/42/43/44/45)

Compass Directions (MW 124)

You can use an acronym such as **'Never Eat Shredded Wheat'** to remember the order of the compass directions in a clockwise direction.



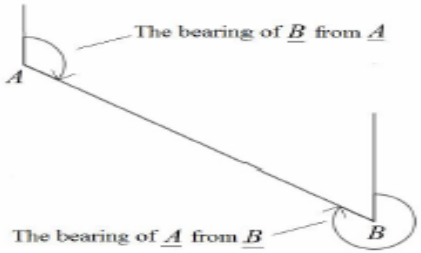
Bearings: $NE = 045°, W = 270°\ etc.$

Bearings (MW 124)

1. Measure from **North** (draw a North line)
2. Measure **clockwise**
3. Your answer must have **3 digits** (eg. 047°)

Look out for where the bearing is measured from.

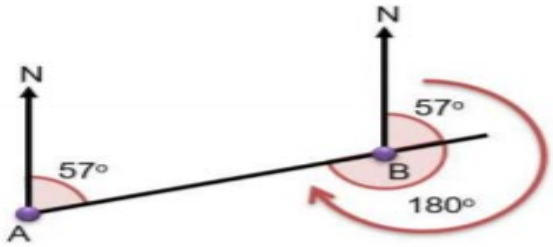
Example.



John runs from A to B and back again

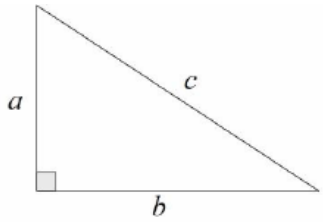
a) What is the bearing of his outward run from A to B?

b) What is the bearing of this return run from B to A? = 057° = 057° + 180° = 237°



Pythagoras' Theorem (MW 150a/b/c)

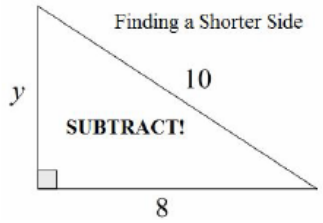
For any **right angled triangle**:



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

Used to find **missing lengths**.
a and b are the shorter sides, c is the **hypotenuse** (**longest side**).

Example.



$$a = y,\ b = 8,\ c = 10$$
$$a^2 = c^2 - b^2$$
$$y^2 = 100 - 64$$
$$y^2 = 36$$
$$y = 6$$

Trigonometry (MW 168)

The **study** of **triangles**.

Sides of a Right-Angle Triangle

Hypotenuse

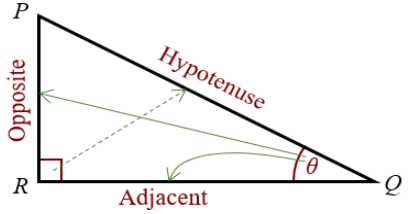
The longest side of a right-angled triangle.
Is always opposite the right angle.

Opposite

Side across from the Angle marked.

Adjacent

Next to the angle.



Trigonometric Formulae (MW 168)

Use **SOHCAHTOA**.

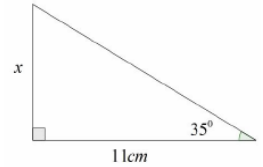
$$\sin\theta = \frac{O}{H} \qquad \cos\theta = \frac{A}{H} \qquad \tan\theta = \frac{O}{A}$$

When finding a missing angle, use the 'inverse' trigonometric function by pressing the 'shift' button on the calculator.

Example.

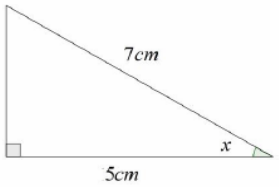
Use *Opposite* and *Adjacent*, so use *'tan'*

$$tan\,35 = \frac{x}{11}$$
$$x = 11\,tan\,35 = 7.70cm$$



Use *Adjacent* and *Hypotenuse*, so use *cos*

$$cos\,x = \frac{5}{7}$$
$$x = cos^{-1}\left(\frac{5}{7}\right) = 44.4°$$



Year 11 Higher (Set 1) Mathematics Knowledge Organiser

Direct Proportion (algebra)

Direct: $y = kx$ or $y \propto x$

1. Solve to find k using the pair of values in the question.
2. Rewrite the equation using the k you have just found.
3. Substitute the other given value from the question in to the equation to find the missing value.

Example:

p is directly proportional to q. When p = 12, q = 4.
Find p when q = 20.

1. p = kq
   12 = k x 4
   so k = 3

2. p = 3q

3. p = 3 x 20 = 60, so p = 60

ANSWER: **p = 60** and **q=120** (3 x 60)

Indirect Proportion (algebra)

Direct: $y = kx$ or $y \propto x$

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2. p = 3q

3. p = 3 x 20 = 60, so p = 60

ANSWER: **p = 60** and **q=120** (3 x 60)

Congruence

Shapes are congruent if they are identical - same shape and same size.
Shapes can be rotated or reflected but still be congruent.

Similar

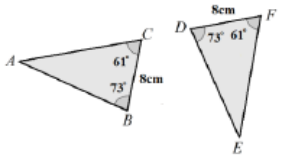
Shapes are similar if they are the same shape but different sizes.
The proportion of the matching sides must be the same, meaning the ratios of corresponding sides are all equal

Proving Congruence

4 ways of proving that two triangles are congruent:

1. SSS (Side, Side, Side)
2. RHS (Right angle, Hypotenuse, Side)
3. SAS (Side, Angle, Side)
4. ASA (Angle, Side, Angle) or AAS

Example:



$BC = DF$
$\angle ABC = \angle EDF$
$\angle ACB = \angle EFD$
$\therefore$ The two triangles are congruent by AAS.

Proving similarity

To show that two triangles are similar, show that:
1. The three sides are in the same proportion
2. Two sides are in the same proportion, and their included angle is the same
3. The three angles are equal

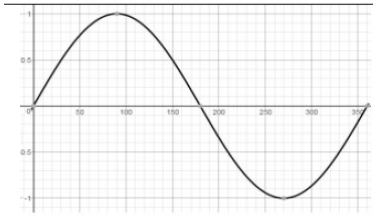
Year 11 Higher (Set 1) Mathematics Knowledge Organiser

Trigonometry Exact Values

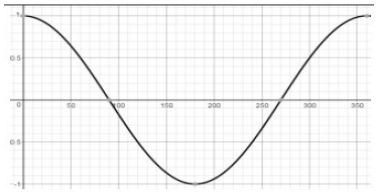
	0°	30°	45°	60°	90°
sin	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
cos	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
tan	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	----

Trigonometry Graphs

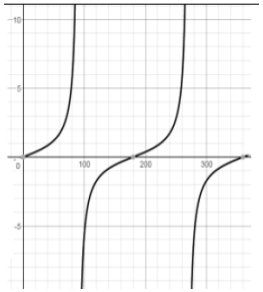
$y = \sin(x)$ for $0 \leq x \leq 360^o$



$y = \cos(x)$ for $0 \leq x \leq 360^o$



$y = \tan(x)$ for $0 \leq x \leq 360^o$

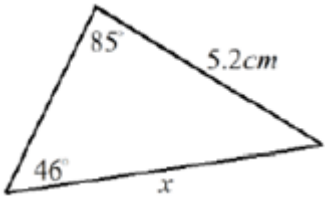


Sine Rule

Use with non right angle triangles.
Use when the question involves 2 sides and 2 angles.

For missing side:

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

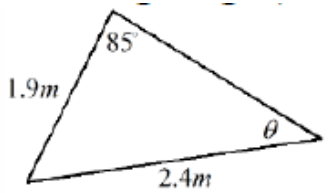


$$\frac{x}{\sin 85} = \frac{5.2}{\sin 46}$$

$$x = \frac{5.2 \times \sin 85}{\sin 46} = 3.75cm$$

For missing angle:

$$\frac{\sin A}{a} = \frac{\sin B}{b}$$



$$\frac{\sin\theta}{1.9} = \frac{\sin 85}{2.4}$$

$$\sin\theta = \frac{1.9 \times \sin 85}{2.4} = 0.789$$

$$\theta = \sin^{-1}(0.789) = 52.1°$$

Cosine Rule

Use with non right angle triangles.
Use when the question involves 3 sides and 1 angle.

.

For missing side:

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

For missing angle:

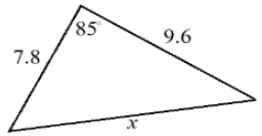
$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

Year 11 Higher (Set 1) Mathematics Knowledge Organiser

Cosine Rule (missing side)

For missing side:

$$a^2 = b^2 + c^2 - 2bc\cos A$$

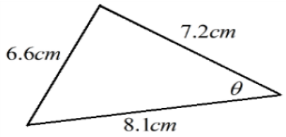


$$x^2 = 9.6^2 + 7.8^2 - (2 \times 9.6 \times 7.8 \times \cos 85)$$

$$x = 11.8$$

Cosine Rule (missing angle)

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

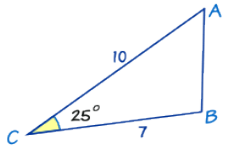


$$\cos\theta = \frac{7.2^2 + 8.1^2 - 6.6^2}{2 \times 7.2 \times 8.1}$$

$$\theta = 50.7°$$

Area of triangle

Area of a Triangle = $\frac{1}{2}\,ab\sin C$



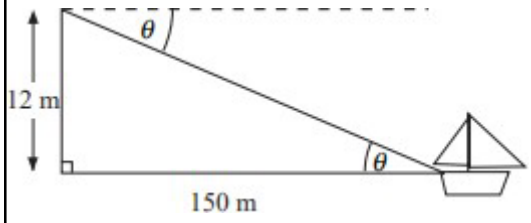
$$\frac{1}{2} \times 7 \times 10 \times \sin 25$$

$$A = 14.8$$

Trig Problem Solving

A man looks out to sea from a cliff top at a height of 12 metres. He sees a boat that is 150 metres from the cliff. What is the angle of depression?

The problem can be represented as this diagram…



We will use SOHCAHTOA as a right angled triangle is involved. Tan is the trig ratio that will apply (hypotenuse is not needed).

$$\tan\theta = \frac{\text{opposite}}{\text{adjacent}}$$

$$\tan\partial = \frac{12}{150}$$

$$\tan^{-1}\left(\frac{12}{150}\right)$$

$$\partial = 4.6$$

Sampling

Population: the whole group that is being studied.

Sample: a selection taken from the population that will let you find out information about the larger group.

Representative: a sample group that accurately represents the population.

Random sample: a group completely chosen by change. No predictability to who it will include.

Bias: a built-in error that makes all values wrong by a certain amount.

Stratified Sampling

Stratified sampling is used to select a sample that is representative of different groups. The aim is to find a proportional sample based on the group size.

$$\frac{\text{number in category}}{\text{total}} \times \text{sample size}$$

Year 7	Year 8	Year 9
120	80	100

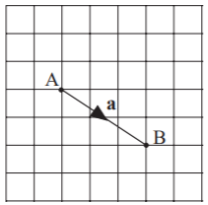
Miss Holland wants to take a stratified sample of 15 students. How many Year 7's should she survey?

$$\frac{120}{300} \times 15 = 6$$

Miss Holland should survey 6 students from year 7

Year 11 Higher (Set 2) Mathematics Knowledge Organiser

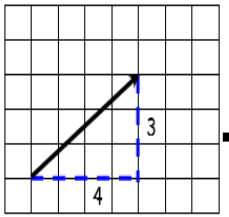
Vectors describe a movement.
A vector has a direction and a distance.



This diagram shows the vector:

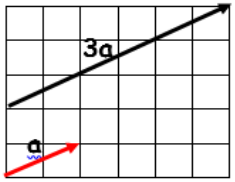
$$\vec{AB} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$$

Magnitude
Magnitude is defined as the **length** of a vector.
Example



Magnitude (length) can be calculated using Pythagoras Theorem:
$3^2 + 4^2 = 25$
$\sqrt{25} = 5$

Scalar of a Vector
A **scalar** is the **number** we **multiply** a vector by.

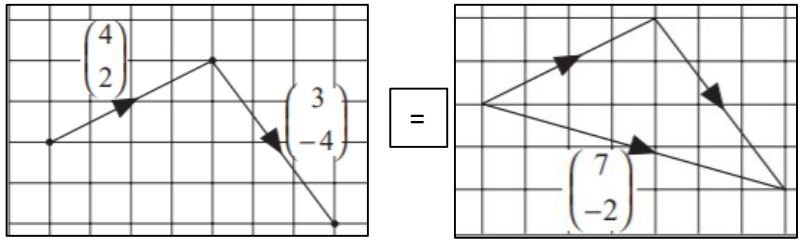


Example

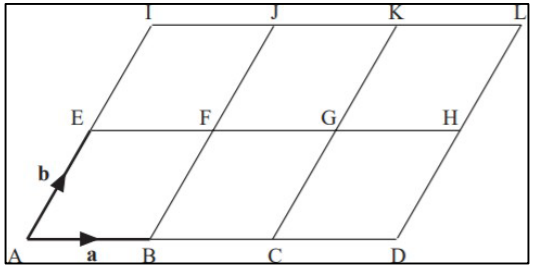
$3a + 2b =$
$= 3\begin{pmatrix} 2 \\ 1 \end{pmatrix} + 2\begin{pmatrix} 4 \\ -1 \end{pmatrix}$
$= \begin{pmatrix} 6 \\ 3 \end{pmatrix} + \begin{pmatrix} 8 \\ -2 \end{pmatrix}$
$= \begin{pmatrix} 14 \\ 1 \end{pmatrix}$

You can add vectors to get a resultant vector as seen below:

$$\begin{pmatrix} 4 \\ 2 \end{pmatrix} + \begin{pmatrix} 3 \\ -4 \end{pmatrix} = \begin{pmatrix} 7 \\ -2 \end{pmatrix}$$



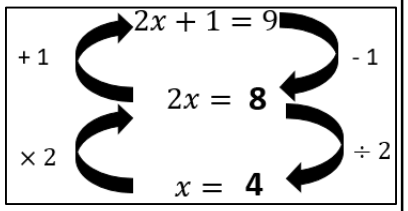
Vectors can be used to describe movements in Geometry as seen below:



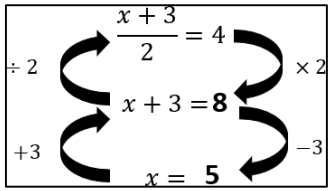
For the diagram on the left:

$\vec{AC} = 2\mathbf{a}$
$\vec{AF} = \mathbf{a} + \mathbf{b}$
$\vec{AL} = 3\mathbf{a} + 2\mathbf{b}$
$\vec{LE} = -3\mathbf{a} - \mathbf{b}$

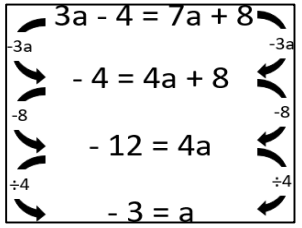
Solving Two Step Equations Finding the value of an unknown, by identifying operations performed and doing the inverse operation:



Solving Equations involving fractions
Finding the value of an unknown. To eliminate a denominator, multiply every term by the denominator:



Solving Equations with unknowns on both sides
Add/subtract the smallest algebraic term from both sides:



Year 11 Higher (Set 2) Mathematics Knowledge Organiser

Forming Equations / Formulae

Substitute letters for words in the question.

Example

Bob charges £3 per window and a £5 call out charge.

$$C = 3N + 5$$

N=number of windows and C=cost

Simultaneous Equations

Finding solutions that work in two (or more) equations at the same time, like the ones below…

$$x + 2y = 8$$
$$2x + y = 7,$$

is called solving simultaneous equations.

Simultaneous Equations (substitution)

The idea here is to rearrange one of the equations into the for y=. Then substitute this equation into the other equation.

$$y - 2x = 3$$
$$3x + 4y = 1$$

Rearrange: $y - 2x = 3 \rightarrow y = 2x + 3$

Substitute: $3x + 4(2x + 3) = 1$

Solve: $3x + 8x + 12 = 1$

$$11x = -11$$
$$x = -1$$

Substitute: $y = 2 \times -1 + 3$

$$y = 1$$

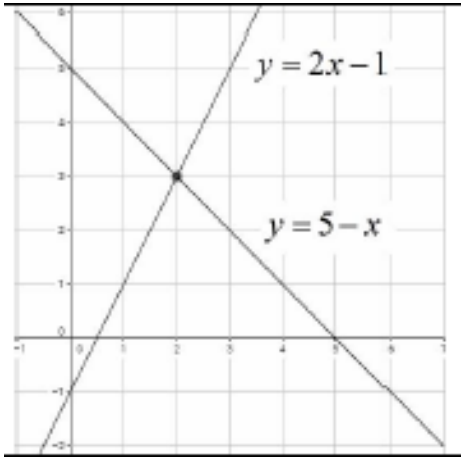
Solution: $x = -1, y = 1$

Solving Simultaneous Equations (Graphically)

Draw the graphs of the two equations.
The **solutions** will be **where the lines meet**.
The solution can be written as a **coordinate**.

Example

$y = 5 - x$ and $y = 2x - 1$.



They meet at the point with coordinates (2,3) so the answer is $x = 2$ and $y = 3$

Simultaneous Equations

First label the equations

$$x + 2y = 8 \quad (1)$$
$$2x + y = 7 \quad (2)$$

Then multiply to match the coefficients (the number before the letter)

$$2x + 4y = 16 \quad (3) \quad [2 \times (1)]$$
$$2x + y = 7 \quad (2)$$

Next add (or subtract) to remove an unknown

$$2x + 4y = 16 \quad (3)$$
$$2x + y = 7 \quad (2)$$
$$3y = 9 \quad (3) - (2)$$

Here, we can see that y=3.

Finally, substitute into a previous equation to calculate the other unknown. Here we used equation:

$$x + 2 \times 3 = 8$$
$$x + 6 = 8$$

We can see here that x=2

So x = 2 and y = 3.

Year 11 Higher (Set 2) Mathematics Knowledge Organiser

Proportion

Proportion compares the size of one part to the size of the whole.
Usually written as a fraction.

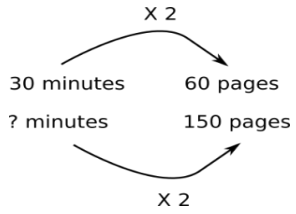
Example

In a class with 13 boys and 9 girls, the proportion of boys is $\frac{13}{22}$ and the proportion of girls is $\frac{9}{22}$

Proportional Reasoning

Comparing two things using multiplicative reasoning and applying this to a new situation.
Identify one multiplicative link and use this to find missing quantities.

Example



Best Buys

Find the unit cost by dividing the price by the quantity.
The lowest number is the best value.

Example

8 cakes for £1.28 → 16p each (÷by 8)
13 cakes for £2.05 → 15.8p each (÷by 13)
Pack of 13 cakes is best value.

Unitary Method

Finding the value of a single unit and then finding the necessary value by multiplying the single unit value.

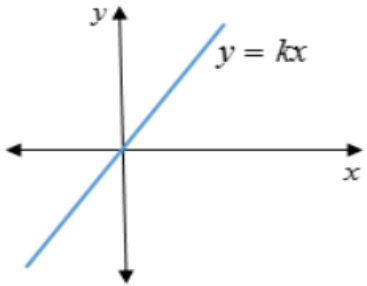
Example

3 cakes require 450g of sugar to make. Find how much sugar is needed to make 5 cakes.
3 cakes = 450g
So 1 cake = 150g (÷ by 3)
So 5 cakes = 750 g (x by 5)

Direct Proportion

If two quantities are in direct proportion, as one increases, the other increases by the same percentage. k is the ratio between x and y

Example



Y is directly proportional to x
When x = 500 y = 10
Calculate the value of y when x = 150
Y = k x
10 = 500k therefore k = 1 / 5 0
Y= 1 / 5 0 x
y =1 / 5 0 x 150 y = 3

Indirect proportion

If two quantities are in indirect proportion, as one increases, the other decreases by the same percentage.
$1/k$ is the ratio between x and y

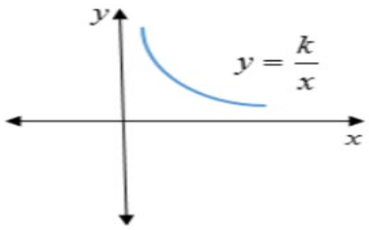
Example

P is inversely proportional to V
When P = 6 V = 8
Calculate the value of P when V = 2
P =k/v 6 = k/8
therefore k = 48
P = 48/2 P=24

Inverse proportion

If two quantities are inversely proportional, as one increases, the other decreases by the same percentage.
If y is inversely proportional to x, this can be written as $y \propto \frac{1}{x}$
An equation of the form $y = \frac{k}{x}$ represents inverse proportion.

Example



Level 1/2 Hospitality and Catering: Unit 2-2.1.1 -
Nutrition at different life stages & special dietary needs

Nutrition at different life-stages

Adults:

- **Early** – Growth in regard to height of the body continues to develop until 21 years of age. Therefore, all micro-nutrients and macro-nutrients especially carbohydrates, protein, fats, vitamins, calcium and iron are needed for strength, to avoid diseases and to maintain being healthy.
- **Middle** – The metabolic rate starts to slow down at this stage, and it is very easy to gain weight if the energy intake is unbalanced and there isn't enough physical activity.
- **Elderly** – The body's systems start to slow down with age and a risk of blood pressure can increase as well as decrease in appetite, vision and long-term memory. Because of this, it is essential to keep the body strong and free from disease by continuing to eat a healthy, balanced diet.

Children:

- **Babies** – All nutrients are essential and important in babies, especially protein as growth and development of the body is very quick at this stage. Vitamins and minerals are also important. You should try to limit the amount of salt and free sugars in the diet.
- **Toddlers** – All nutrients remain very important in the diet at this stage as growth remains. A variety of foods are needed for toddlers to have all the micro-nutrients and macro-nutrients the body needs to develop.
- **Teenagers** – The body grows at a fast pace at different times at this stage as the body develops from a child to an adult, therefore all nutrients are essential within proportions. Girls start their menstruation which can sometimes lead to anaemia due to not having enough iron in the body.

Special Dietary needs

Different energy requirements based on:

- Lifestyles / Occupation / Age / Activity level

The amount of energy the body needs is determined with each of the above factors e.g. active lifestyle or physical activity level would need more energy compared to a person being sedentary.

Medical conditions:

- **Allergens** – Examples of food allergies include milk, eggs, nuts and seafood.
- **Lactose intolerance** – Unable to digest lactose which is mainly found in milk and dairy products.
- **Gluten intolerance** – Follows a gluten free diet and eats alternatives to food containing wheat, barley and rye.
- **Diabetes (Type 2)** – High level of glucose in the blood, therefore changes include reducing the amount of fat, salt and sugar in the diet.
- **Cardiovascular disorder** – Needing a balanced, healthy diet with low levels of salt, sugar and fat.
- **Iron deficiency** – Needing to eat more dark green leafy vegetables, fortified cereals and dried fruit.

Dietary requirements:

- **Religious beliefs** – Different religions have different dietary requirements.
- **Vegetarian** – Avoids eating meats and fish but does eat dairy products and protein alternatives such as quorn and tofu.
- **Vegan** – Avoids all animal foods and products but can eat all plant-based foods and protein alternatives such as tofu and tempeh.
- **Pescatarian** – Follows a vegetarian diet but does eat fish products and seafood.

Level 1/2 Hospitality and Catering: Unit 2-2.1.1 -
Understanding the importance of nutrition

The importance of nutrition

Listed below are the macro-nutrients and micro-nutrients. You need to know their function in the body and know examples of food items for each. You need to know why they are needed in the diet and why there is a need for a balanced/varied diet.

Macro-nutrients

Carbohydrates - Carbohydrates are mainly used in the body for energy. There are two types of carbohydrates which are:

- **Starch** - Examples include bread, pasta, rice, potatoes and cereals.
- **Sugar** - Examples include sweets, cakes, biscuits & fizzy drinks.

Fat - This is needed to insulate the body, for energy, to protect bones and arteries from physical damage and provides fat soluble vitamins. There are two main types of fat which are:

- **Saturated fat** - Examples include butter, lard, meat and cheese.
- **Unsaturated fat** - Examples include avocados, plant oils such as sunflower oil, seeds and oily fish.

Protein - Protein is mainly used for growth and repair in the body and cell maintenance. There are two types of protein which are:

- **High biological value (HBV) protein** - Includes meat, fish, poultry, eggs, milk, cheese, yogurt, soya and quinoa.

- **Low biological value (LBV) protein** - Includes cereals, nuts, seeds and pulses.

Micro-nutrients

Vitamins

- **Fat soluble vitamin A** - Main functions include keeping the skin healthy, helps vision in weak light and helps children grow. Examples include leafy vegetables, eggs, oily fish and orange/yellow fruits.
- **Fat soluble vitamin D** - The main function of this micro-nutrient is to help the body absorb calcium during digestion. Examples include eggs, oily fish, fortified cereals and margarine.
- **Water soluble vitamin B group** - Helps absorbs minerals in the body, release energy from nutrients and helps to create red blood cells. Examples include wholegrain foods, milk and eggs.
- **Water soluble vitamin C** - Helps absorb iron in the body during digestion, supports the immune system and helps support connective tissue in the body which bind cells in the body together. Examples include citrus fruits, kiwi fruit, cabbage, broccoli, potatoes and liver.

Minerals

- **Calcium** - Needed for strengthening teeth and bones. Examples include dairy products, soya and green leafy vegetables.
- **Iron** - To make haemoglobin in red blood cells to carry oxygen around the body. Examples include nuts, beans, red meat and green leafy vegetables.
- **Sodium** - Controls how much water is in the body and helps with the function of nerves and muscles. Examples include salt, processed foods and cured meats.
- **Potassium** - Helps the heart muscle to work correctly and regulates the balance of fluid in the body. Examples include bananas, broccoli, parsnips, beans, nuts and fish.
- **Magnesium** - Helps convert food into energy. Examples include wholemeal bread, nuts and spinach.
- **Dietary fibre (NSP)** - Helps digestion and prevents constipation. Examples include wholegrain foods (wholemeal pasta, bread and cereals), brown rice, lentils, beans and pulses.
- **Water** - Helps control temperature of the body, helps get rid of waste products from the body and prevents dehydration. Foods that contain water naturally include fruits and vegetables, milk and eggs.

Level 1/2 Hospitality and Catering: Unit 2-2.1.2 -
How cooking methods can impact on nutritional value

Boiling

- Up to 50% of vitamin C is lost when boiling green vegetables in water.
- The vitamin B group is damaged and lost in heat.

Poaching

- The vitamin B group are damaged in heat and dissolve in water.

Roasting

- Roasting is a method of cooking in high temperatures and so this will destroy most of the group C vitamins and some of the group B vitamins.

Frying

- Using fat whilst frying increases the amount of vitamin A the body can absorb from some vegetables
- Cooking in fat will increase the calorie count of food e.g deep fat frying foods.

Stir-frying

- The small amount of fat used whilst stir-frying increases the amount of vitamin A the body can absorb from some vegetables.
- Some vitamin C and B are lost due to cooking in heat for a short amount of time.

Steaming

- Steaming is the best cooking method for keeping vitamin C in foods.
- Only up to 15% of vitamin C is lost as the foods do not come into contact with water.

Grilling

- Using this cooking method can result in losing up to 40% of group B vitamins.
- It is easy to overcook protein due to the high temperature used in grilling foods.

Baking

- Due to high temperatures in the oven, it is easy to overcook protein and damage the vitamin C and B group vitamins.

Level 1/2 Hospitality and Catering: Unit 2: 2.2.1 Factors affecting menu planning – Environmental issues

Sustainability

Many diners are interested in hospitality and catering provisions that provide sustainable dining.

The aim of the three Rs of sustainability is to conserve natural resources and prevent excess waste. By following the rules of reduce, reuse, and recycle, hospitality and catering provisions can save money at the same time as attracting more diners and bringing in more profit.

Sustainability also means buying local produce, using organic ingredients, buying meat and poultry from farm assured producers who guarantee better welfare for the animals, using Marine Stewardship Council sustainable fish and offering meat-free versions of favourite dishes.

Reduce

Food waste: If food and waste were its own country, it would be the third largest producer of greenhouse gas in the world! If it cannot be used to make new dishes or given away, then as much food waste as possible should be composted.

Energy use: Hospitality and catering provisions can save energy in many ways including using low-energy lighting, maintaining and upgrading equipment, putting lids on saucepans, batch baking and cooking.

Food miles: Using local suppliers means that the food does not have to travel as far from 'field to fork'.

Water usage: Use less in cooking by only just submerging vegetables or using a steamer. Use an energy and water efficient dishwasher.

Reuse

Food that is past its best, for example a brown banana, or scraps such as bones can be used to create new dishes which in turn will decrease food waste. www.lovefoodhatewaste.com has a vast range of recipe ideas for using surplus food.

- Bread: breadcrumbs, bread and butter pudding, bread sauce and croutons.
- Meat and poultry: bones can be used to make stocks.
- Fruit: banana muffins, apple crumble, fruit coulis, smoothies.
- Vegetables: bubble and squeak, vegetable stock, vegetable bakes, omelettes.
- Eggs: whites can be used to make meringue; yolks can be used to make mayonnaise.

Recycle

Many hospitality and catering provisions have separate bins for recyclable materials. Professional kitchens should also have areas to separate waste into recyclable, non-recyclable and compostable materials. All staff should be trained to know how to dispose waste correctly.

Coffee grounds can be composted. Compost can be used to grow fruit, vegetables and herbs for use in the kitchen.

Jars and plastic containers can be used for storage in the kitchen. Glass bottles can be used to hold flowers or candles as table decorations.

Too Good To Go, Karma and *Olio* are apps used by restaurants and supermarkets. Customers can buy discounted food which would otherwise go into landfill.

Level 1/2 Hospitality and Catering – Unit 2-2.2.2:
How to plan production

You need to be able to plan dishes for a menu as well as know, understand and include the following:

Commodity list with quantities

This means naming all the ingredients needed to make all dishes and how much of each one e.g. grams (g), ounces (oz), millilitres (ml), etc.

Timing

You need to state realistic timings of how long each step is likely to take throughout your plan to give accurate information of how long your dishes take to complete.

Contingencies

This means stating, in the plan, what you would do to deal with a problem if something were to go wrong.

Mise en place

This is all the preparation you undertake before cooking. Examples of this include weighing out ingredients, collecting equipment and washing hands.

Equipment list

Naming all pieces of equipment you would need to cook the dishes, which also includes specialist equipment such as pasta machines and ice cream makers as well as saucepans, chopping boards, knives, etc.

Cooking

Throughout your plan, you will need to state how you ensure food is cooked correctly, e.g. chicken is white in the middle, using a temperature probe, etc.

Health, safety and hygiene

Stating in the plan, points regarding the health, safety and hygiene. The use of temperature probes to ensure foods are cooked, correctly using colour coded chopping boards or washing hands after handling raw meat are a few examples.

Cooling and hot holding

Cooling dishes correctly within 1.5hrs to 8 degrees and keeping hot dishes for service at 63 degrees should be mentioned in your plan for relevant dishes, as well as how you would ensure these temperatures are met, e.g. by using temperature probes.

Quality points

These include naming any quality points to consider in the preparation, cooking and serving stage of the plan. Examples could include checking foods are in use by/best before dates, dishes are cooked to minimum temperatures, ingredients stored in correct places and correct temperature, etc.

Serving

Once you have finished cooking your dish or dishes, you need to state how you would present your dish/dishes, e.g. on plate, bowl, etc., as well as what decoration, garnishes and sauces you include before serving.

Sequencing or dovetailing

This means you fit together the different steps and activities in logical order when planning to cook more than one dish.

Storage

In your plan, you should state where different kinds of ingredients need to be stored, e.g. raw chicken in the fridge or frozen fruit in the freezer and at what temperatures these pieces of equipment need to be (fridge needs to be 0–5 degrees and freezer needs to be -18 degrees).

Level 1/2 Hospitality and Catering: Unit 2: 2.3.2 Presentation techniques

Creativity

It is said that 'we eat with our eyes'. Creativity in plating dishes enhances the diner's experience – diners want to be 'wowed' when their meal appears!

Serving dishes: Start with the plate – varied sizes, shapes and colours can add immediate impact to your dish. Dishes served in bowls or dessert glasses should be placed on a plate to aid serving.

Elements: Each dish will consist of several elements – the main protein, accompaniments, garnish and decoration.

Volume: Do not overcrowd the plate – leave some space so that the diner can see each element of the dish. The rule of thumb is that only two-thirds of the plate should be full.

Height: Food can be stacked to add height to the overall dish, but each element should be visible.

Colour: Accompaniments, garnishes and decoration can add colour to dishes where the main elements are similar in colour. An example is fish and chips: bright green peas and a slice of yellow lemon will enhance the overall appearance of the meal.

Functionality: The dish should be beautiful to look at, but easy for the diner to eat.

Temperature: Hot food should be served on hot plates. Cold food should be served on chilled plates.

Accompaniments

Accompaniments should be chosen to complement the main part of the dish. Examples include:

Carbohydrate accompaniments:

- Savoury: bread, dauphinoise potatoes, pilau rice.
- Sweet: shortbread, brandy snaps, macaron.

Fruit and vegetable accompaniments:

- Savoury: pea purée, roasted root vegetables, griddled asparagus.
- Sweet: berry compote, fruit kebabs, grilled peaches.

Sauces:

- Savoury: gravy, red wine jus, parsley sauce.
- Sweet: custard, salted caramel sauce, chocolate sauce.

Portion control

It is important that the customer is satisfied with their portion without the plate being overcrowded. Keeping portion control accurate allows hospitality and catering provisions to order adequate supplies of ingredients. Accurate portion control will also help prevent food waste.

Garnish

Garnishes are additions to a dish which both add to the overall taste and enhance the overall appearance.

Savoury: parmesan crisps, crispy onions, caviar, watercress, lemon wedges, fresh herbs, salsa, edible flowers.

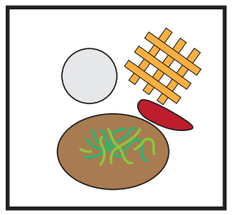
Sweet: chocolate dipped strawberries, tuile biscuits, chopped nuts, tempered chocolate work, spun sugar work, edible flowers.

Decoration

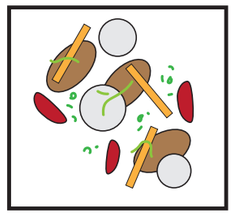
Decoration adds drama to the finished dish but it is not meant to be eaten or add to the overall flavour of the dish. Examples include:

- whole spices added to pilau rice
- gold leaf
- hollow eggshell as serving dish.

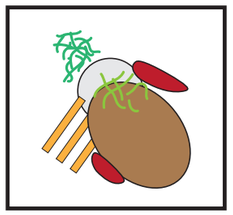
Plating styles



Classic



Freeform



Landscape

Food safety practices

During your practical session, you must demonstrate that you can work safely and hygienically. Your plan should show that you have thought about food safety and hygiene during all parts of your practical session. Your personal safety and hygiene practices will be observed during your practical session.

Personal safety and hygiene practices

Hands:

- Wash before, during and after preparing food especially after touching raw meat, dirty vegetables and fridge handles.
- Wash after going to the toilet.
- Wash after sneezing or blowing your nose.
- Wash after disposing of waste.

Clothing and hair:

- Clean apron and/or chef's whites.
- Non-slip closed-toe shoes.
- Tie hair back.
- Wear a bandana or hair net.

Cuts:

- Cover with a blue, waterproof plaster.

Equipment:

- Handle knives safely.
- Use oven gloves when carrying hot items.
- Keep electrical equipment away from water.
- Clean spills immediately.

Food safety and hygiene practices

Ingredients:

- Check use-by and best before dates.
- Check ingredients for freshness; no bruises on fruit, fish should not smell.
- Store correctly until needed.

Cleaning:

- Clean worktops before preparation.
- Clean workstation and equipment after preparing high-risk foods.
- Wash up throughout the session – do not leave it all until the end!

Temperatures:

- Keep high-risk foods in the fridge (0°C – 5°C) until needed.
- Use a temperature probe to check core temperature of high-risk foods.

Waste management:

- Keep waste separate from ingredients during preparation, cooking and serving.
- Recycle and compost waste if possible.

Management of accidents

- Ensure that you know the location of the First Aid box.
- Ensure that you know how to use a fire blanket or fire extinguisher.

Level 1/2 Hospitality and Catering: Unit 2: 2.4.1 Reviewing of dishes

Dish production

- Were you able to keep to your time plan?
- Did you have any problems during the practical? How did you resolve them?

Dish selection

- Did your dishes contain the right nutrients for your two groups?
- Were they expensive or cheap to produce?
- Did they contain seasonal or local produce?

Organoleptic

How did your dishes:

- Look (appearance)?
- Taste (flavour and texture)?
- Smell (aroma)?

Hygiene

- Did you follow all hygiene guidelines?
- Did you wear correct PPE?
- Did you wash up between jobs?

Reviewing of dishes

PEE: **P**oint, **E**vidence, **E**xplain

You need to write a self-reflection of how you performed during your practical session. There are 8 areas to consider when you write your review of your dishes.

Presentation

- Were the portions the right size for your two groups?
- How did you add colour to your dishes?
- Were your garnishes and decorations appropriate?

Health and safety

- Were you able to use equipment safely?
- Did you store ingredients correctly?

Waste

- Did you separate your waste into categories? (Food waste, recyclable materials, general waste.)
- Did you buy the right amount of ingredients?

Improvements

- If you made your dishes again, what would you do differently?
- If you had to do the task again, would you change your choice of dishes?
- Would you add additional accompaniments?

Level 1/2 Hospitality and Catering: Unit 2: 2.4.2 Reviewing own performance

Decision making

- What were your strengths in completing the written tasks?
- What were your strengths in choosing dishes?
- How could you improve weak decisions?
- Were the dishes easy to make together?
- What were the disadvantages of the chosen dishes?
- Did your dishes meet the needs of the provision?
- Did your dishes meet the needs of your two groups (nutrition and cost)?

Planning

Was the practical session plan in a logical order?

- Discuss your strengths.
- Discuss your weaknesses.
- Suggest improvements.

Were you able to keep to the plan during the practical session?

- Discuss your strengths.
- Discuss your weaknesses.
- Suggest improvements.

Organistation

How did you organise your written tasks?

- Discuss your strengths.
- Discuss your weaknesses.
- Suggest improvements.

How did you organise your workstation during the practical session?

- Discuss your strengths.
- Discuss your weaknesses.
- Suggest improvements.

Time management

How did you manage your time when completing the written tasks?

- Discuss your strengths.
- Discuss your weaknesses.
- Suggest improvements.

How did you manage your time during the practical session?

- Discuss your strengths.
- Discuss your weaknesses.
- Suggest improvements.

Level 1/2 Hospitality and Catering:
Unit 2-2.2.1: Factors affecting menu planning

Factors affecting menu planning

You need to be aware of the following factors when planning menus:

- **cost** (ingredients as well as business costs)
- **portion control** (value for money without waste)
- **balanced diets/current national advice**
- **time of day** (breakfast, lunch, and dinner menus as well as small plates and snacks)
- **clients/customers** (a menu with prices that will suit the people who visit your establishment).

Equipment available

You need to know and understand the type of equipment needed to produce a menu. The choice of dishes will be influenced by the equipment available to the chef.

This includes kitchen equipment such as:

- hobs, ovens, and microwaves
- fridge, freezer and/or blast chiller
- specialist equipment, for example a *sous vide* or pizza oven
- hand-held equipment, for example electric whisks or hand-blenders
- other electric equipment, for example food processors.

Skills of the chef

The skills of the chef must be suited to the type of provision and the menu offered.

A Michelin starred restaurant will require a chef who has complex skills in preparation, cooking and presentation of dishes.

A café will require a chef who has a range of medium and complex skills to produce a suitable menu.

A large restaurant will normally have a full kitchen brigade while a smaller establishment may only have a single chef with one or two assistants.

Time available

The type of provision will influence the amount of time a customer may be willing to wait for their dish to be prepared. Can the chef prepare, cook, and present more than one dish at the same time? Can some items be made in advance?

Time of year

The time of year can affect menu choices. Light and cold dishes such as salads are better suited to the summer months. Hearty dishes such as stews are more suited to the winter. Special dishes linked to holidays such as Christmas and Valentine's Day may also be included. The availability of **seasonal** produce can also affect menu choices as certain commodities, for example strawberries, are less expensive when in season.

Environmental issues

The chef will need to think about environmental issues when planning a menu. Can the chef **reduce** the amount of ingredients bought as well as reducing food waste? Can the chef **reuse** ingredients to create new dishes for example stale bread made into bread-and-butter pudding? Can the kitchen **recycle** waste wherever possible? Running the kitchen sustainably will save money.

Organoleptic properties

Organoleptic properties are the sensory features of a dish (**appearance**, **aroma**, **flavour**, and **texture**).

The chef will need to think about how the dish will look and taste. Is there a range of colours? Do the flavours go well together? Are there a variety of textures?

Level 1/2 Hospitality and Catering:
Unit 2-2.3.1: Practical skills and techniques

Skills and techniques

You need to be able to identify the different types of skills you need to produce your selected dishes. Some dishes will require the use of more complex skills. You will need to demonstrate a range of skills when producing your chosen dishes.

Preparation and cooking skills are categorised as follows: **basic**, **medium**, and **complex**.

Presentation

You should know and understand the importance of using the following appropriate presentation techniques during the production of dishes:

- creativity
- garnish and decoration
- portion control
- accompaniments.

Basic preparation skills and techniques

Blending, beating, chopping, grating, hydrating, juicing, marinading, mashing, melting, peeling, proving, sieving, tenderising, trimming, and zesting.

Medium preparation skills and techniques

Baton, *chiffonade*, creaming, dehydrating, deseeding, dicing, folding, kneading, measuring, mixing, puréeing, rub-in, rolling, skinning, slicing, spatchcocking, toasting (nuts/seeds) and weighing.

Complex preparation skills and techniques

Brunoise, crimping, de-boning, filleting, *julienne*, laminating (pastry), melting using *bain-marie*, mincing, piping, and segmenting, shaping, unmoulding and whisking (aeration).

Basic cooking skills and techniques

Basting, boiling, chilling, cooling, dehydrating, freezing, grilling, skimming, and toasting.

Medium cooking skills and techniques

Baking, blanching, braising, deglazing, frying, griddling, pickling, reduction, roasting, sautéing, steaming, stir-frying, and using a *sous vide* (water bath).

Complex cooking skills and techniques

Baking blind, caramelising, deep fat frying, emulsifying, poaching, and tempering.