

Y11 A Christmas Carol by Charles Dickens, Knowledge Organiser

Exam Paper Overview:

Literature Paper 2: A Christmas Carol is on the Literature Paper 2 exam. This part of the exam is usually 1 hour, however, this year you will have 1 hour 20 minutes to respond to the novel question.

Dickens' Intentions and Ideas

Dickens' writing criticised economic, social, and moral issues in the Victorian era. He showed compassion and empathy towards the vulnerable and disadvantaged people in English society, and help to bring about several important social reforms. Dickens' deep social commitment and awareness of social issues come from his traumatic childhood, where his father was imprisoned for debt, and he was forced to work in a shoe-blackening factory at 12 years old. In his adult life, Dickens developed a strong social conscience and empathised with the victims of social and economic injustice. Dickens' intention in A Christmas Carol is to draw readers' attention to the plight of the poor and to highlight the hypocrisy of Victorian society. He juxtaposes the wealth and greed of capitalists with the poorer classes and draws attention to the way in which the greed and selfishness of some impacts on the quality of the lives of others. His moral message appears to be that we should care for our fellow man. The transformation of Scrooge suggests that Dickens feels it is never too late for change and redemption. Dickens emphasises the importance of family, friendship and charity in bringing about this change.

Stave Summaries

Stave 1	Stave 2	Stave 3	Stave 4	Stave 5
<p>1. Introduced to Ebenezer Scrooge on Christmas Eve. He is a lonely miser obsessed with money. He won't pay to heat the office properly – meaning Bob Cratchit is very cold.</p> <p>2. We learn Jacob Marley, Scrooge's business partner, died exactly 7 years earlier.</p> <p>3. Scrooge is irritated that Christmas Day seems to be interrupting his business.</p> <p>4. Scrooge is visited by his nephew Fred, who invites his uncle to Christmas dinner. Scrooge refuses.</p> <p>5. Scrooge is visited by two charity workers, asking for donations. Scrooge refuses and exclaims he wants to be left alone.</p> <p>6. Scrooge allows Bob to have Christmas Day off.</p> <p>7. Scrooge, when he is home, is visited by the Ghost of Jacob Marley – warning him he will be visited by three more ghosts to help him change his ways.</p>	<p>1. Scrooge is visited by the Ghost of Christmas Past who takes him to witness his past.</p> <p>2. Scrooge is taken first to his schoolboy years and he is reminded how his friends would go home from Christmas while he was left at school.</p> <p>3. We see him with his sister, who one year took him home for the holidays.</p> <p>4. Next we are shown Scrooge as a young apprentice, working for Fezziwig. Dickens describes the Christmas ball Fezziwig organised for his employees.</p> <p>5. Finally, Scrooge is taken to see his ex-fiancée, Belle. We see the scene when they break up, as money has taken over Scrooge's life.</p> <p>6. Scrooge cannot bear to see any more and struggles with the spirit.</p>	<p>1. Scrooge is then visited by the Ghost of Christmas Present.</p> <p>2. The spirit shows Scrooge how the Cratchit family celebrate Christmas. Scrooge asked if Tiny Tim will live. The spirit explains unless there are changes, he will die. The spirit reminds Scrooge of his earlier words: 'If he is to die, he had better do it, and decrease the surplus population'</p> <p>3. Scrooge is then taken to see how others celebrate Christmas: miners, lighthouse workers, sailors on a ship.</p> <p>4. He is then taken to Fred's house at Christmas, where they are playing games.</p> <p>5. The spirit then begins to age, and see under the spirit's robes two children: Want and Ignorance.</p> <p>6. The Ghost of Christmas Future then appears</p>	<p>1. The Ghost of Christmas Future is described.</p> <p>2. The spirit takes Scrooge to see a group of businessmen discussing someone who has died.</p> <p>3. Scrooge is then taken to see Old Joe, where he is in the process of buying property of the dead man – which have been stolen.</p> <p>4. Scrooge then returns to Bob Cratchit's house, where it is revealed Tiny Tim has died.</p> <p>5. Scrooge is then taken to the graveyard and is shown a grave stone and realises this is for him.</p> <p>6. Scrooge falls to his knees and begs that he will change his ways.</p>	<p>1. Scrooge wakes up in his own bed.</p> <p>2. Scrooge wonders how much time has passed and calls to a boy. He then sends the boy to the poulterer for the prize turkey to give to Bob Cratchit,</p> <p>3. Scrooge meets one of the charity collectors from earlier and whispers to him that he will give a large donation.</p> <p>4. Scrooge then goes to Fred's house and is welcomed in. He enjoys the dinner and party.</p> <p>5. On Boxing Day, Scrooge arrives early to work, and plays a trick on Bob. Scrooge then tells him he is going to raise his salary and promises to help Bob's struggling family.</p> <p>6. Scrooge is described to have completely changed and becomes a 'second father' to Tiny Tim – 'who did not die.'</p>

Assessment Overview: Part A and Part B: 1 hour	Language	Structure and Form	Characters	Themes
<p>Part A: You are given an extract from the novella. You need to analyse how Dickens presents a character or relationship.</p> <p>Criteria: 3 paragraphs Clear point Embed evidence Include language, structure and form Explain what the quote shows Analyse the techniques Refer to reader</p> <p>Part B: After the extract, you are given a theme shown in the novella.</p> <p>You need to refer to events elsewhere in the novella which relate to that theme.</p> <p>Criteria: 3-4 paragraphs Clear point Event description Explain what the event shows Explain how it shows the theme Explain why it is significant Reader effect</p>	<p>Alliteration Triple Emphasis Satire- use of humour or ridicule to criticise Simile- comparing using 'like' or 'as' Metaphor- saying one thing is another Personification- make object human Pathetic fallacy- weather to create mood Pathos- language to evoke pity Allusion- reference to another literary work Hyperbole- exaggerated statement Connotation- associated meaning of word Characterisation- built up description of character in text Semantic field- words related in meaning Imagery- visually descriptive language. Noun: Name of person, place, thing Adjective: Describes noun Determiner: Gives information about the noun: <i>the/a/every/some</i> Abstract Noun: An idea/concept <i>love/anger</i> Concrete Noun: Something you can touch/hold Verb: Doing word Adverb: Describes verb Modal Verb: Gives information about the verb: <i>should/could/might</i> Imperative Verb: A command Pronoun: In place of noun <i>I/he/it/they</i> Preposition: Tells you where something is <i>on/over/under</i> Conjunction: A connective <i>and/or/but/although</i> Superlative: The most extreme version <i>tallest/smallest</i></p>	<p>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: <i>The cat sat on the chair.</i> Compound sentence: Two main clauses joined with a connective that both make sense independently: <i>The cat sat on the chair and the man sat on the floor.</i> Complex sentence: A sentence with a main clause and a subordinate clause: <i>The cat, who was spoilt, sat on the chair whilst the man sat on the floor.</i> 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. Conflict- problem faced by characters Resolution- point where conflict is resolved Foreshadowing- clue about something later Foreboding- sense that something will occur Backstory- insight into character's past Exposition- revelation of something Poetic justice- good rewarded bad punished Melodrama- exaggerated characters/events Motif- repeated image or symbol Antithesis- contrast of ideas in same grammatical structure Authorial intrusion- where author pauses to speak directly to reader Allegory- characters/events represent ideas about religion, morals or politics Asyndeton- list without conjunctions Polysyndeton- list with conjunctions (and)</p>	<p>1. Ebenezer Scrooge: Miserly, mean, bitter, materialistic, unsympathetic, indifferent, cold, selfish, isolated, cynical, charitable, value driven, generous, happy, sociable, transformed. 2. Marley's Ghost: Materialistic, self-centred, terrifying, haunting, exhausted, direct, reformed, regretful, hopeful, selfless, wise 3. Bob Cratchit: Uncomplaining, tolerant, courteous, deferential, patient, civil, eager, pleasurable, good-humoured, playful, caring, tender, cheerful, loving, forgiving. 4. Fred: Warm-hearted, empathetic, cheerful, optimistic, even-tempered, insightful, determined, generous, forgiving, jovial, enthusiastic, caring 5. Ghost of Christmas Past: Contradictory, strong, gentle, quiet, forceful, questioning, mysterious 6. Ghost of Christmas Present: Compassionate, abundant, generous, cheerful, jolly, friendly, severe, sympathetic 7. Ghost of Christmas Future: Mysterious, silent, ominous, intimidating, frightening, resolute. 8. Tiny Tim: Frail, ill, good, religious</p>	<p>-Family -Loneliness and isolation -Time -Education -Christmas Spirit -Redemption -Poverty -Social responsibility -Supernatural -Poverty -Fate -Charity -Transformation -Capitalism -Greed -Money -Friendship -Religion -Morality - Isolation/Loneliness, -Choices -Memory and the past -Compassion -Forgiveness -Guilt and blame -Time -Rationality</p>

Knowledge Organiser: Non-Fiction Reading

Module Overview: You will read a variety of unseen Non-Fictions texts and will practise comprehension, analysis, evaluation and comparison. You will write a transactional writing piece.

<p style="text-align: center;"><u>AO1: Comparison</u> Identify and select key information</p>	<p style="text-align: center;"><u>AO2: Analysis</u> Explaining how and language / structural devices are used.</p>	<p style="text-align: center;"><u>AO3: Comparison</u> Identifying similarities/differences between writers' ideas/perspectives.</p>	<p style="text-align: center;"><u>AO4: Evaluation</u> Exploring how and why a text is effective.</p>	<p style="text-align: center;"><u>A05/6 Writing and SPaG</u> Use of ideas, language and structure. Accurate and effective SPaG.</p>
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Assessment Overview: 2 hours and 5 minutes: The exam paper includes two unseen Non-Fiction Texts and a transactional writing task.

<u>Questions 1-3:</u> Text 1		<u>Questions 4-6:</u> Text 2		<u>Question 7:</u> Texts 1 and 2		<u>Q8/9 : Transactional Writing:</u> Choice of two questions, you will answer one
Q1/2: (3) AO1	Q3: (15 marks) AO2	Q4/5: (3) AO1	Q6: (15 marks) AO4	Q7a: (6 marks) AO3	Q7b: (14 marks) AO3	Q8/9: A05 (24 marks) A06 (16 marks)
<p>Find and copy key quotes from the text.</p> <p style="text-align: right;">5 minutes</p>	<p>Identify key quotes Analyse language devices Analyse structural choice Analyse word choices Explore effect on reader/writer's intentions</p> <p style="text-align: right;">20 minutes</p>	<p>Find and copy key quotes from the text.</p> <p style="text-align: right;">5 minutes</p>	<p>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</p> <p style="text-align: right;">20 minutes</p>	<p>Find three similarities Include a quote from each text No need to explain or elaborate as long as it's clear.</p> <p style="text-align: right;">5 minutes</p>	<p>Build on 7a analysis Refer to the PAF Compare how the texts are similar/different Include key quotes</p> <p style="text-align: right;">20 minutes</p>	<p>Communicate clearly, effectively and selecting and adapting tone, style and register for different forms, purposes and audiences.</p> <p>Organise information and ideas, using structural and grammatical features to support coherence and cohesion of texts.</p> <p>Candidates must use a range of vocabulary and sentence structures for clarity, purpose and effect, with accurate spelling and punctuation.</p>

Key Terms:	Formats:	Purposes:
<p>Purpose: The reason the piece is written.</p> <p>Audience: Who the piece is written for.</p> <p>Format: What type of text is the piece written in.</p> <p>Analyse: Examine the text to explain.</p> <p>Evaluate: Judge the success of the piece.</p> <p>Compare: Find similarities between two texts</p> <p>Contrast: Find differences between two texts.</p> <p>Perspective: Point of view of the writer.</p>	<p>Article: a piece of writing included with others in a newspaper, magazine, or other publication.</p> <p>Letter: a written, typed, or printed communication, sent in an envelope by post or messenger.</p> <p>Speech: a formal address or discourse delivered to an audience.</p> <p>Review: a critical appraisal of a book, play, film, etc. published in a newspaper or magazine.</p>	<p>Persuade: To make someone think/do something.</p> <p>Argue: To offer both points of view whilst concluding on own judgment.</p> <p>Inform: To offer information on a topic.</p> <p>Advise: To offer ideas, tips and suggestions.</p> <p>Review: judge and critique a book, play, event, restaurant etc.</p>
Structure Devices		Word Classes
<p>Order of ideas: Thinking about what the writer started/finished with; why they saved something until last or shared it early on.</p> <p>Paragraph length: Is it particularly long/short?</p> <p>Sentence length: As above.</p> <p>Simple sentence: A sentence with only one subject and one verb: <i>The cat sat on the chair.</i></p> <p>Compound sentence: Two main clauses joined with a connective that both make sense independently: <i>The cat sat on the chair and the man sat on the floor.</i></p> <p>Complex sentence: A sentence with a main clause and a subordinate clause: <i>The cat, who was spoilt, sat on the chair whilst the man sat on the floor.</i></p>	<p>Imperative sentence: A command or instruction</p> <p>Interrogative sentence: A legitimate question</p> <p>Declarative sentence: A simple statement</p> <p>Exclamatory sentence: An exclamation to show anger/shock/excitement</p> <p>Punctuation: Consider how these devices have been used</p> <p>Juxtaposition: Two opposite ideas used close by one another</p> <p>Repetition: Using the same words, phrase or ideas more than once</p> <p>Main Clause: The main part of a sentence; makes sense on its own.</p> <p>Subordinate Clause: A clause which does not make sense on its own.</p>	<p>Noun: Name of person, place, thing</p> <p>Adjective: Describes noun</p> <p>Determiner: Gives information about the noun: <i>the/a/every/some</i></p> <p>Abstract Noun: An idea/concept <i>love/anger</i></p> <p>Concrete Noun: Something you can touch/hold</p> <p>Verb: Doing word</p> <p>Adverb: Describes verb</p> <p>Modal Verb: Gives information about the verb: <i>should/could/might</i></p> <p>Imperative Verb: A command</p> <p>Pronoun: In place of noun <i>I/he/it/they</i></p> <p>Preposition: Tells you where something is <i>on/over/under</i></p> <p>Conjunction: A connective <i>and/or/but/although</i></p> <p>Superlative: The most extreme version <i>tallest/smallest</i></p>

Figurative Language Devices

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*

Rhetorical Language Devices

Anaphora: Repetition of word/phrase at start of several sentences
Anecdote: A personal story to exemplify a point
Fact: Can be proven
Opinion: Someone's thoughts
Rhetorical Question: A question used for effect and not answered
Emotive Language: Words used to provoke an emotional reaction
Statistics: Facts and figures
Triple Emphasis: A list of three words or sentence structures used to emphasise a certain point or perspective
Hyperbole: Exaggeration to prove a point
Sensational Language: Purposely dramatic or over-the-top language

Y11 Conflict Poetry and Unseen, Knowledge Organiser

Plot Overview:

Students must study and annotate a selection of 'Conflict' poetry from the GCSE Anthology. Additionally, to this they must then become familiar with Unseen Poetry and learn the skills of comparison.

Summary: After we annotate each Conflict Poem, add a sentence to summarise poem.

A Poison Tree:

The Destruction of Sennacherib:

Extract from The Prelude:

The Man He Killed:

Cousin Kate:

Half-Caste:

Exposure:

The Charge of the Light Brigade:

Catrin:

War Photographer:

Belfast Confetti:

The Class Game:

Poppies:

No Problem:

What were they Like?

Exam Overview:

Part A and Part B.

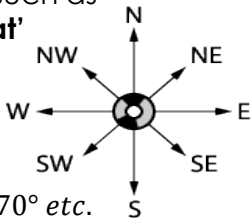
Techniques:

Language, structure and form.

Section 1- Anthology	Section 2- Unseen	Language	Structure	Form
<p>You are given one of the poems from the Anthology.</p> <p>You will be given a theme to then compare with another poem of your choice.</p> <p>Criteria: 3/4 paragraphs Clear point Embed evidence Include language, structure and form Explain what the quote shows Analyse the techniques Refer to the reader. Compare and contrast throughout your analysis.</p>	<p>You will be given two unseen poems and asked to compare and contrast the sharing theme.</p> <p>Criteria: 3-4 paragraphs Clear point Embed evidence Include language, structure and form Explain what the quote shows Analyse the techniques Refer to the reader. Compare and contrast throughout your analysis.</p>	<p>Imagery: Language which creates vivid sensory ideas in</p> <p>Simile: An explicit comparison between two things using 'like' or 'as'</p> <p>Metaphor: An implicit comparison between two things not using 'like' or 'as'.</p> <p>Personification: Attributing human like qualities to objects, ideas or animals.</p> <p>Alliteration: the occurrence of the same letter or sound.</p> <p>Triple emphasis: Description using 3.</p> <p>Oxymoron: The combination of words or ideas which have opposite or very different meanings.</p> <p>Assonance: Resemblance of sound between syllables of nearby words, arising particularly from the rhyming of two or more stressed vowels.</p> <p>Sibilant: The sibilant or hissing sounds are created. These soft consonants are s with sh, and ch, th including three others such as z, x, f and softer c.</p> <p>Motif: A repeated idea or image used throughout a text.</p>	<p>Stanza: The verses in the poem. Consider the shape; how it starts; and how the poem ends.</p> <p>Refrain: Last line repeated</p> <p>Juxtaposition: The placement of two ideas, statements or events near each other to invite comparison to contrast.</p> <p>Rhyming: (of a word, syllable, or line) have or end with a sound that corresponds to another.</p> <p>Rhythm: a strong, regular repeated pattern of movement or sound</p> <p>Line length: The length of the line.</p> <p>Repetition: the action of repeating something that has already been said or written.</p> <p>Enjambement: The continuation of a sentence without a pause beyond the end of a line, couplet, or stanza.</p> <p>Iambic pentameter: A line of verse with five metrical feet, each consisting of one short (or unstressed) syllable followed by one long (or stressed) syllable.</p> <p>Caesura: A break between words within a metrical foot</p>	<p>Lyric Poetry: Modern lyric poetry is a formal type of poetry which expresses personal emotions or feelings, typically spoken in the first person.</p> <p>Monologue Poetry: Dramatic monologue is a type of poetry written in the form of a speech of an individual character.</p> <p>Narrative Poetry: Narrative poetry is a form of poetry that tells a story, often using the voices of both a narrator and characters; the entire story is usually written in metered verse.</p> <p>Free Verse: Free verse is an open form of poetry, which in its modern form arose through the French vers libre form. It does not use consistent meter patterns, rhyme, or any musical pattern. It thus tends to follow the rhythm of natural speech</p> <p>Sonnet: A sonnet is a poem that consists of 14 lines and more than often uses an iambic pentameter structure.</p> <p>Epic Poetry: An epic poem, or simply an epic, is a lengthy narrative poem typically about the extraordinary deeds of extraordinary characters.</p>

Compass Directions (MW 124)

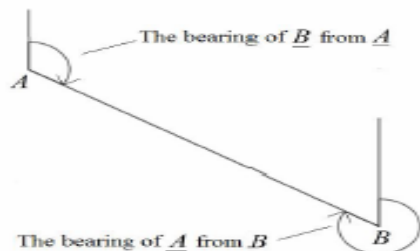
You can use an acronym such as '**Never Eat Shredded Wheat**' to remember the order of the compass directions in a clockwise direction.
Bearings: $NE = 045^\circ, W = 270^\circ$ etc.



Bearings (MW 124)

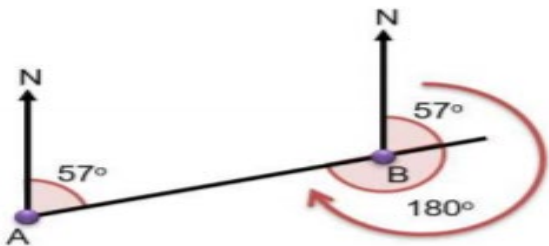
1. Measure from **North** (draw a North line)
 2. Measure **clockwise**
 3. Your answer must have **3 digits** (eg. 047°)
- Look out for where the bearing is measured from.

Example.



John runs from A to B and back again

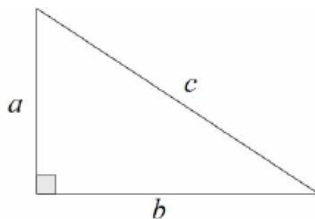
- a) What is the bearing of his outward run from A to B?
- b) What is the bearing of this return run from B to A? = $057^\circ = 057^\circ + 180^\circ = 237^\circ$



Pythagoras' Theorem

(MW 150a/b/c)

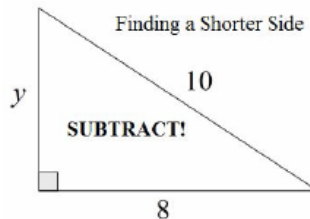
For any **right angled triangle**:



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

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

Example.



$$\begin{aligned} a &= y, b = 8, c = 10 \\ a^2 &= c^2 - b^2 \\ y^2 &= 100 - 64 \\ y^2 &= 36 \\ y &= 6 \end{aligned}$$

Trigonometry (MW 168)

The **study of triangles**.

Sides of a Right-Angle Triangle

Hypotenuse

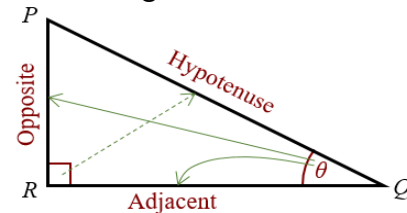
The longest side of a right-angled triangle. Is always opposite the right angle.

Opposite

Side across from the Angle marked.

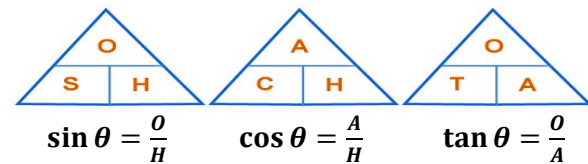
Adjacent

Next to the angle.



Trigonometric Formulae (MW 168)

Use **SOHCAHTOA**.



$$\sin \theta = \frac{O}{H}$$

$$\cos \theta = \frac{A}{H}$$

$$\tan \theta = \frac{O}{A}$$

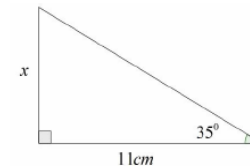
When finding a missing angle, use the 'inverse' trigonometric function by pressing the 'shift' button on the calculator.

Example.

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

$$\tan 35 = \frac{x}{11}$$

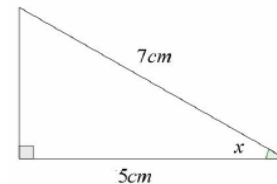
$$x = 11 \tan 35 = 7.70 \text{ cm}$$



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

$$\cos x = \frac{5}{7}$$

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

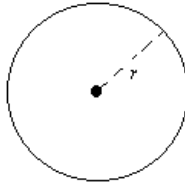


Year 11 Mathematics Knowledge Organiser (Term 1– Unit 46/47/48)

Circle

A circle is the locus of all points equidistant from a central point.

Example



Area of a Circle (MW 117)

$A = \pi r^2$ which means 'pi x radius squared'.

Example

If the radius was 5cm, then:

$$A = \pi \times 5^2 = 78.5\text{cm}^2$$

Arc Length of a Sector (MW 1149)

The arc length is part of the circumference.

Take the **angle** given as a **fraction over 360°** and **multiply** by the **circumference**.

Example

$$\begin{aligned} \text{Arc Length} &= \frac{115}{360} \times \pi \times 8 \\ &= 8.03\text{cm} \end{aligned}$$

Parts of a Circle (MW 116)

Radius – the **distance** from the **centre** of a circle to the **edge**

Diameter – the total **distance** across the **width** of a circle **through the centre**.

Circumference – the **total distance** around the **outside** of a circle

Chord – a **straight line** whose **end points lie on a circle**

Tangent – a **straight line** which **touches** a circle at exactly **one point**

Arc – a **part of the circumference** of a circle

Sector – the **region** of a circle enclosed by **two radii** and their intercepted **arc**

Segment – the **region** bounded by a **chord** and the **arc** created by the chord.

Circumference of a Circle (MW 118)

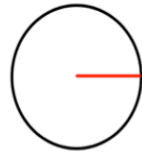
$C = \pi d$ which means 'pi x diameter'

Example

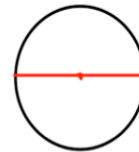
If the radius was 5cm, then:

$$C = \pi \times 10 = 31.4\text{cm}$$

Parts of a Circle



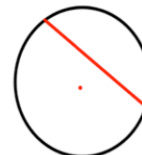
Radius



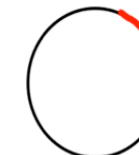
Diameter



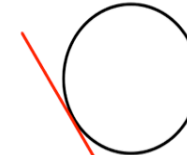
Circumference



Chord



Arc



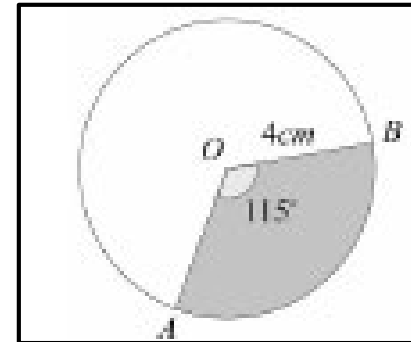
Tangent



Segment



Sector



Area of a Sector (MW 167)

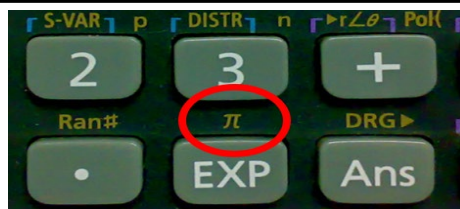
The area of a sector is part of the total area. Take the **angle** given as a **fraction over 360°** and **multiply** by the **area**.

Example

$$\begin{aligned} \text{Area} &= \frac{115}{360} \times \pi \times 4^2 \\ &= 16.1\text{cm}^2 \end{aligned}$$

π ('pi')

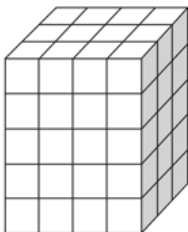
Pi is the circumference of a circle divided by the diameter.



Volume

Volume is a measure of the amount of space inside a solid shape.
Units: mm^3 , cm^3 , m^3 etc.

Example



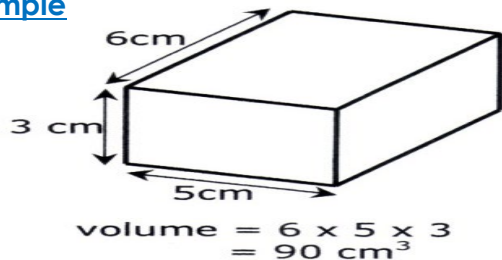
Volume of a Cube/Cuboid (MW 115)

$V = \text{Length} \times \text{Width} \times \text{Height}$

$$V = L \times W \times H$$

You can also use the Volume of a Prism formula for a cube/cuboid.

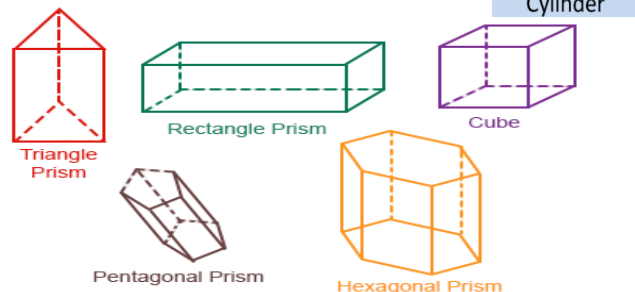
Example



Prism

A prism is a 3D shape whose **cross section is the same** throughout.

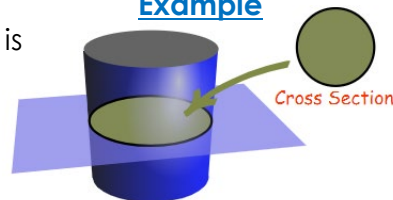
Example



Cross Section

The **cross section** is the **shape** that **continues** all the way **through the prism**.

Example

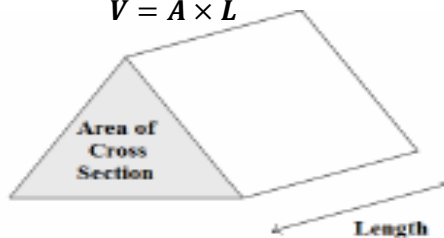


Volume of a Prism (MW 119)

$V = \text{Area of Cross Section} \times \text{Length}$

$$V = A \times L$$

Example



Properties of Solids (MW 43)

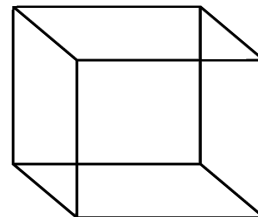
Faces = flat surfaces

Edges = sides/lengths

Vertices = corners

Example

A cube has **6 faces**,
12 edges
8 vertices.



Surface area a Cube/Cuboid (MW 114a/b)

The total area of all the faces of a cube/cuboid

Example

Area of front and back = $3 \times 5 \times 2 = 30 \text{ cm}^2$

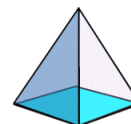
Area of left and right = $3 \times 6 \times 2 = 36 \text{ cm}^2$

Area of top and bottom = $5 \times 6 \times 2 = 60 \text{ cm}^2$

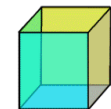
Surface area = $30 + 36 + 60 = 126 \text{ cm}^2$



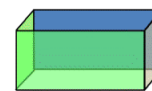
Tetrahedron
(Triangular pyramid)



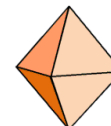
Square pyramid
(Square-based pyramid)



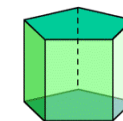
Cube



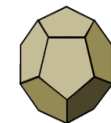
Cuboid



Octahedron



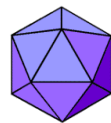
Pentagonal prism



Dodecahedron



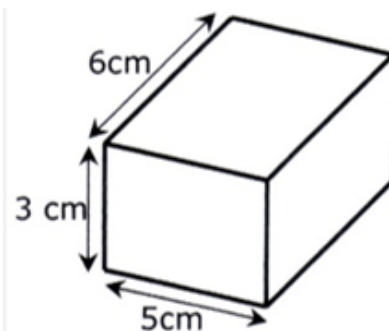
Sphere



Icosahedron



Cone



Recurring Decimal

A decimal with one or a group of digits that repeat itself indefinitely.

E.g. $0.\dot{2}\dot{3} = 0.23232323\dots$

Convert 0.84 to a fraction.

Multiply the decimal so that the repeated decimal digits are on the left side of the decimal point.

$$\begin{aligned}x &= 0.84848484 \\ 100x &= 84.848484\end{aligned}$$

Subtract x from 100x.

$$99x = 84$$

Isolate x, then simplify:

$$x = \frac{84}{99} = \frac{28}{33}$$

Fractional Indices

The denominator of a fractional power acts as a 'root'. The numerator of a fractional power acts as a normal power.

$$a^{\frac{m}{n}} = (\sqrt[n]{a})^m$$

Example

$$27^{\frac{2}{3}} = (\sqrt[3]{27})^2 = 3^2 = 9$$

$$\left(\frac{25}{16}\right)^{\frac{3}{2}} = \left(\frac{\sqrt{25}}{\sqrt{16}}\right)^3 = \left(\frac{5}{4}\right)^3 = \frac{125}{64}$$

Negative Indices

$$a^{-n} = \frac{1}{a^n}$$

Example

$$\begin{aligned}3^{-2} &= \frac{1}{3^2} \\ &= \frac{1}{9}\end{aligned}$$

Product Rule

To find the total number of outcomes for two or more events, multiply the number of outcomes for each event together. This is called the product rule because it involves multiplying to find a product.

Example:

A restaurant menu offers 4 starters, 7 main courses and 3 different desserts. How many different three-course meals can be selected from the menu?

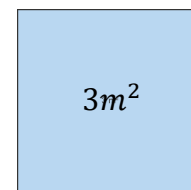
Multiplying together the number of choices for each course gives $4 \times 7 \times 3 = 84$ different three-course meals.

Surds

A surd is an expression with an irrational square root. An irrational number cannot be written as a fraction. We leave them in surd form as the decimal version is too long.

$\sqrt{2}$ and $\sqrt{3}$ are surds
 $\sqrt{4} = 2$ so $\sqrt{4}$ is not a surd

If we were to write down the exact length of the square it would be $\sqrt{3}$.



Upper and Lower Bounds

The upper and lower bound come from the largest and smallest values that would round to a particular number. Take 'half a unit above and half a unit below'. For example rounded to 1 d.p means nearest 0.1, so add 0.05 and subtract 0.05 to get the bounds.

All error intervals look the same like this - $\leq x <$

Example - State the upper and lower bound of 360 when it has been rounded to 2 significant figures:

2 significant figures is the nearest 10, so 'half this' to get 5, and add on to 360 and take it off 360,

$$355 \leq x < 365$$

Year 11 Higher (Set 1) Mathematics Knowledge Organiser

Simplifying Surds

To simplify surds look for square number factors.

Rules:

$$\sqrt{ab} = \sqrt{a} \times \sqrt{b}$$

e.g. $\sqrt{75} = \sqrt{25} \times \sqrt{3} = 5\sqrt{3}$

e.g. $\sqrt{3} \times \sqrt{15} = \sqrt{45} = \sqrt{9 \times 5} = 3\sqrt{5}$

$$m\sqrt{a} + n\sqrt{a} = (m + n)\sqrt{a}$$

e.g. $2\sqrt{5} + 7\sqrt{5} = (2 + 7)\sqrt{5} = 9\sqrt{5}$

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

e.g. $\sqrt{\frac{72}{20}} = \frac{\sqrt{72}}{\sqrt{20}} = \frac{\sqrt{36 \times 2}}{\sqrt{4 \times 5}} = \frac{6\sqrt{2}}{2\sqrt{5}} = \frac{3\sqrt{2}}{\sqrt{5}}$

Rationalising the denominator

This is the removing of a surd from the denominator of a fraction by multiplying both the numerator and the denominator by that surd.

$$\frac{a}{\sqrt{b}} = \frac{a}{\sqrt{b}} \times \frac{\sqrt{b}}{\sqrt{b}} = \frac{a\sqrt{b}}{b}$$

Example

e.g. $\frac{6}{\sqrt{12}} = \frac{6}{\sqrt{12}} \times \frac{\sqrt{12}}{\sqrt{12}}$ (multiply both top and bottom by $\sqrt{12}$)

$$= \frac{6\sqrt{12}}{12} = \frac{\sqrt{12}}{2} \text{ (now simplify)}$$

$$= \frac{\sqrt{4 \times 3}}{2} = \frac{2\sqrt{3}}{2} = \sqrt{3}$$

Expand (Cubic)

Example - $(3x + 2)(2x - 4)(5x + 7)$

First of all expand the first two brackets like normal (FOIL or Grid).

	3x	+2
2x	$6x^2$	$+4x$
-4	$-12x$	-8

$$6x^2 + 8x - 8$$

Now expand $(6x^2 + 8x - 8)(5x + 7)$:

	$6x^2$	+8x	-8
5x	$30x^3$	$+40x^2$	$-40x$
+7	$42x^2$	$-56x$	-56

$$30x^3 + 2x^2 - 96x - 56$$

Expand (Quadratic)

Each term in one bracket needs to be multiplied by each term in the other bracket.

Example (grid method)

$$(x + 2)(x + 5)$$

	x	+5
x	x^2	$+5x$
+2	$+2x$	$+10$

Factorise (Quadratic)

Factorising is writing an expression as a product of terms by 'taking out' a common factor.

What numbers multiply to make the last number in the expression? Which of these factors add /subtract to make the number in the middle?

Example

$$x^2 - 2x - 3$$

$$(x - 3)(x + 1)$$

$$x^2 - 6x + 5$$

$$(x - 5)(x - 1)$$

Factorise (with coefficients)

.Factorise $6x^2 - 11x - 10$

This time we also need to find factors of the first term as well as the last term.

Factors of 10 - 1 and 10 OR 2 and 5

Factors of 6 - 1 and 6 OR 2 and 3.

Now I need to see which pairs of factors will multiply together so they will create 11x.

Answer: $(3x + 2)(2x - 5)$

Subject of a formula

More difficult questions – think about inverse operations to help you!

Examples

Make r the subject of $V = \frac{1}{3}\pi r^2 h$.

To start, isolate r^2 by multiplying by 3 and then dividing by πh .

$$3V = \pi r^2 h$$

$$\frac{3V}{\pi h} = r^2$$

Now we square root both sides.

$$\sqrt{\frac{3V}{\pi h}} = r$$

$$r = \sqrt{\frac{3V}{\pi h}}$$

Make x the subject of $3x + 5 = y - ax$.

When a formula contains the new subject more than once, start by isolating any terms including it on one side of the equals sign.

Here, add ax and subtract 5.

$$3x + ax = y - 5$$

Now we factorise the side with our new subject.

$$x(3 + a) = y - 5$$

Then divide by the bracket to leave x on its own.

$$x = \frac{y - 5}{3 + a}$$

Rearranging formulae (difficult)

More difficult questions may require you to factorise an expression to be able to make a certain variable the subject. This is usually when the variable appears twice in the formulae we need to rearrange.

Make x the subject of $3x + 5 = y - ax$.

When a formula contains the new subject more than once, start by isolating any terms including it on one side of the equals sign.

Here, add ax and subtract 5.

$$3x + ax = y - 5$$

Now we factorise the side with our new subject.

$$x(3 + a) = y - 5$$

Then divide by the bracket to leave x on its own.

$$x = \frac{y - 5}{3 + a}$$

Year 11 Higher (Set 1) Mathematics Knowledge Organiser

Finding the nth term of a linear sequence

1. Find the **difference**.
2. **Multiply that by n** .
3. Substitute $n = 1$ to **find out what number you need to add or subtract to get the first number in the sequence**.

Example

Find the nth term of: 3, 7, 11, 15...

1. Difference is +4
2. Start with $4n$
3. $4 \times 1 = 4$, so we need to subtract 1 to get 3.
nth term = $4n - 1$

Geometric Sequence

A sequence of numbers where each term is found by **multiplying the previous one** by a number called the **common ratio, r** .

Example

An example of a geometric sequence is:

2, 10, 50, 250 ...

The common ratio is 5

Another example of a geometric sequence is:

81, -27, 9, -3, 1 ...

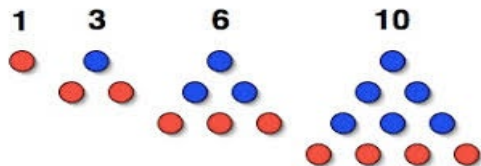
The common ratio is $-\frac{1}{3}$

Triangular numbers

The sequence which comes from a pattern of dots that form a triangle.

1, 3, 6, 10, 15, 21 ...

Example



nth term of a quadratic sequence

1. Find the first and second differences.
2. Halve the second difference and multiply this by n^2 .
3. Substitute $n = 1, 2, 3, 4 \dots$ into your expression so far.
4. Subtract this set of numbers from the corresponding terms in the sequence from the question.
5. Find the nth term of this set of numbers.
6. Combine the nth terms to find the overall nth term of the quadratic sequence.

Substitute values in to check your nth term works for the sequence.

Example

Find the nth term of: 4, 7, 14, 25, 40..

Answer:

Second difference = +4 \rightarrow nth term = $2n^2$

Sequence: 4, 7, 14, 25, 40

$2n^2$ 2, 8, 18, 32, 50

Difference: 2, -1, -4, -7, -10

Nth term of this set of numbers is $-3n + 5$

Overall nth term: $2n^2 - 3n + 5$

nth term of a geometric sequence

$$r^{n-1}$$

where a is the first term and r is the common ratio

Example

The nth term of 2, 10, 50, 250 ... is

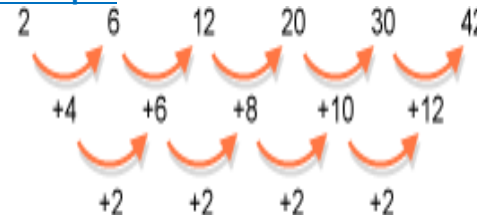
$$2 \times 5^{n-1}$$

Quadratic Sequence

A sequence of numbers where the **second difference is constant**.

A quadratic sequence will have a n^2 term.

Example



Fibonacci type sequences

A sequence where the next number is found by **adding up the previous two terms**

Example

The Fibonacci sequence is:

1, 1, 2, 3, 5, 8, 13, 21, 34 ...

An example of a Fibonacci-type sequence is:

4, 7, 11, 18, 29 ...

Year 11 Higher (Set 1) Mathematics Knowledge Organiser

Parallel lines

If two lines are parallel, they will have the **same gradient**. The value of m will be the same for both lines.

Are the lines $y = 3x - 1$ and $2y - 6x + 10 = 0$ parallel?

Answer: Rearrange the second equation in to the form

$$y = mx + c.$$

$$2y - 6x + 10 = 0 \rightarrow y = 3x - 5$$

Since the two gradients are equal (3), the lines are parallel.

Perpendicular lines

If two lines are perpendicular, the product (times together) of their gradients will always equal -1 . The gradient of one line will be the **negative reciprocal** of the gradient of the other line.

Find the equation of the line perpendicular to $y = 3x + 2$ which passes through $(6,5)$.

Answer: As they are perpendicular, the gradient of the new line will be $-1/3$ as this is the negative reciprocal of 3.

$$\begin{aligned} y &= mx + c \\ 5 &= -\frac{1}{3} \times 6 + c \\ c &= 7 \end{aligned}$$

$$y = -\frac{1}{3}x + 7$$

or

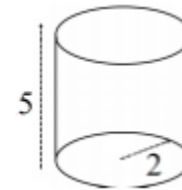
$$3x + y - 7 = 0$$

Surface Area of a cylinder

$$2\pi r^2 + 2\pi rh$$

Example:

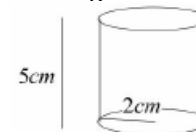
$$\begin{aligned} 2\pi(2)^2 + \pi(4)(5) \\ = 28\pi \end{aligned}$$



Volume of a cylinder

$$\pi r^2 \times \text{height}$$

Example:



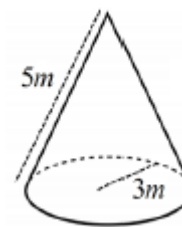
$$\begin{aligned} V &= \pi(4)(5) \\ &= 62.8\text{cm}^3 \end{aligned}$$

Surface Area of a cone

$$\pi rl + \pi r^2$$

Example:

$$\begin{aligned} \pi(3)(5) + \pi(3)^2 \\ = 24\pi \end{aligned}$$



Volume of a cone

$$\frac{1}{3} \times \pi r^2 \times \text{height}$$

Example:



$$\begin{aligned} V &= \frac{1}{3} \pi(4)(5) \\ &= 20.9\text{cm}^3 \end{aligned}$$

Surface Area of a sphere

$$4\pi r^2$$

Example:

Find the surface area of a sphere with radius 3cm.

$$SA = 4\pi(3)^2 = 36\pi\text{cm}^2$$

Volume of a sphere

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

Example:

Find the volume of a sphere with diameter 10cm.

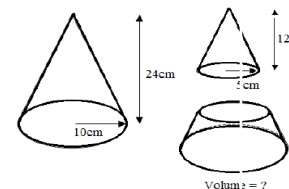
$$\frac{4}{3} \pi(5)^3 = \frac{500\pi}{3}\text{cm}^3$$

Frustum

A frustum is a solid (usually a cone or pyramid) with the top removed.

Volume:

Find the volume of the whole shape, then take away the volume of the small cone/pyramid removed at the top.



$$\begin{aligned} &\frac{1}{3} \pi(10)^2(24) \\ &- \frac{1}{3} \pi(5)^2(12) \\ &= 700\pi\text{cm}^3 \end{aligned}$$

Year 11 Higher (Set 1) Mathematics Knowledge Organiser

Transformations

The movement or manipulation of an object. The four transformations we use are rotation, reflection, translation and enlargement.

Reflection

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

To describe a reflection you need to give the equation of the mirror line

Line $x=?$ is a vertical line.

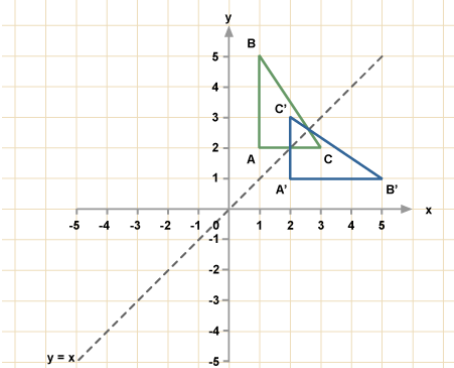
Line $y=?$ is a horizontal line.

Line $y=x$ is a diagonal line.

Example:

Reflect shape C in the line $y=x$.

TIP: Reflect each point of the triangle separately then join them up.



Rotation

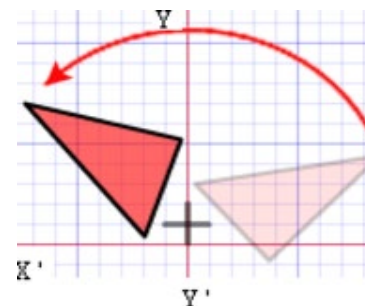
The size does not change, but the shape is turned around a point.

Use tracing paper.

To describe a rotation you need to give:
the direction (clockwise or anti-clockwise)
the angle
the centre of rotation (coordinate)

Example:

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



Translations

Translate means to move a shape.

The shape does **not** change size or orientation.

In a column vector, the top number moves left (-) or right (+) and the bottom number moves up (+) or down (-)

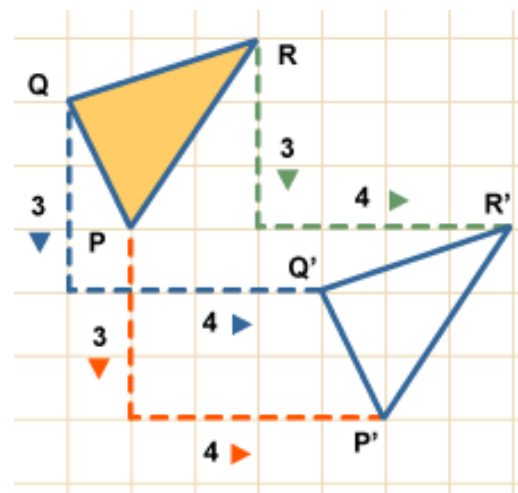
$\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ means '2 right, 3 up'

$\begin{pmatrix} -1 \\ -5 \end{pmatrix}$ means '1 left, 5 down'

Example:

In the example on the right, the shape has

been translated by vector $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$



Enlargement

The shape will get bigger or smaller. Multiply each side by the scale factor.

For example:

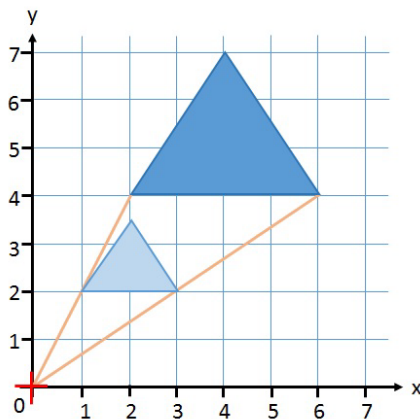
Scale factor 3 means '3 times larger = multiply all the lengths by 3'

Scale factor $\frac{1}{2}$ means 'half the size = divide all lengths by 2'

Sometimes the shape may need to be enlarged from a specific point.

Example:

This shape has been enlarged by scale factor 2 at the centre of enlargement (0, 0).



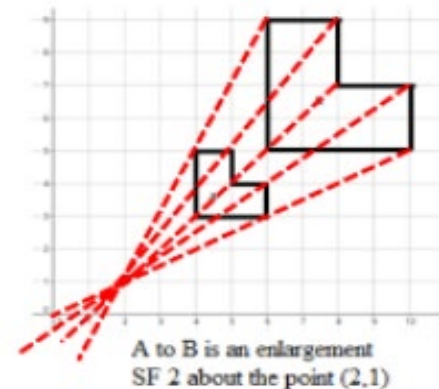
Finding the Centre of Enlargement

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:

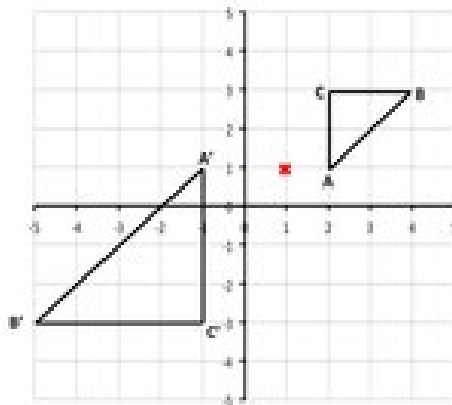


Negative Enlargement

Negative enlargements will look like they have been rotated. They are enlarged in the opposite direction to a positive enlargement.

Example

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

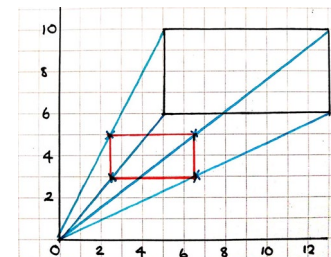


Fractional Enlargement

This is where the shape will get smaller. Such as scale factor $\frac{1}{3}$ would make the shape 3 times smaller.

Example

This shape has been enlarged by scale factor $\frac{1}{2}$



Iteration

Iteration is the repetition of a mathematical procedure applied to the result of a previous application, typically as a means of obtaining successively closer approximations to the solution of a problem.

Starting with $x_0 = 0$ use the iteration formula

$$x_{n+1} = \frac{2}{x_n^2 + 3}$$

3 times to find an estimate to the solution.

Calculate the values of x_1, x_2, x_3 to find an estimate for the solution to $x^3 + 3x = 2$

$$x_{0+1} = \frac{2}{0^2 + 3} = 0.6 \quad \leftarrow \text{We substitute this value into the next step.}$$

$$x_{1+1} = \frac{2}{0.6^2 + 3} = 0.5806451613$$

$$x_{2+1} = \frac{2}{(0.58\dots)^2 + 3} = 0.5993140006$$

An estimate of the solution is 0.6 because all of the solutions round to 1d.p.

Using the Quadratic Formula

The formula is:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Quadratics are usually in the form:

$$ax^2 + bx + c = 0$$

This is how we pick out the values that will be substituted into the formula:

$$x^2 + 4x + 2 = 0$$

$$a = 1 \quad b = 4 \quad c = 2$$

Now that you have the a, b and c values these can now be substituted into the formula – then gradually start to simplify the formula:

$$x = \frac{-4 \pm \sqrt{4^2 - 4 \times 1 \times 2}}{2 \times 1}$$

$$\Rightarrow x = \frac{-4 \pm \sqrt{8}}{2}$$

$$\Rightarrow x = -0.585\dots$$

$$= -0.59 \text{ (1dp)}$$

$$\text{or } x = -3.414\dots$$

$$= -3.41 \text{ (1dp)}$$

Completing the square

A quadratic in the form $x^2 + b + c$ can be written in the form $(x + p)^2 + q$.

1. Write a set of brackets with x in and half the value of b .
2. Square the bracket.
3. Subtract $\left(\frac{b}{2}\right)^2$ and add c .
4. Simplify the expression.

You can **use the completing the square form** to help **find the maximum or minimum** of quadratic graph.

Example:

Complete the square of

$$y = x^2 - 6x + 2$$

$$(x - 3)^2 - 3^2 + 2$$

$$= (x - 3)^2 - 7$$

The minimum value of this expression occurs when $(x - 3)^2 = 0$, which occurs when $x=3$

$$\text{When } x = 3, y = 0 - 7 = -7$$

Minimum point = (3,-7)

If there is a coefficient in front of x^2 then use the same method as above, but factorise out a at the start.

Year 11 Higher (Set 1) Mathematics Knowledge Organiser

Simultaneous Equations

This involves finding solutions that work in two (or more) equations at the same time – e.g.:

$$x + 2y = 8$$

$$2x + y = 7,$$

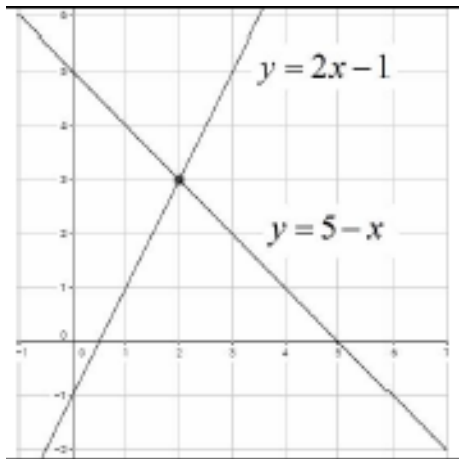
Solving Simultaneous Equations (Graphically)

Draw the graphs of the two equations. The solutions will be where the lines meet.

The solution can be written as a coordinate.

Example

$$y = 5 - x \text{ and } y = 2x - 1.$$



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 $y = 3$.

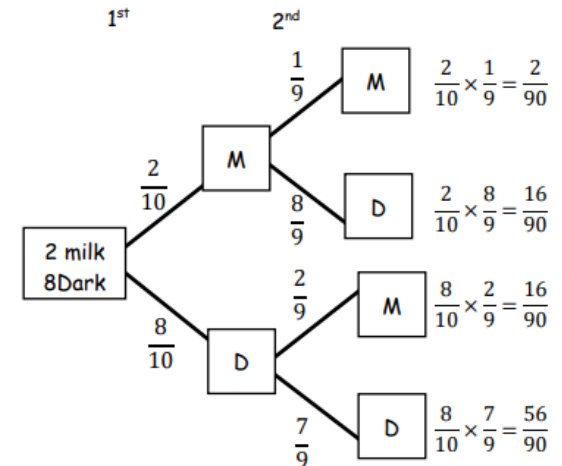
Conditional Probability

When events are dependent, the probability of the second event is called a conditional event because it is conditional on the outcome of the first event.

Example

2 milk and 8 dark chocolates in a box. Kate chooses one and eats it. She chooses a second one.

This can be shown on a tree diagram:



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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. $p = kq$
 $12 = k \times 4$
so $k = 3$

2. $p = 3q$

3. $p = 3 \times 20 = 60$, so $p = 60$

ANSWER: $p = 60$ and $q = 120$ (3×60)

Indirect 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.
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Example:

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 $12 = k \times 4$
so $k = 3$

2. $p = 3q$

3. $p = 3 \times 20 = 60$, so $p = 60$

ANSWER: $p = 60$ and $q = 120$ (3×60)

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.

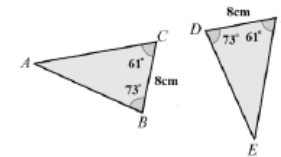
The proportion of the matching sides must be the same, meaning the ratios of corresponding sides are all equal

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

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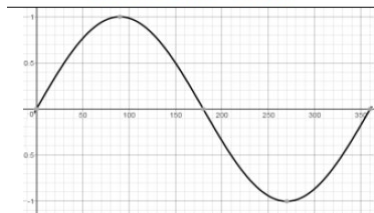
Trigonometry Exact Values

	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

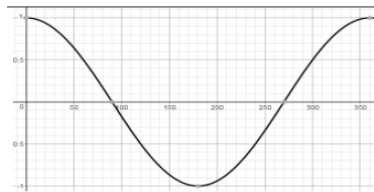
$$y = \sin(x)$$

for $0 \leq x \leq 360^\circ$



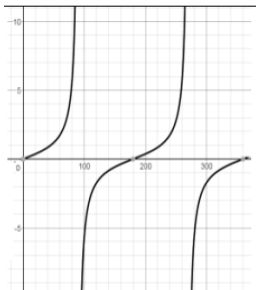
$$y = \cos(x)$$

for $0 \leq x \leq 360^\circ$



$$y = \tan(x)$$

for $0 \leq x \leq 360^\circ$



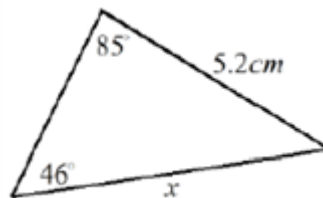
Sine Rule

Use with non right angle triangles.

Use when the question involves 2 sides and 2 angles.

For missing side:

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

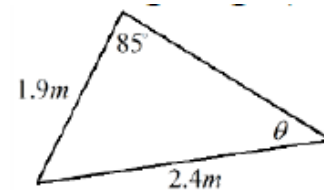


$$\frac{x}{\sin 85} = \frac{5.2}{\sin 46}$$

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

For missing angle:

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



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

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

$$\theta = \sin^{-1}(0.789) = 52.1^\circ$$

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:

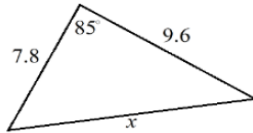
$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$

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Cosine Rule (missing side)

For missing side:

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

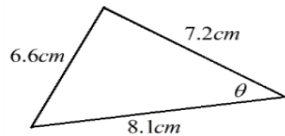


$$x^2 = 9.6^2 + 7.8^2 - (2 \times 9.6 \times 7.8 \times \cos 85)$$

$$x = 11.8$$

Cosine Rule (missing angle)

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

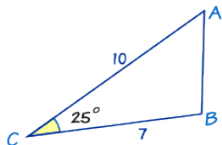


$$\cos \theta = \frac{7.2^2 + 8.1^2 - 6.6^2}{2 \times 7.2 \times 8.1}$$

$$\theta = 50.7^\circ$$

Area of triangle

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



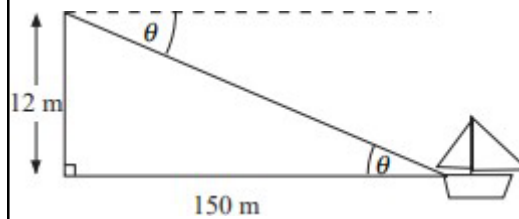
$$\frac{1}{2} \times 7 \times 10 \times \sin 25$$

$$A = 14.8$$

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).

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

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

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

$$\theta = 4.6$$

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 chance. 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

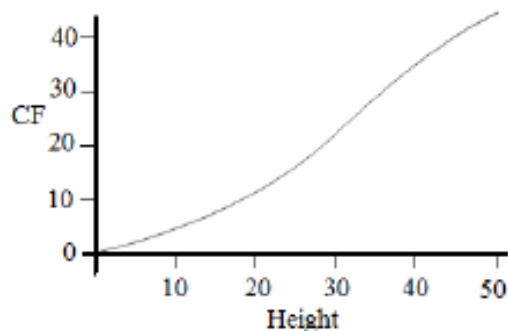
Cumulative frequency

Cumulative Frequency is a running total.

Age	Frequency	Cumulative Frequency
$0 < a \leq 10$	15	15
$10 < a \leq 40$	35	$15 + 35 = 50$
$40 < a \leq 50$	10	$50 + 10 = 60$

A cumulative frequency diagram is a curve that goes up. It looks a little like a stretched-out S shape.

Plot the cumulative frequencies at the end-point of each interval.



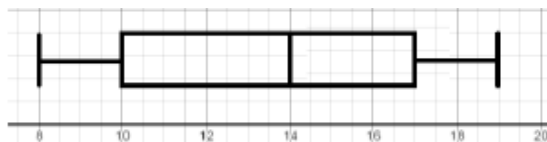
You can find the Lower Quartile, Median, and Upper quartile by drawing lines $\frac{1}{4}$ of the way, $\frac{1}{2}$ of the way and $\frac{3}{4}$ of the way across the cumulative frequency axis. Then see where this line hits the curve and then read down onto the x axis.

Boxplot

The minimum, lower quartile, median, upper quartile and maximum are shown on a box plot.

Example

Students sit a maths test. The highest score is 19, the lowest score is 8, the median is 14, the lower quartile is 10 and the upper quartile is 17. Draw a box plot to represent this information.



Boxplot Keywords

Lower Quartile - represents the first $\frac{1}{4}$ of the data (halfway between minimum value and median).

Median - the middle value

Upper Quartile - represents $\frac{3}{4}$ of data (halfway between median and maximum value)

Interquartile Range (IQR) - Difference between upper quartile and lower quartile.

Comparing Boxplots

Write two sentences.

1. Compare the averages using the medians for two sets of data.
2. Compare the spread of the data using the range or IQR for two sets of data.

The smaller the range/IQR, the more consistent the data.

You must compare box plots in the context of the problem.

Example:

'On average, students in class A were more successful on the test than class B because their median score was higher.'

'Students in class B were more consistent than class A in their test scores as their IQR was smaller.'

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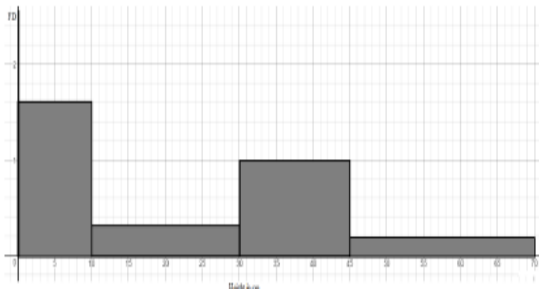
Histograms

A visual way to display frequency data using bars. Bars can be unequal in width.

Histograms show *frequency density* on the y-axis, not frequency.

$$\text{Frequency Density} = \frac{\text{Frequency}}{\text{Class Width}}$$

Height(cm)	Frequency	Frequency Density (FD)
$0 < h \leq 10$	8	$8 \div 5 = 1.6$
$10 < h \leq 30$	6	$6 \div 20 = 0.3$
$30 < h \leq 45$	15	$15 \div 15 = 1$
$45 < h \leq 70$	5	$5 \div 25 = 0.2$

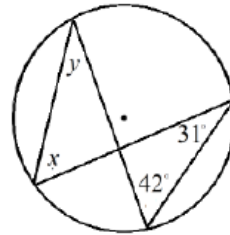


The area of the bar is proportional to the frequency of that class interval.

$$\text{Frequency} = \text{Freq Density} \times \text{Class Width}$$

Circle Theorem: Angles in the same segment are equal.

Example:

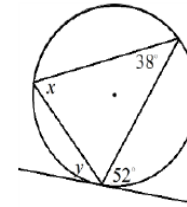


$$x = 42^\circ$$

$$y = 31^\circ$$

Circle Theorem: Alternate segment theorem

Example:

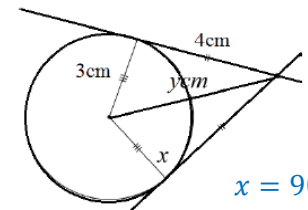


$$x = 52^\circ$$

$$y = 38^\circ$$

Circle Theorem: A tangent meets a radius at 90°

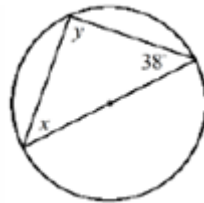
Example:



$$x = 90^\circ$$

Circle Theorem: Angle in a semi-circle has a right angle at the circumference

Example:

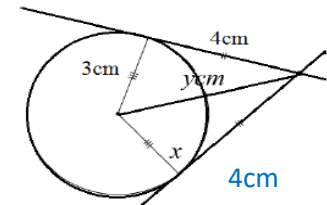


$$y = 90^\circ$$

$$x = 180 - 90 - 38 = 52^\circ$$

Circle Theorem: Tangents from an external point are equal in length.

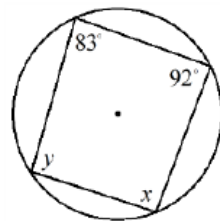
Example:



$$4 \text{ cm}$$

Circle Theorem: Opposite angles in a cyclic quadrilateral add up to 180°

Example:

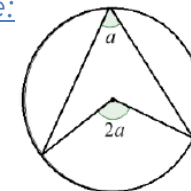


$$x = 180 - 83 = 97^\circ$$

$$y = 180 - 92 = 88^\circ$$

Circle Theorem: Angle at centre is twice the angle at circumference.

Example:

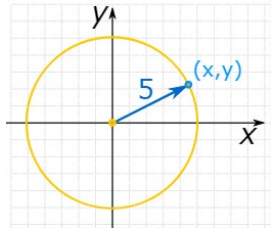


$$x = 104 \div 2 = 52^\circ$$

Graphs of circles

The equation of a circle, centre (0,0), radius r, is:

$$x^2 + y^2 = r^2$$



$$x^2 + y^2 = 25$$

The equation of a circle is always in the form:

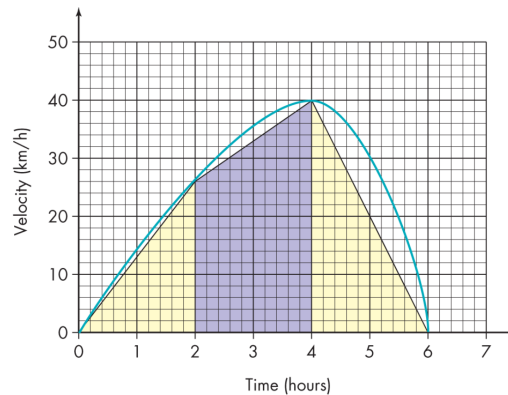
$$x^2 + y^2 = r^2$$

This is provided the centre of the circle is (0,0). This is because you can find the equation of a circle using Pythagoras theorem.

Area under a curve

You can only estimate the area under a curve.

This can be done by splitting the area up into similar shapes (such as rectangles, triangles and trapeziums). You can find the area of each of these shapes and then add them together.



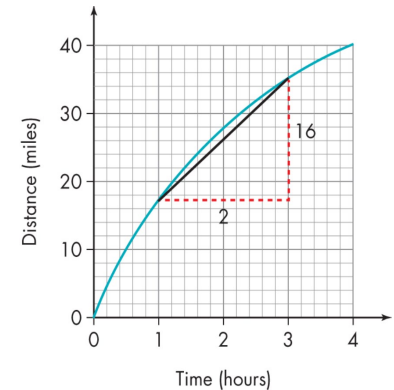
Gradient of a curve

Remember gradient is the change in y over the change in x!

The gradient of a curve at a point is the same as the gradient of the tangent at that point.

1. Draw a tangent carefully at the point.
2. Make a right-angled triangle.
3. Use the measurements on the axes to calculate the rise and run (change in y and change in x)
4. Calculate the gradient.

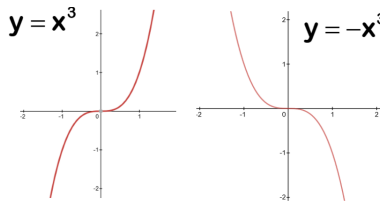
Example:



$$\text{Gradient} = \frac{16}{2} = 8$$

Cubic graph

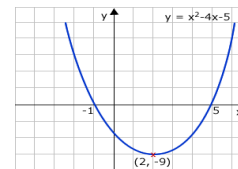
Cubic graphs are a curve shape – the diagram below shows the difference between a positive and negative cubic graph:



Cubic graphs are in the form $ax^3 + bx^2 + cx + d = 0$.

Quadratic graph

A 'U-shaped' curve called a parabola. The equation is of the form $y = ax^2 + bx + c$, where a, b and c are numbers, $a \neq 0$.



If $a < 0$, the parabola is upside down.

A root is a solution. The roots of a quadratic are the x-intercepts of the quadratic graph

Adding and subtracting Algebraic Fractions

Use the same method for adding and subtracting fractions – find a common denominator!

Example:

$$\begin{aligned} & \frac{1}{x} + \frac{x}{2y} \\ &= \frac{1(2y)}{2xy} + \frac{x(x)}{2xy} \\ &= \frac{2y + x^2}{2xy} \end{aligned}$$

Multiplying Algebraic Fractions

Multiply numerators and multiply the denominators!

Example:

$$\begin{aligned} & \frac{x}{3} \times \frac{x+2}{x-2} \\ &= \frac{x(x+2)}{3(x-2)} \\ &= \frac{x^2 + 2x}{3x - 6} \end{aligned}$$

Dividing Algebraic Fractions

Multiply the first fraction by the reciprocal of the second fraction.

Example:

$$\begin{aligned} & \frac{x}{3} \div \frac{2x}{7} \\ &= \frac{x}{3} \times \frac{7}{2x} \\ &= \frac{7x}{6x} = \frac{7}{6} \end{aligned}$$

Functions

A function is the relationship between two sets of values.

Notation:

f(x)
x is the input value
f(x) is the output value.

Composite Functions

A combination of two or more functions to create a new function. fg(x) is the composite function that substitutes the function g(x) into the function f(x).

fg(x) means 'do g first, then f'
gf(x) means 'do f first, then g'

Example:

$$f(x) = 5x - 3, g(x) = \frac{1}{2}x + 1$$

What is fg(4)?

$$g(4) = \frac{1}{2} \times 4 + 1 = 3$$

$$f(3) = 5 \times 3 - 3 = 12 = fg(4)$$

What is fg(x)?

$$fg(x) = 5 \left(\frac{1}{2}x + 1 \right) - 3 = \frac{5}{2}x + 2$$

Inverse Functions

$$f^{-1}(x)$$

A function that performs the opposite process of the original function.

1. Write the function as y=f(x)
2. Rearrange to make x the subject.
3. Replace the y with x and the x with f⁻¹(x)

Example:

f(x) = (1 - 2x)⁵. Find the inverse.

$$\begin{aligned} y &= (1 - 2x)^5 \\ \sqrt[5]{y} &= 1 - 2x \\ 1 - \sqrt[5]{y} &= 2x \\ \frac{1 - \sqrt[5]{y}}{2} &= x \end{aligned}$$

$$f^{-1}(x) = \frac{1 - \sqrt[5]{x}}{2}$$

Algebraic Proof

To demonstrate or show that a statement is true, we use examples. To prove that a statement is true you can use algebra.

Some useful generalisations

Consecutive Integers	n, n + 1, n + 2, ...
Even Numbers	2n
Odd Numbers	2n + 1
Consecutive Evens	2n, 2n + 2, 2n + 4, ...
Consecutive Odd	2n + 1, 2n + 3, ...

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Algebraic proof - Example:

Prove that the square of an odd number is always odd.

Let the odd number be $2n + 1$.

$$\begin{aligned} \text{So } (2n + 1)^2 &= (2n + 1)(2n + 1) \\ &= 4n^2 + 4n + 1 \end{aligned}$$

We can take out a factor of 2 (ignore the 1).

As $2(2n^2 + 2n)$ is even, then when we add 1, the number must be odd.

Prove for any 3 consecutive integers the difference between the product of the first 2 and the product of last two is always twice the middle number

Let the consecutive integers be $n, n + 1$ and $n + 2$.

The product of the first and second

$$n(n + 1) = n^2 + n$$

The product of the second and third

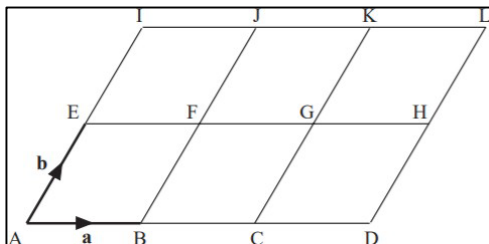
$$(n + 1)(n + 2) = n^2 + 3n + 2$$

So the difference between these products is

$$n^2 + 3n + 2 - n^2 + n = 2n + 2$$

This equals $2(n + 1)$ which is twice the middle number

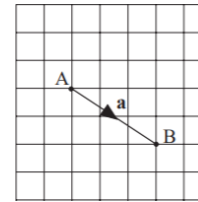
Vectors can be used to describe movements in Geometry as seen below:



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

Vectors describe a movement.

A vector has a direction and a distance.



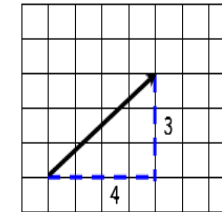
This diagram shows the vector:

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

Magnitude

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

Example



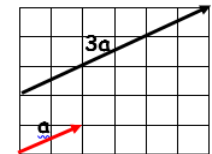
Magnitude (length) can be calculated using Pythagoras Theorem:
 $3^2 + 4^2 = 25$
 $\sqrt{25} = 5$

Scalar of a Vector

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

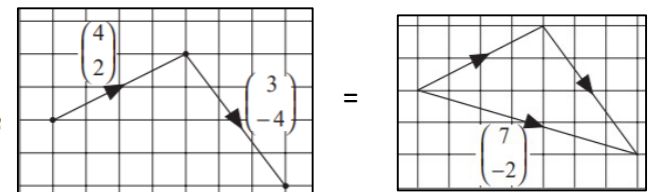
Example

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



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

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



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Depreciation

This is where the value of something devalues at the same percentage rate each year.

Example

John buys a car for £17000. It depreciates in value every year by 8%. What will it be worth after 5 years?

$$\begin{aligned} \text{Cost} &- \text{interest} \\ 100\% &- 8\% = 92\% = 0.92 \\ 17000 \times 0.92^5 &= 11204.39 \end{aligned}$$

Answer £11204.39

Compound Interest

Amount of interest changes each year based on what is in the bank at the end of the year.

Example

John invests £3000 in a bank that pays 1.5% compound interest. How much will he have after 4 years?

$$\begin{aligned} \text{Investment} + \text{interest} \\ 100\% + 1.5\% &= 101.5\% = 1.015 \\ 3000 \times 1.015^4 &= 3184.09 \end{aligned}$$

Answer £3184.09

Simple Interest

Same amount of interest is added on each year.

Example

£200 is invested into a bank account with a rate of 3% simple interest for 2 years.

$$3\% \text{ of } 200 = \text{£}6$$

$$\text{Year 1} = \text{£}200 + \text{£}6 = \text{£}206$$

$$\text{Year 2} = \text{£}206 + \text{£}6 = \text{£}212$$

ANSWER: £212 in bank account at end of the year.

Reverse percentage

Example

Jane buys a pair of trousers in a sale for £68 after they were reduced by 15%. What was the original cost of the trousers?

Trousers now worth 85% of original price

$$85\% = 68$$

$$1\% = 68 \div 85 = 0.8$$

$$100\% = 0.8 \times 100 = 80$$

Original cost = £80

Subject of a formula

A formula usually has a single variable on one side of the equals sign. This is called the subject of the formula. Sometimes you will want to rearrange the formula so that one of the other variables becomes the subject. To do this you use inverse operations (in a similar way to solving equations) in order to isolate the new subject.

Examples

Make r the subject of $C = 2\pi r$.

To isolate r , divide by 2π .

$$\frac{C}{2\pi} = r$$

We often write formulae with the subject on the left-hand side, so this becomes

$$r = \frac{C}{2\pi}$$

Make x the subject of $y = \frac{x}{5} + 3$.

To isolate x , start by subtracting 3.

$$y - 3 = \frac{x}{5}$$

Next, multiply by 5 – remember to multiply each term of the left-hand side.

$$5(y - 3) = x$$

$$x = 5(y - 3)$$

Subject of a formula

More difficult questions – think about inverse operations to help you!

Examples

Make r the subject of $V = \frac{1}{3}\pi r^2 h$.

To start, isolate r^2 by multiplying by 3 and then dividing by πh .

$$3V = \pi r^2 h$$

$$\frac{3V}{\pi h} = r^2$$

Now we square root both sides.

$$\sqrt{\frac{3V}{\pi h}} = r$$

$$r = \sqrt{\frac{3V}{\pi h}}$$

Make x the subject of $3x + 5 = y - ax$.

When a formula contains the new subject more than once, start by isolating any terms including it on one side of the equals sign.

Here, add ax and subtract 5.

$$3x + ax = y - 5$$

Now we factorise the side with our new subject.

$$x(3 + a) = y - 5$$

Then divide by the bracket to leave x on its own.

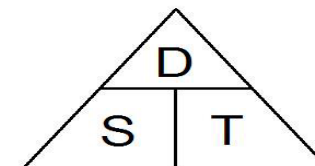
$$x = \frac{y - 5}{3 + a}$$

Speed, Distance, Time

Speed = Distance \div Time

Distance = Speed \times Time

Time = Distance \div Speed



Example

Speed = 4mph

Time = 2 hours

Find the Distance.

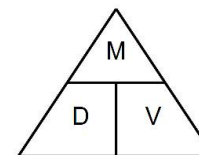
$$D = S \times T = 4 \times 2 = 8 \text{ miles}$$

Density, Mass, Volume

Density = Mass \div Volume

Mass = Density \times Volume

Volume = Mass \div Density



Example

Density = 8kg/m³

Mass = 2000g

Find the Volume.

$$\begin{aligned} V &= M \div D = 2 \div 8 \\ &= 0.25m^3 \end{aligned}$$

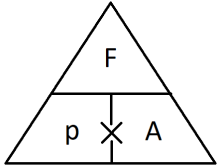
Year 11 Higher (Set 2) Mathematics Knowledge Organiser

Pressure, Force, Area

Pressure = Force \div Area

Force = Pressure \times Area

Area = Force \div Pressure



Remember the correct units.

Example

Pressure = 10 Pascals

Area = 6cm²

Find the Force

$$F = P \times A = 10 \times 6 \\ = 60 \text{ N}$$

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 chance. No predictability to who it will include.

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

Primary data: data collected from an original source for a purpose.

Secondary data: data taken from an external location. Not collected directly.

Outlier: a value that stands apart from the data set

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

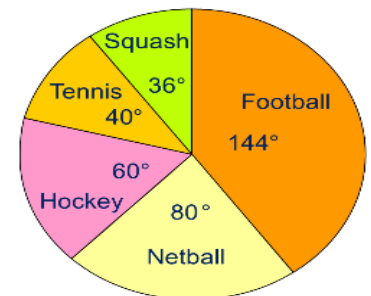
Pie Chart

Used for showing **how data breaks down into** its constituent **parts**.

Remember to **label** the category that each sector in the pie chart represents.

Example

If there are 40 people in a survey, then each person will be worth $360 \div 40 = 9^\circ$ of the pie chart.



Find the angle in a Pie Chart

When drawing a pie chart, **divide 360° by the total frequency**. This will tell you how many degrees to use for the frequency of each category.

$$\text{Angle} = \frac{\text{Frequency}}{\text{Total Frequency}} \times 360$$

Example

In a survey of 30 people, each person would be represented by $\frac{1}{30}$ of the full circle.

$$360 \div 30 = 12^\circ$$

Each person would get 12°

In a survey of 30 people, 12 said their favourite colour is red.

$$\frac{12}{30} \times 360 = 144^\circ$$

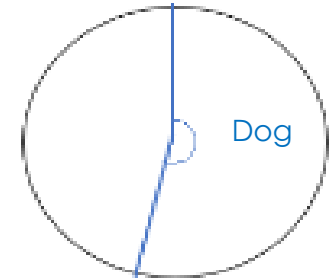
Draw and interpret Pie Charts

Example

Type of pet	Dog	Cat	Hamster
Frequency	32	25	3

There were 60 people asked in this survey (Total frequency)

"32 out of 60 people had a dog" (32/60)
 This fraction of the 360 degrees represents dogs is
 $32/60 \times 360 = 192^\circ$
 Use a protractor to draw
 This is 192°



Multiple method

As 60 goes into 360 – 6 times.

Each frequency can be multiplied by 6 to find the degrees (proportion of 360)

Comparing Pie Charts:

You NEED the overall frequency to make any comparisons

Plans and Elevations

This takes 3D drawings and produces 2D drawings.

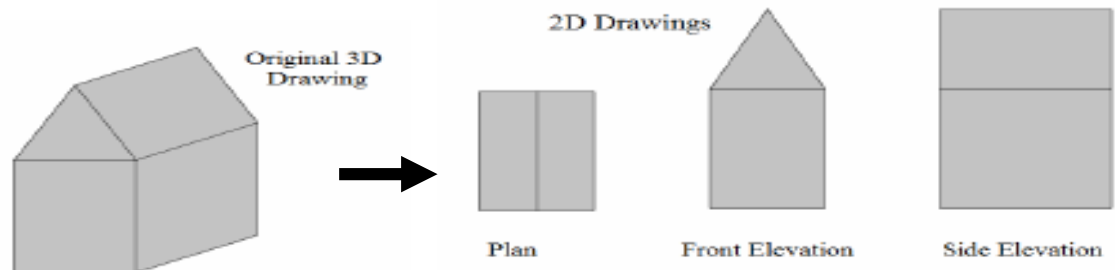
Plan View: from **above**

Side Elevation: from the **side**

Front Elevation: from the **front**

Example

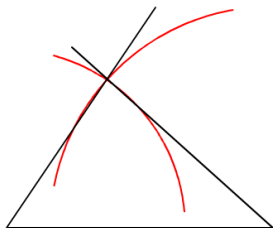
See to the right for the example.



Constructing Triangles (Side, Side, Side)

Angle Bisector: Cuts the angle in half.

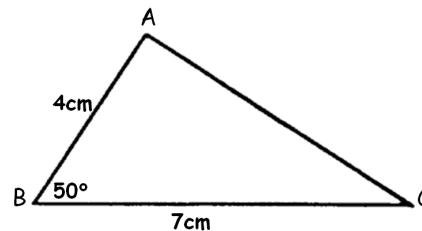
1. Draw the base of the triangle using a ruler.
2. Open a pair of compasses to the width of one side of the triangle.
3. Place the point on one end of the line and draw an arc.
4. Repeat for the other side of the triangle at the other end of the line.
5. Using a ruler, draw lines connecting the ends of the base of the triangle to the point where the arcs intersect.



Constructing Triangles (Side, Angle, Side)

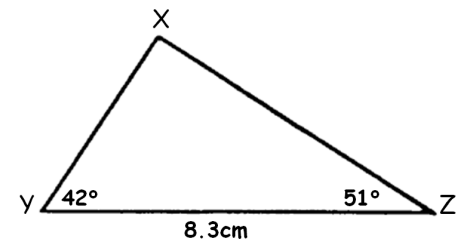
Perpendicular Bisector: Cuts a line in half and at right angles.

1. Draw the base of the triangle using a ruler.
2. Measure the angle required using a protractor and mark this angle.
3. Remove the protractor and draw a line of the exact length required in line with the angle mark drawn.
4. Connect the end of this line to the other end of the base of the triangle.



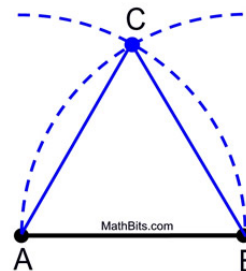
Constructing Triangles (Angle, Side, Angle)

1. Draw the base of the triangle using a ruler.
2. Measure one of the angles required using a protractor and mark this angle.
3. Draw a straight line through this point from the same point on the base of the triangle.
4. Repeat this for the other angle on the other end of the base of the triangle.



Constructing an Equilateral Triangle (also makes a 60° angle)

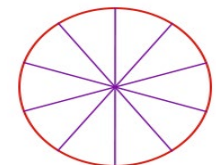
1. Draw the base of the triangle using a ruler.
2. Open the pair of compasses to the exact length of the side of the triangle.
3. Place the sharp point on one end of the line and draw an arc.
4. Repeat this from the other end of the line.
5. Using a ruler, draw lines connecting the ends of the base of the triangle to the point where the arcs intersect.



Equidistant

A point is equidistant from a set of objects if the **distances between that point and each of the objects is the same.**

Example

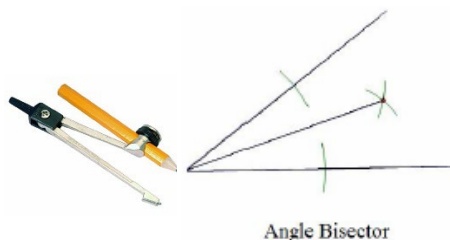


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Angle Bisector

Angle Bisector: Cuts the angle in half.

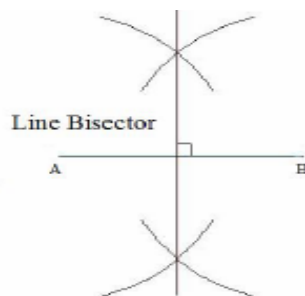
1. Place the sharp end of a pair of compasses on the vertex.
2. Draw an arc, marking a point on each line.
3. Without changing the compass put the compass on each point and mark a centre point where two arcs cross over.
4. Use a ruler to draw a line through the vertex and centre point.



Perpendicular Bisector

Perpendicular Bisector: Cuts a line in half and at right angles.

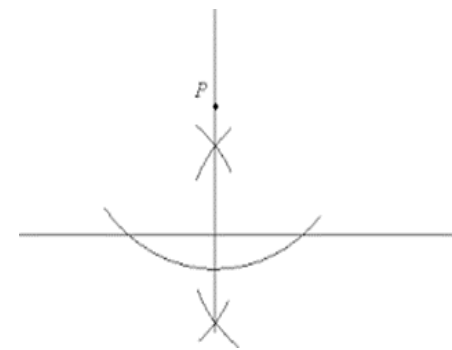
1. Put the sharp point of a pair of compasses on A.
2. Open the compass over half way on the line.
3. Draw an arc above and below the line.
4. Without changing the compass, repeat from point B.
5. Draw a straight line through the two intersecting arcs



Perpendicular from an External Point

The **perpendicular distance** from a point to a line is the **shortest distance** to that line.

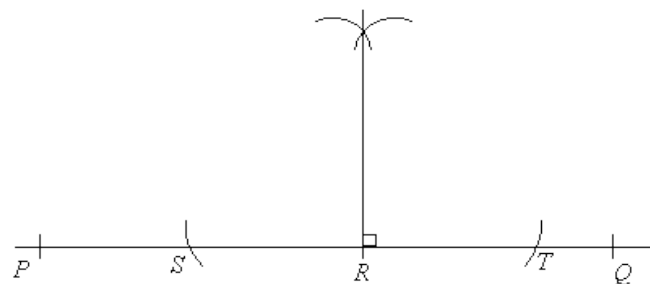
1. Put the sharp point of a pair of compasses on the point.
2. Draw an arc that crosses the line twice.
3. Place the sharp point of the compass on one of these points, open over half way and draw an arc above and below the line.
4. Repeat from the other point on the line.
5. Draw a straight line through the two intersecting arcs.



Perpendicular from a Point on a Line

Given line PQ and point R on the line:

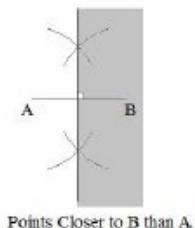
1. Put the sharp point of a pair of compasses on point R.
2. Draw two arcs either side of the point of equal width (giving points S and T)
3. Place the compass on point S, open over halfway and draw an arc above the line.
4. Repeat from the other arc on the line (point T).
5. Draw a straight line from the intersecting arcs to the original point on the line.



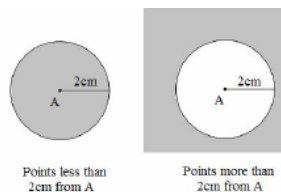
Loci and Regions

A **locus** is a **path of points that follow a rule**.

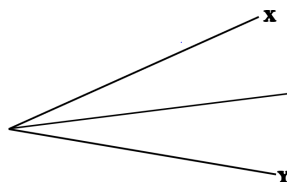
For the locus of points **closer to B than A**, create a **perpendicular bisector** between A and B and shade the side closer to B.



For the locus of points **equidistant from A**, use a compass to draw a **circle**, centre A.



For the locus of points **equidistant to line X and line Y**, create an **angle bisector**.



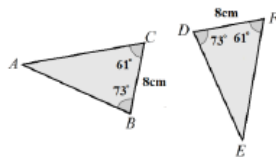
For the locus of points a set **distance from a line**, create **two semi-circles** at either end joined by **two parallel lines**.



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



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

[See the example on the right.](#)

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



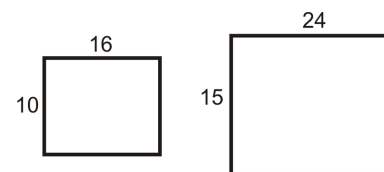
Proving similarity

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

Finding a scale factor

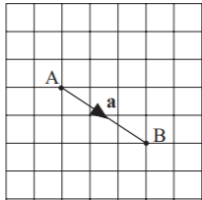
To find a scale factor, divide a length on one shape by the corresponding length on a similar shape.



Scale Factor = $15 \div 10 = 1.5$

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

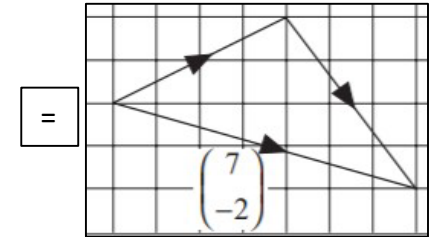
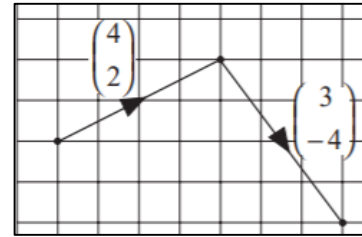


This diagram shows the vector:

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

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

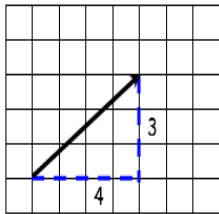
$$\begin{pmatrix} 4 \\ 2 \end{pmatrix} + \begin{pmatrix} 3 \\ -4 \end{pmatrix} = \begin{pmatrix} 7 \\ -2 \end{pmatrix}$$



Magnitude

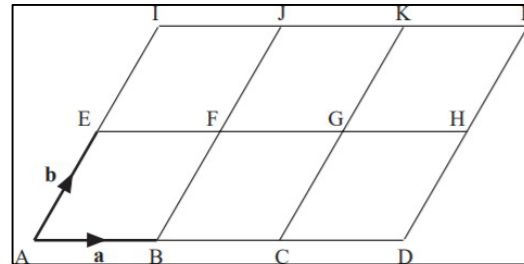
Magnitude is defined as the **length** of a vector.

Example



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

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



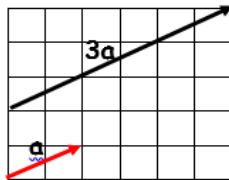
For the diagram on the left:

$$\begin{aligned} \vec{AC} &= 2a \\ \vec{AF} &= a + b \\ \vec{AL} &= 3a + 2b \\ \vec{LE} &= -3a - b \end{aligned}$$

Scalar of a Vector

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

Example



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

Solving Two Step Equations

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

$$\begin{array}{l} +1 \\ \times 2 \end{array} \begin{array}{l} \curvearrowright \\ \curvearrowright \end{array} \begin{array}{l} 2x + 1 = 9 \\ 2x = 8 \\ x = 4 \end{array} \begin{array}{l} -1 \\ \div 2 \end{array} \begin{array}{l} \curvearrowleft \\ \curvearrowleft \end{array}$$

Solving Equations involving fractions

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

$$\begin{array}{l} \div 2 \\ +3 \end{array} \begin{array}{l} \curvearrowright \\ \curvearrowright \end{array} \begin{array}{l} \frac{x+3}{2} = 4 \\ x+3 = 8 \\ x = 5 \end{array} \begin{array}{l} \times 2 \\ -3 \end{array} \begin{array}{l} \curvearrowleft \\ \curvearrowleft \end{array}$$

Solving Equations with unknowns on both sides

Add/subtract the smallest algebraic term from both sides:

$$\begin{array}{l} -3a \\ -8 \\ \div 4 \end{array} \begin{array}{l} \curvearrowright \\ \curvearrowright \\ \curvearrowright \end{array} \begin{array}{l} 3a - 4 = 7a + 8 \\ -4 = 4a + 8 \\ -12 = 4a \\ -3 = a \end{array} \begin{array}{l} -3a \\ -8 \\ \div 4 \end{array} \begin{array}{l} \curvearrowleft \\ \curvearrowleft \\ \curvearrowleft \end{array}$$

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 (substitution)

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

$$\begin{aligned} y - 2x &= 3 \\ 3x + 4y &= 1 \end{aligned}$$

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

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

$$\begin{aligned} \text{Solve: } 3x + 8x + 12 &= 1 \\ 11x &= -11 \\ x &= -1 \end{aligned}$$

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

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

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.

Solving Simultaneous Equations (Graphically)

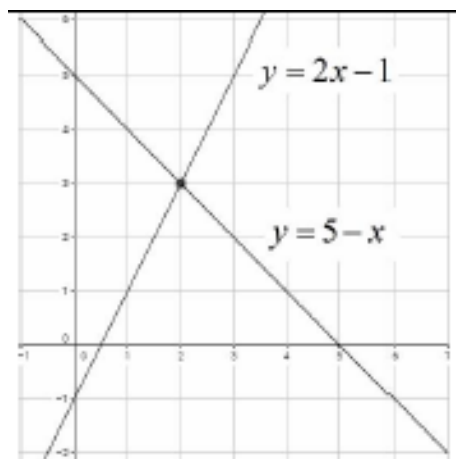
Draw the graphs of the two equations.

The **solutions** will be **where the lines meet**.

The solution can be written as a **coordinate**.

Example

$$y = 5 - x \text{ and } y = 2x - 1.$$



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

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

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

$$\underline{\hspace{1cm}} \\ 3y = 9 \quad (3) - (2)$$

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 $y = 3$.

Proportion

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

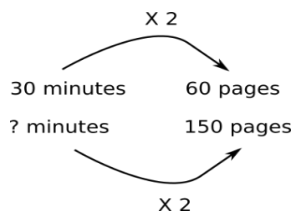
Example

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 (\div by 8)
 13 cakes for £2.05 → 15.8p each (\div 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.

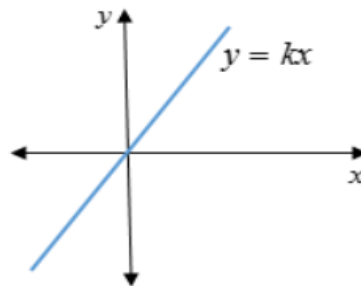
Example

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 (\div by 3)
 So 5 cakes = 750 g (\times 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 $x = 150$

$Y = kx$

$10 = 500k$ therefore $k = 1 / 50$

$Y = 1 / 50 x$

$y = 1 / 50 \times 150$

$y = 3$

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 $k = 48$

$P = 48/2$ $P = 24$

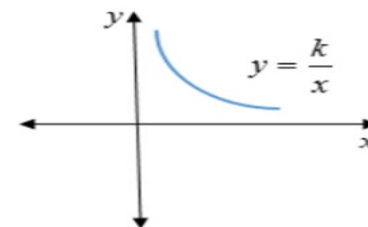
Inverse proportion

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



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Recurring Decimal

A decimal with one or a group of digits that repeat itself indefinitely.

E.g. $0.\dot{2}\dot{3} = 0.23232323\dots$

Convert 0.84 to a fraction.

Multiply the decimal so that the repeated decimal digits are on the left side of the decimal point.

$$\begin{aligned}x &= 0.84848484 \\ 100x &= 84.848484\end{aligned}$$

Subtract x from $100x$.
 $99x = 84$

Isolate x , then simplify:

$$x = \frac{84}{99} = \frac{28}{33}$$

Fractional Indices

The denominator of a fractional power acts as a 'root'. The numerator of a fractional power acts as a normal power.

$$a^{\frac{m}{n}} = (\sqrt[n]{a})^m$$

Example

$$27^{\frac{2}{3}} = (\sqrt[3]{27})^2 = 3^2 = 9$$

$$\left(\frac{25}{16}\right)^{\frac{3}{2}} = \left(\frac{\sqrt{25}}{\sqrt{16}}\right)^3 = \left(\frac{5}{4}\right)^3 = \frac{125}{64}$$

Negative Indices

$$a^{-n} = \frac{1}{a^n}$$

Example

$$\begin{aligned}3^{-2} &= \frac{1}{3^2} \\ &= \frac{1}{9}\end{aligned}$$

Expand (Linear)

To expand a bracket, **multiply** each term **in the bracket** by the expression **outside** the bracket.

Example

$$3(m + 7) = 3m + 21$$

Factorise (Linear)

The **reverse** of **expanding**.

Factorising is writing an expression as a product of terms by **'taking out'** a **common factor**.

Example

$$6x - 15 = 3(2x - 5),$$

where 3 is the common factor.

Expand (Quadratic)

Each term in one bracket needs to be multiplied by each term in the other bracket.

Example (grid method)

$$(x + 2)(x + 5)$$

	x	$+5$
x	x^2	$+5x$
$+2$	$+2x$	$+10$

Factorise (Quadratic)

What numbers multiply to make the last number in the expression? Which of these factors add /subtract to make the number in the middle?

Example

$$\begin{aligned}x^2 - 2x - 3 \\ (x - 3)(x + 1)\end{aligned}$$

Upper and Lower Bounds

The upper and lower bound come from the largest and smallest values that would round to a particular number. Take 'half a unit above and half a unit below'. For example rounded to 1 d.p means nearest 0.1, so add 0.05 and subtract 0.05 to get the bounds.

All error intervals look the same like this - $\leq x <$

Example - State the upper and lower bound of 360 when it has been rounded to 2 significant figures:

2 significant figures is the nearest 10, so 'half this' to get 5, and add on to 360 and take it off 360,

$$355 \leq x < 365$$

Solving Quadratics By Factorising

Make the equation equal to 0 and factorise. The solutions of the unknowns is the value to make each bracket equal to 0:

$$x^2 - 3x = 18$$

$$+18 \quad \curvearrowright \quad x^2 - 3x - 18 = 0 \quad \curvearrowleft \quad +18$$

Factorise

$$(x + 3)(x - 6) = 0$$

$$\begin{array}{ccc} \downarrow & & \downarrow \\ x + 3 = 0 & & x - 6 = 0 \\ x = -3 & \text{or} & x = 6 \end{array}$$

The Quadratic Formula

This is a proven formula to solve quadratics. The \pm part is how you get more than one solution.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

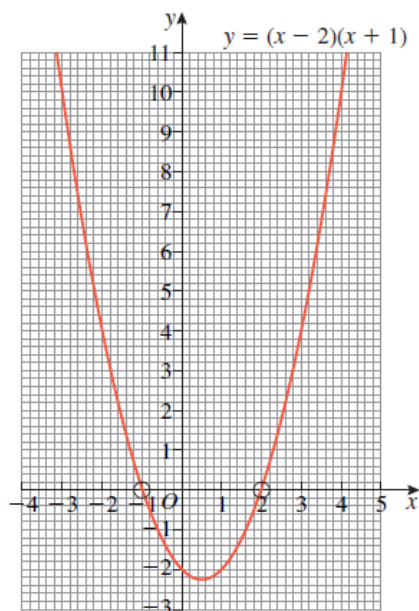
The quadratic expression must be equal to zero first. This formula needs to be memorised!

Solving Quadratics graphically

Quadratics can also be solved graphically.

Draw the graph of the quadratic – by substituting in values from the graph.

x	-3	-2	-1	0	1	2	3	4
y	10	4	0	-2	-2	0	4	10



The Solutions or Roots are where $y=0$, at the points $(-1,0)$ and $(2,0)$

Using the Quadratic Formula

Quadratics are usually in the form:

$$ax^2 + bx + c = 0$$

This is how we pick out the values that will be substituted into the formula:

$$x^2 + 4x + 2 = 0$$

$$a = 1 \quad b = 4 \quad c = 2$$

Now that you have the a, b and c values these can now be substituted into the formula – then gradually start to simplify the formula:

$$x = \frac{-4 \pm \sqrt{4^2 - 4 \times 1 \times 2}}{2 \times 1}$$

$$\Rightarrow x = \frac{-4 \pm \sqrt{8}}{2}$$

$$\Rightarrow x = -0.585...$$

$$= -0.59 \text{ (1dp)}$$

$$\text{or } x = -3.414...$$

$$= -3.41 \text{ (1dp)}$$

NOTE:

Another way you can solve quadratics is to 'complete the square' and 'iteration'. You will come across these later in the year.

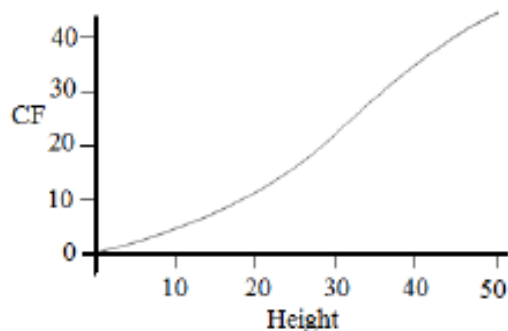
Cumulative frequency

Cumulative Frequency is a running total.

Age	Frequency	Cumulative Frequency
$0 < a \leq 10$	15	15
$10 < a \leq 40$	35	$15 + 35 = 50$
$40 < a \leq 50$	10	$50 + 10 = 60$

A cumulative frequency diagram is a curve that goes up. It looks a little like a stretched-out S shape.

Plot the cumulative frequencies at the end-point of each interval.



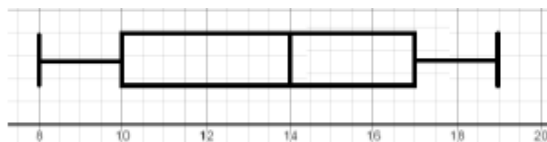
You can find the Lower Quartile, Median, and Upper quartile by drawing lines $\frac{1}{4}$ of the way, $\frac{1}{2}$ of the way and $\frac{3}{4}$ of the way across the cumulative frequency axis. Then see where this line hits the curve and then read down onto the x axis.

Boxplot

The minimum, lower quartile, median, upper quartile and maximum are shown on a box plot.

Example

Students sit a maths test. The highest score is 19, the lowest score is 8, the median is 14, the lower quartile is 10 and the upper quartile is 17. Draw a box plot to represent this information.



Boxplot Keywords

Lower Quartile - represents the first $\frac{1}{4}$ of the data (halfway between minimum value and median).

Median - the middle value

Upper Quartile - represents $\frac{3}{4}$ of data (halfway between median and maximum value)

Interquartile Range (IQR) - Difference between upper quartile and lower quartile.

Comparing Boxplots

Write two sentences.

1. Compare the averages using the medians for two sets of data.
2. Compare the spread of the data using the range or IQR for two sets of data.

The smaller the range/IQR, the more consistent the data.

You must compare box plots in the context of the problem.

Example:

'On average, students in class A were more successful on the test than class B because their median score was higher.'

'Students in class B were more consistent than class A in their test scores as their IQR was smaller.'

Year 11 Higher (Set 2) Mathematics Knowledge Organiser

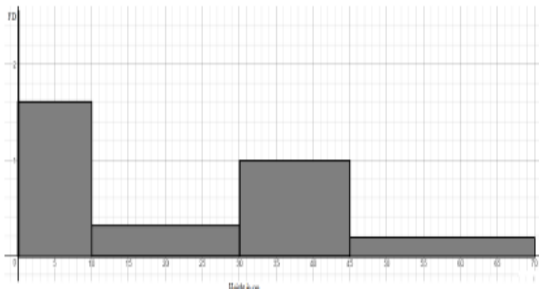
Histograms

A visual way to display frequency data using bars. Bars can be unequal in width.

Histograms show *frequency density* on the y-axis, not frequency.

$$\text{Frequency Density} = \frac{\text{Frequency}}{\text{Class Width}}$$

Height(cm)	Frequency	Frequency Density (FD)
$0 < h \leq 10$	8	$8 \div 5 = 1.6$
$10 < h \leq 30$	6	$6 \div 20 = 0.3$
$30 < h \leq 45$	15	$15 \div 15 = 1$
$45 < h \leq 70$	5	$5 \div 25 = 0.2$

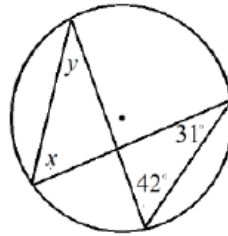


The area of the bar is proportional to the frequency of that class interval.

$$\text{Frequency} = \text{Freq Density} \times \text{Class Width}$$

Circle Theorem: Angles in the same segment are equal.

Example:

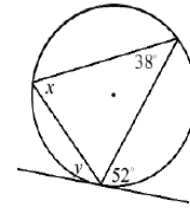


$$x = 42^\circ$$

$$y = 31^\circ$$

Circle Theorem: Alternate segment theorem

Example:

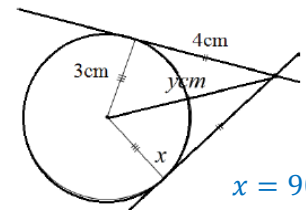


$$x = 52^\circ$$

$$y = 38^\circ$$

Circle Theorem: A tangent meets a radius at 90°

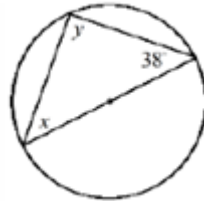
Example:



$$x = 90^\circ$$

Circle Theorem: Angle in a semi-circle has a right angle at the circumference

Example:

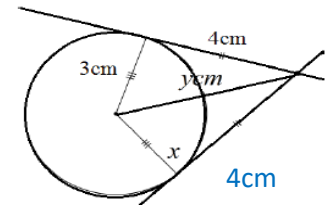


$$y = 90^\circ$$

$$x = 180 - 90 - 38 = 52^\circ$$

Circle Theorem: Tangents from an external point are equal in length.

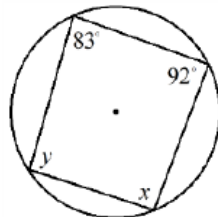
Example:



$$4\text{cm}$$

Circle Theorem: Opposite angles in a cyclic quadrilateral add up to 180°

Example:

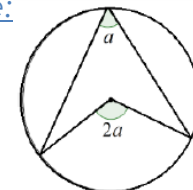


$$x = 180 - 83 = 97^\circ$$

$$y = 180 - 92 = 88^\circ$$

Circle Theorem: Angle at centre is twice the angle at circumference.

Example:

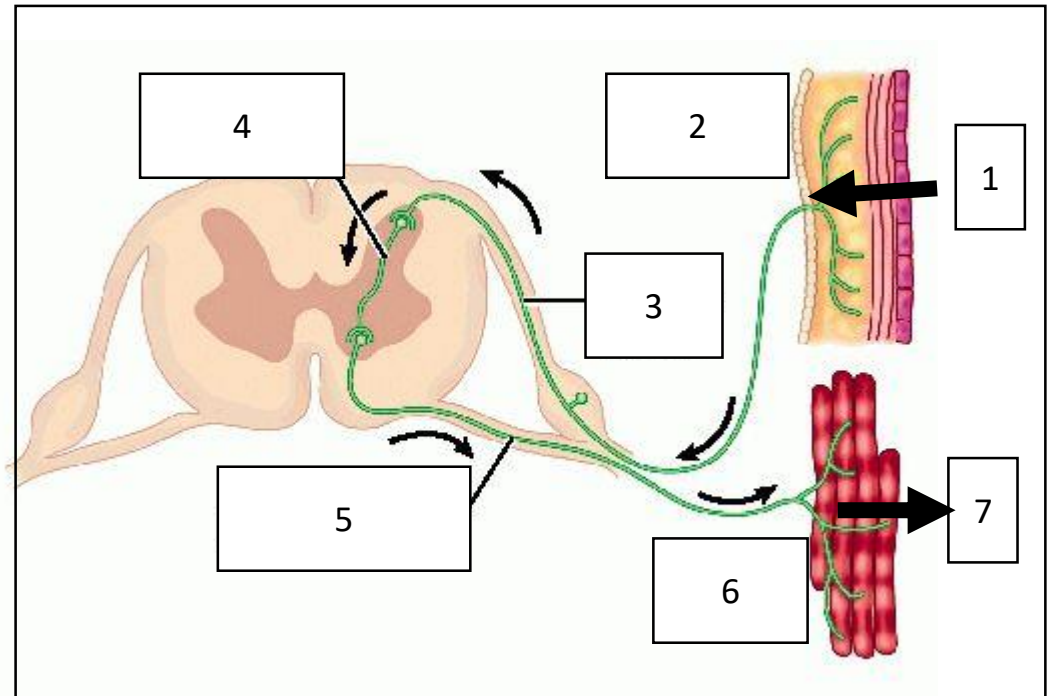


$$x = 104 \div 2 = 52^\circ$$

Biology Topic 5: Homeostasis and response

1. Keywords

Homeostasis	The regulation of the internal conditions of a cell or organism to maintain optimum conditions for function in response to internal and external changes.
Optimum conditions	The perfect conditions for an organism to survive and grow. E.g. blood glucose level, body temperature and water level.
Nervous response	Uses electrical signal in nerves to make fast changes
Chemical response	Uses hormones in the blood to make changes.
Reflex arc	A nervous response that is fast and automatic for protection. Does not involve the conscious brain.
CNS	(Central nervous system) The brain and the spinal chord
Neurone	Nerve cell. Carries an electrical signal from one end to the other

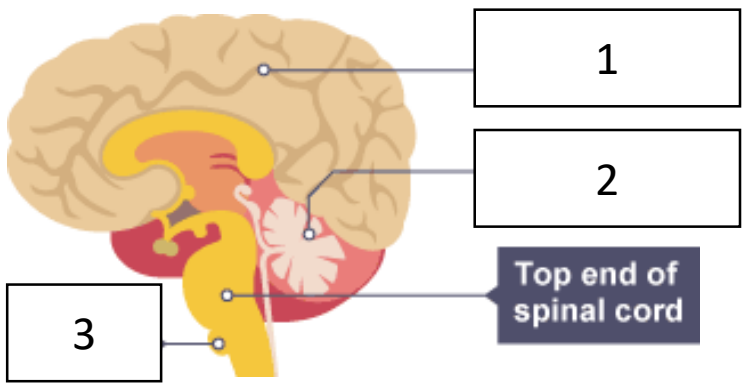


2. Nervous system: Reflex arc

No.	1	2	3	4	5	6	7
Section	Stimulus	Receptor	Sensory neurone	Co-ordinator	Motor neurone	Effector	Response
Definition	A change to the environment that triggers a nervous response	A cell which detects a specific stimulus	A neurones which carries electrical signal from receptor to CNS	The area that receives and processes the information	Neurone that connects the CNS to the effector	The organ that creates the correct response form the stimulus	The effect of the stimulus. Often designed to prevent injury
Example	Touching a flame	Pain receptor in skin	Sensory neurone	Brain Relay neurone	Motor neurone	Muscle gland	Movement

3. The brain (TRIPLE ONLY)

No	Name	Function
1	Cerebral cortex	High level functions like language, memory and consciousness
2	Cerebellum	Balance and coordination of muscles in the body
3	Medulla	Controls life supporting functions like breathing and heart rate. Key for homeostasis

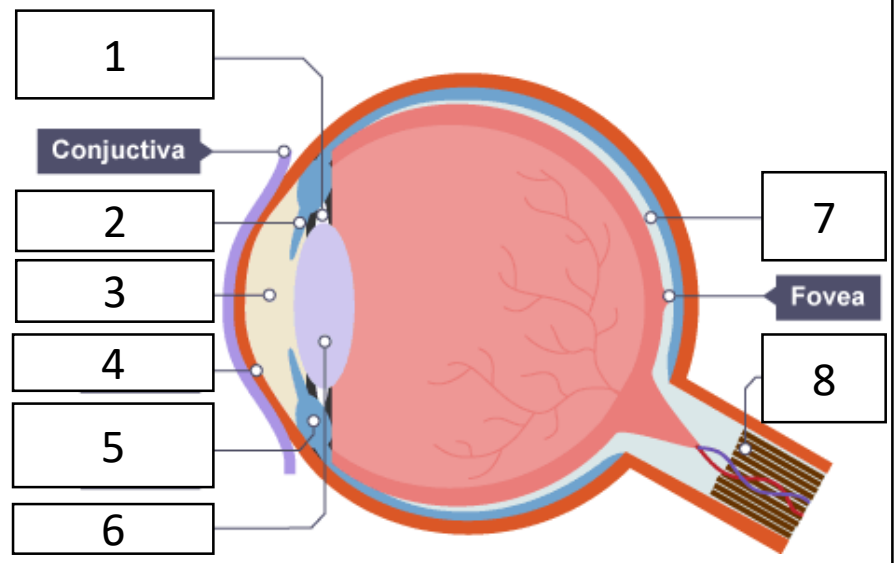


5. Adjusting focus (TRIPLE ONLY)

Object	Near	Distant
Ciliary muscles	Contract	Relax
Suspensory ligaments	Loosen	Tighten
Lens	Is thicker	Is thinner

4. The eye (TRIPLE ONLY)

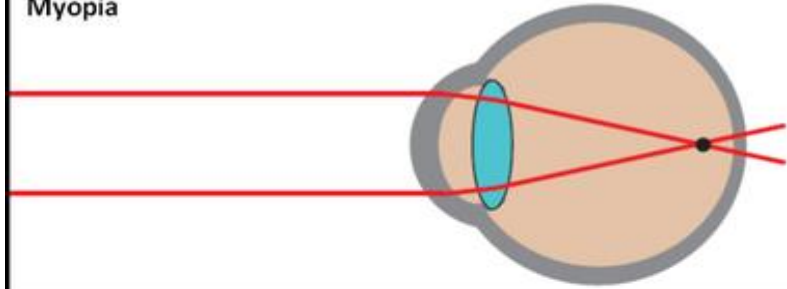
No	Name	Function
	Sclera	White outer protective layer.
1	Suspensory ligaments	Connect ciliary muscles to lens
2	Iris	Controls the size of the pupil
3	Pupil	Hole in eye that lets light through. Wide in dark conditions small in light conditions
4	Cornea	Transparent protective layer
5	Ciliary muscles	Contract to change shape of lens to see near and far objects
6	Lens	Refracts light onto retina
7	Retina	Contain light sensitive rod and cone cells
8	Optic nerve	Send signals from retina to brain to make image



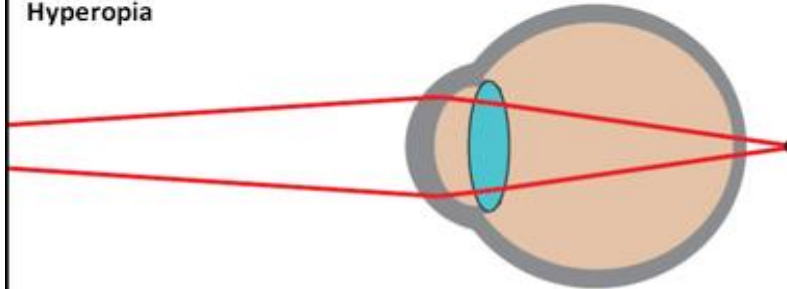
6. Vision problems (TRIPLE ONLY)

Name	Myopia	Hyperopia
Common name	Short-sighted	Long-sighted
Corrected by	<ul style="list-style-type: none"> Glasses Contact lenses Laser eye surgery 	

Myopia



Hyperopia



7. Control of body temperature (TRIPLE ONLY)

Thermoregulatory centre	Part of the brain that receives signals about temperature of the blood and skin
37°C	Optimum internal body temperature
Vasodilation	The widening of blood vessels near the surface of the skin
Vasoconstriction	The narrowing of blood vessels near the surface of the skin
Sweat	Liquid released from pores on skin to cool the body as it evaporates
Shivering	Involuntary muscle contractions to generate heat

How the body responds to changes in temperature

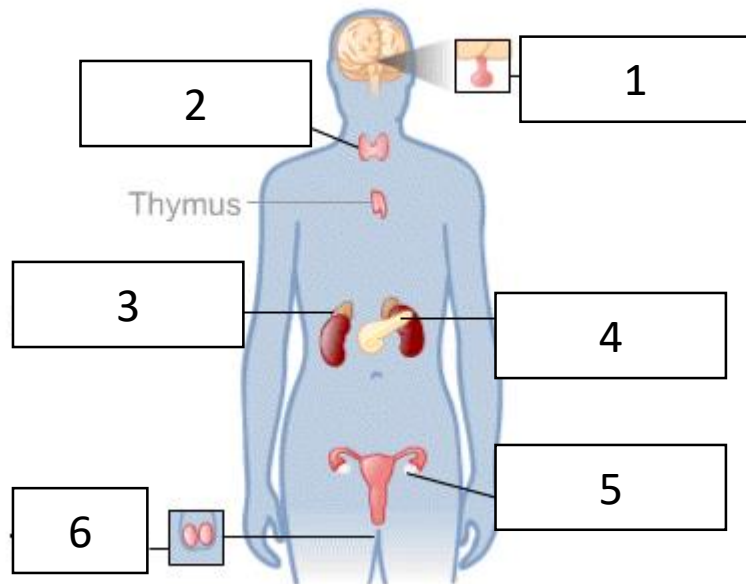
Too hot	Too cold
<ol style="list-style-type: none"> Vasodilation bring blood near the surface Sweating increases Heat is lost through evaporation and radiation Body temp drops 	<ol style="list-style-type: none"> Vasoconstriction take blood away from surface Sweating stops Muscles contractions (shivering) generate heat Body temp increases

8. Hormonal control: Endocrine system

Endocrine system	A chemical response where glands secrete hormones into the blood which make changes around the body
Glands	Special tissues designed to produce specific chemical (hormones)
Secrete	Release

9. Major glands on the body

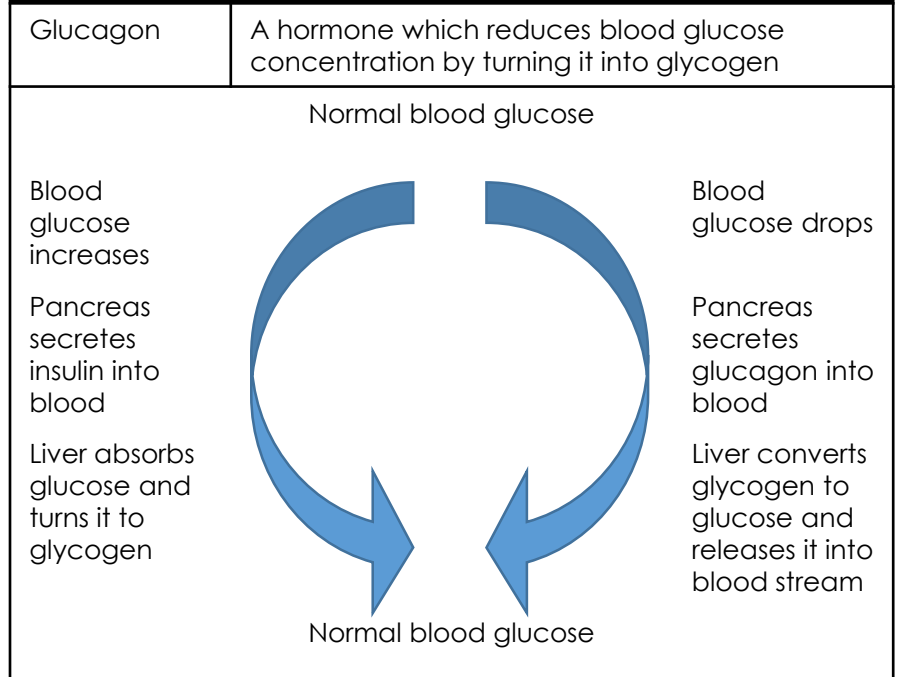
1	Pituitary gland	The 'master gland' makes hormones which affect other glands causing them to secrete hormones
2	Thyroid gland	Controls metabolism
3	Adrenal gland	Makes adrenalin
4	Pancreas	Controls blood sugar levels
5	Ovary	Produces female sex hormones
6	Testes	Produce male sex hormone



10. Control of blood glucose levels

Type 1 diabetes	When the pancreas is damaged from infection and cannot make insulin. Needs injections to treat
Type 2 diabetes	When poor diet and obesity cause body cells to not respond to insulin anymore. Treated with diet and exercise
Insulin	Hormone made in pancreas that reduces glucose levels in the blood
glycogen	The long term store of sugar in the body. Made in the liver

11. Control of blood glucose continued (HT ONLY)



12. Controlling water and nitrogen levels (TRIPLE ONLY)

Urea	The waste product made by the breakdown of amino acids in the liver.
Urine	The urea, excess water and ions not needed by the body. Made by the kidneys
Kidneys	The organ responsible for filtration and selective reabsorption
Selective reabsorption	When the kidneys reabsorb: <ul style="list-style-type: none"> • All of the glucose • Some of the mineral ions • Some of the water
Dialysis	A way of manually filtering the blood when the kidneys are no longer functioning. Whilst waiting for a transplant

13. Hormones and the kidneys (TRIPLE HT ONLY)

ADH (anti-diuretic hormone)	A hormone made in the pituitary gland which increase the reabsorption of water by kidney tubules
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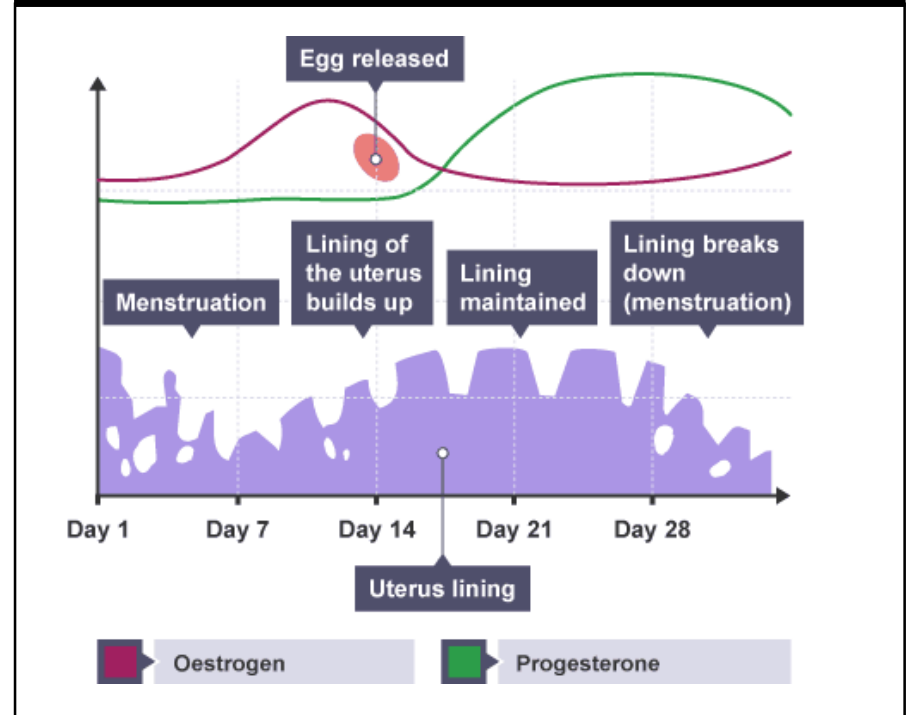
How ADH works:

1. Blood is too concentrated
2. Pituitary gland releases ADH into blood.
3. ADH increase permeability of kidney tubules
4. More water is reabsorbed
5. Blood dilutes to normal levels. Urine is yellow.

14. Reproductive hormones

Hormone	Made in	Function
Testosterone	Testes	Creates male sexual changes at puberty including sperm production
Oestrogen	Ovary	Creates female sexual changes at puberty including ovulation
Follicle stimulating hormone (FSH)	Pituitary gland	Causes egg to mature in ovary
Luteinising hormone (LH)	Pituitary gland	Causes egg to be released by ovary
Progesterone	Ovary	Maintains lining of womb

15. Menstrual cycle (HT ONLY)



16. Contraception

Type	How it works
Oral (the pill)	Stops FSH so no egg released
Injection/implant	Release progesterone which prevents egg maturation for months or years
Barrier (condoms)	Prevent sperm and egg meeting
Intrauterine (the coil)	Prevents embryo implanting
Spermicides	Kill sperm
Abstinence	Not having sex
Surgical (vasectomy/hysterectomy)	Surgically sterilising the adult permanently

17. Hormones in fertility (HT ONLY)

Fertility drugs	Drugs which stimulate the production and release of eggs. Eg FSH and LH
IVF (in vitro fertilisation)	The process of creating an embryo in the lab when couples struggle to conceive a baby
Stages of IVF:	
<ol style="list-style-type: none"> 1. FSH and LH stimulate production of many eggs 2. Eggs are harvested and fertilised by fathers sperm in a lab 3. Fertilised eggs grow in lab 4. A few embryos are implanted into mother womb 	
Possible consequences of IVF	Physical and emotional fatigue Low success rate Risk of multiple births simultaneously

18. Negative feedback (HT ONLY)

Negative feedback	A system where the product reduces the stimulus to return the change to normal levels
Adrenalin	Fight or flight hormone. Increases heart rate and boosts blood supply of oxygen and glucose
Thyroxine	Controls metabolic rate and affects growth and development. Controlled by negative feedback.

19. Plant hormones (TRIPLE ONLY)

Phototropism	The shoot of a plant growing towards light. The root growing away from light
Gravitropism (geotropism)	The shoot of a plant growing up and the roots growing down
Auxin	Group of plant hormones which make cells in shoots grow more and cells in roots grow less. Used as rooting powder and weedkiller.

How tropisms work

Phototropism	<ol style="list-style-type: none"> 1. Shaded side contains more auxin 2. So grows faster 3. Plant leans towards light
Gravitropism	<ol style="list-style-type: none"> 1. Bottom of shoot has more auxin 2. So grows slower 3. Roots bends downwards

20. Other plant hormones (TRIPLE HT ONLY)

Gibberellins	Start seed germination. Used to promote fruit development and flowering
Ethene	Cell division and ripening fruit

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. 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	<ul style="list-style-type: none"> • 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	$A \rightarrow T$ $T \rightarrow A$ $G \rightarrow C$ $C \rightarrow G$
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

6. 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

7. 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

8. 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

9. 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

10. 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

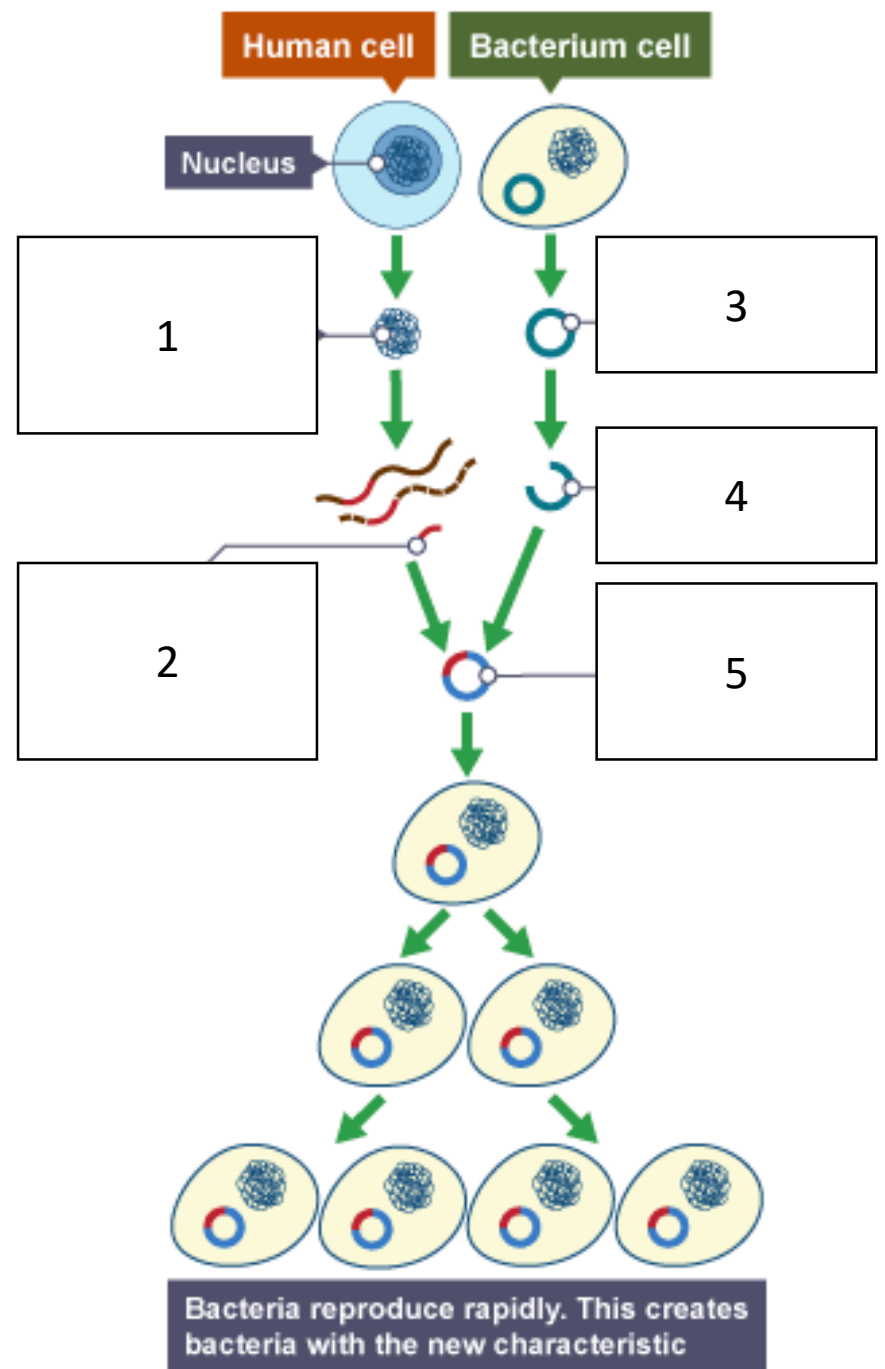
Stages of evolution

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

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	<ul style="list-style-type: none"> • Disease resistance in crops • Increased meat and milk production • Domestication of pets • Large unusual flowers

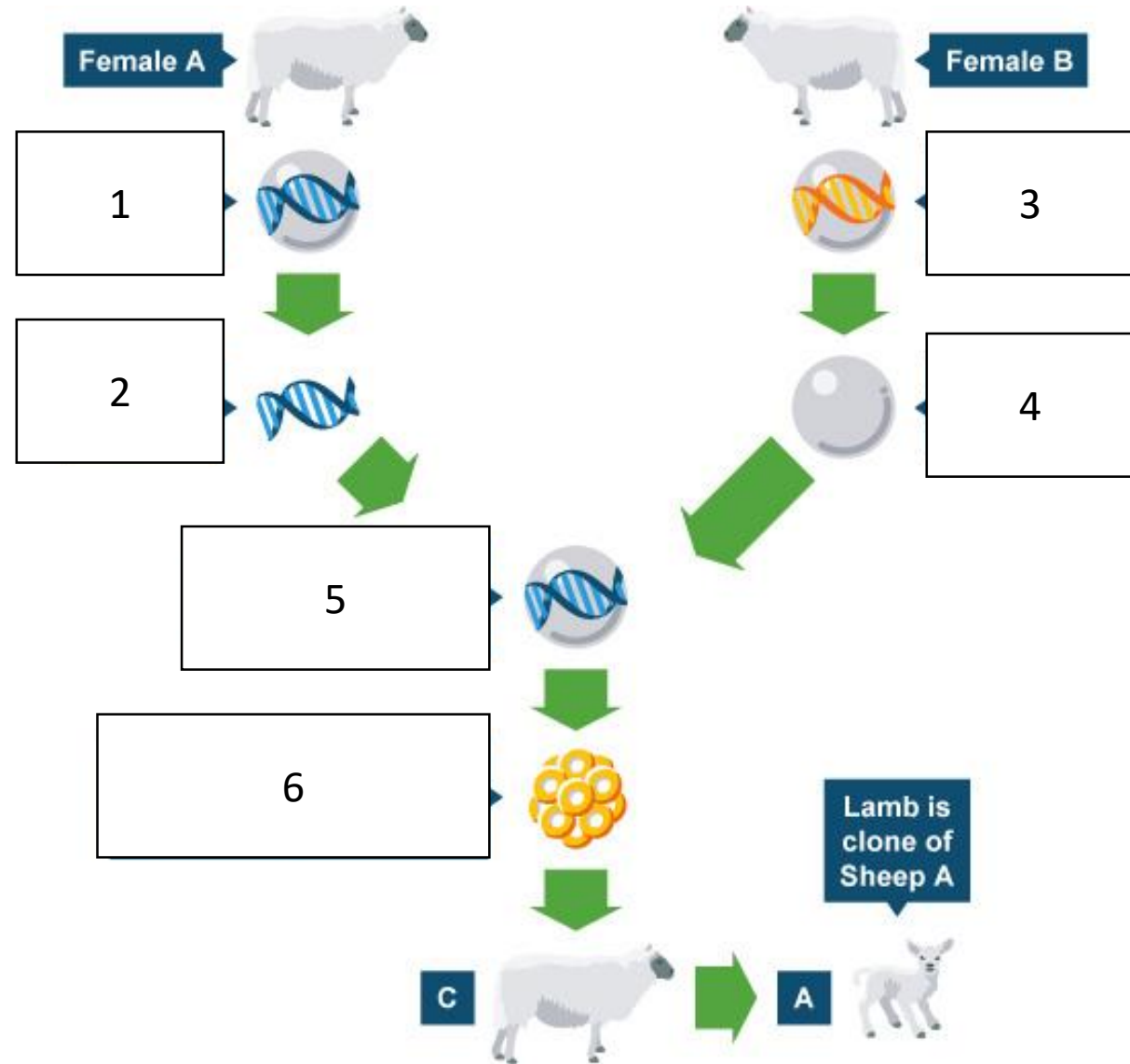
12. Genetic engineering	
Genetic engineering	The process of changing the genome by adding a desirable gene from another organism
GM crops	Genetically modified crops that are resistant to disease or grow bigger crops. Controversial to some

13. 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



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:	<ul style="list-style-type: none"> 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 19 th century	Gregor Mendel a monk who carried out breeding experiments on plants. Discovered the inheritance of characteristics as 'units'
Late 19 th century	Chromosomes observed
Early 20 th century	Chromosomes linked to inheritance. Genes discovered.
Mid 20 th 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

Fossil	Remains of a plant or animal that were alive millions of years ago. Found in rocks. Normally only the hard parts
Fossil formation	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Early life forms were soft bodied so not fossils formed Geological activity destroyed fossils

18. Extinction

Extinction	When an entire species has died
Causes of extinction	<ol style="list-style-type: none"> Disease New predators Famine Natural disaster (meteor, volcano)

19. Resistant bacteria

MRSA	A type of bacteria that has evolved to be resistant to antibiotics
How to prevent antibiotic resistance	<ol style="list-style-type: none"> Not prescribing antibiotic for viral and non-threatening infections Completing the course of antibiotic given Restricting the use of agricultural antibiotics

20. 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

Mnemonic Device

Kingdom

• King

Phylum

• Phillip

Class

• Came

Order

• Over

Family

• For

Genus

• Good

species

• Soup

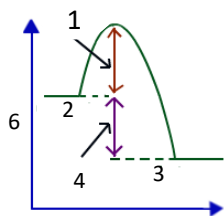
Chemistry Topic 5: Energy changes

1. Keywords

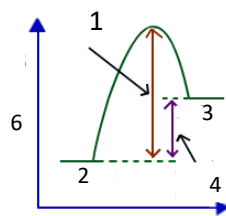
Conservation of energy	Energy can not be created or destroyed just transferred from one for to another
Exothermic reaction	Reaction which releases heat to the surroundings. Causing an increase in temperature
Endothermic reaction	Reaction which absorbs heat from the surroundings. Causing a decrease in temperature

2. Reaction profiles

1	Activation energy
2	Reactants
3	Products
4	Energy released
5	Reaction progress
6	Potential energy



Exothermic reaction



Endothermic reaction

3. Energy changes of reactions (HT ONLY)

Reaction type	Temperature change	Amount of energy absorbed to break bonds	Amount of energy released when making new bonds
Exothermic	Increases	Less	More
Endothermic	Decreases	More	Less

4. Cells and batteries (TRIPLE ONLY)

Simple cell	Made from connecting two different metals in contact with an electrolyte
Battery	Two or more cells joined together in series to make a greater voltage
Non-rechargeable cell	Type of cell where the reactions stop when one of the reactants is used up. E.g Alkali batteries
Rechargeable cell	Type of cell where the chemical reactions can be reversed when an electric current is supplied
Fuel cell	Type of cell that makes electricity from reacting a fuel (eg Hydrogen) with oxygen

5. Hydrogen fuel cell (TRIPLE ONLY)

Overall equation	$2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
Anode equation (HT ONLY)	$4\text{H}^+(\text{aq}) + \text{O}_2(\text{g}) + 4\text{e}^- \rightarrow 2\text{H}_2\text{O}(\text{g})$
Cathode equation (HT ONLY)	$\text{H}_2(\text{g}) - 2\text{e}^- \rightarrow 2\text{H}^+(\text{aq})$

Physics topic 5a: Forces

1. Forces keywords

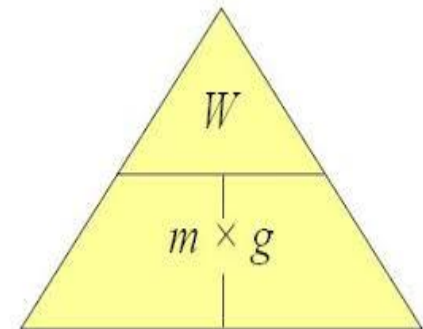
Force	Something that makes a change happen
Magnitude	The value of a force in newtons
Scalar	Things that have magnitude but not direction
Vector	Things that have a magnitude and a direction. Forces are always vectors
Contact force	Can only act when two things touch
Non-contact force	Can act on things not touching
Balanced (forces)	When forces are equal and opposite each other also called equilibrium
Unbalanced (forces)	When opposing forces are not equal to each other
Resultant (force)	The overall force once all the forces are considered
Force arrows	Show direction and size of a force
Newton	Unit force is measured in
Newtonmeter	A spring calibrated so it has a scale to measure force
Centre of mass	A point in the middle of an object where all its mass acts
Elastic	A material that returns to its original shape after being deformed
Plastic	A material that does NOT return to its original shape after being deformed

2. Types of force

Force	Between	Contact or non-contact	Example
Friction	Two moving surfaces	Contact	Brakes
Upthrust	An object and water	Contact	Boat
Reaction	Two stationary objects	Contact	Book on shelf
Air resistance	A moving object and air	Contact	Plane
Gravity	Two masses	Non-contact	You and the earth
Tension	Two ends of an elastic material	Contact	Spring
Magnetic	Magnets and magnetic materials	Non-contact	Magnet picking up a nail

3. Calculating weight

Symbol	Name	Calculated by..
W	Weight (N)	= Mass x Gravity
m	Mass (Kg)	= Weight ÷ Gravity
g	Gravitational field strength	= Weight ÷ mass
On earth $g = 10 \text{ N/kg}$		



4. Calculating work

Symbol	Name	Calculated by..
W	Work (J)	= Force x Distance
F	Force (N)	= Work ÷ Distance
s	Distance (m)	= Work ÷ Force
$W = Fs$		

5. Hooke's law

Symbol	Name	Calculated by..
F	Force (N)	= Spring constant x Extension
k	Spring constant (N/m)	= Force ÷ Extension
e	Extension (m)	= Force ÷ Spring constant
$F = ke$		

6. Energy stored in a spring

Symbol	Name	Calculated by..
E_p	Elastic potential energy stored (J)	$E_p = \frac{1}{2}ke^2$
$\frac{1}{2}$	Half (0.5)	N/A
k	Spring constant (N/m)	$k = \frac{2E_p}{e^2}$
e	Extension (m)	$e = \sqrt{\frac{2E_p}{k}}$
$E_p = \frac{1}{2}ke^2$		
To calculate extension: <ol style="list-style-type: none"> 1. Measure the original length of the object 2. Measure the stretched length of the object 3. Extension = stretched length – original length 		

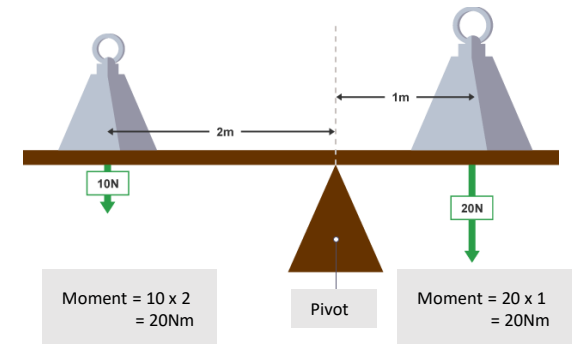
7. Moments:

1. To calculate a moment you need to know:
 - How much force is being applied (Newtons, N)
 - The distance from the pivot that the force is being applied (Meters, m)

$$\text{Moment} = \text{force} \times \text{distance}$$

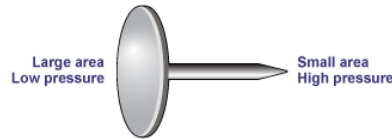
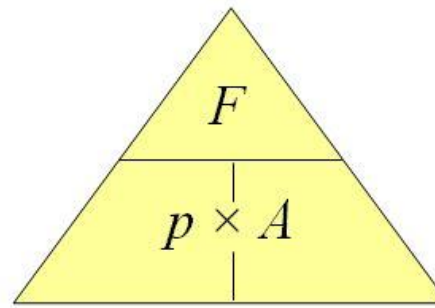
2. The unit for moment is newton metre (Nm)

3. A small force over a large distance can generate the same moment as a large force over a small distance.



8. Calculating pressure

Symbol	Name	Calculated by..
F	Force (N)	= pressure x area
p	Pressure (Pa = n/m ²)	= force ÷ area
A	Area (m ²)	= force ÷ pressure



9. Calculating pressure in column of liquid (HT ONLY)

Symbol	Name	Calculated by..
g	Gravitational field strength (10 N/Kg)	$g = \frac{p}{h\rho}$
p	Pressure (Pa = n/m ²)	$p = h\rho g$
h	Height (m)	$h = \frac{p}{g\rho}$
ρ	Density (kg/m ³)	$\rho = \frac{p}{gh}$

$$p = h\rho g$$

Physics Topic 5b: Forces in motion

1. Keywords

Speed	Distance ÷ time. Scalar quantity
Velocity	Distance (in a certain direction) ÷ time. Vector quantity
Distance	How far an object moves. Scalar quantity
Displacement	The straight line distance from the start point to the end point. Vector quantity
Terminal velocity	The maximum speed reached when the forces are balanced

2. Typical speeds

Walking	1.5 m/s
Running	3 m/s
Cycling	6 m/s
Sound	330 m/s

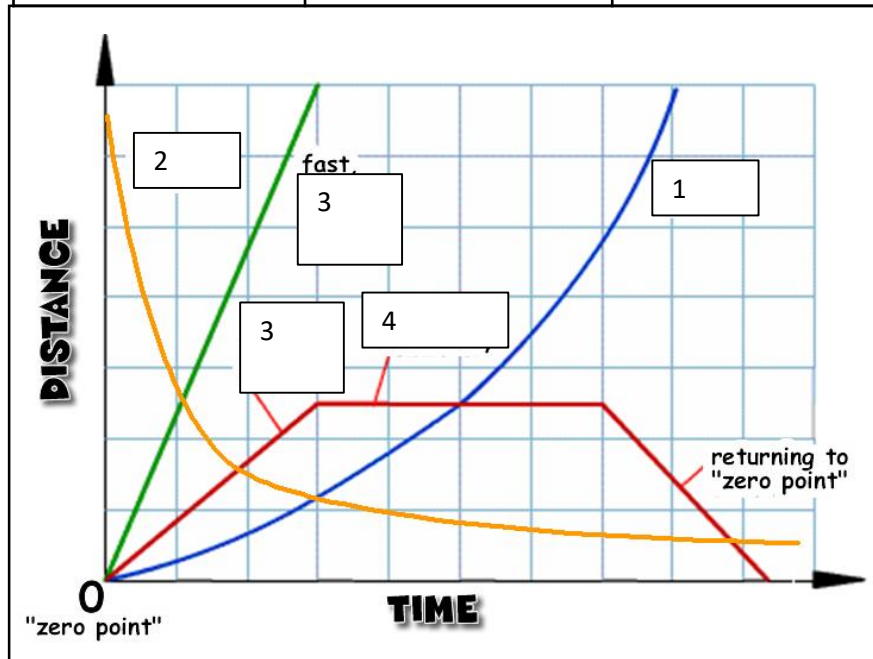
3. Calculating speed

Symbol	Name	Calculated by..
s	Distance (m)	= speed x time
v	Speed/Velocity (m/s)	= distance ÷ time
t	Time (s)	= distance ÷ speed

$$s = v t$$

4. D/T graph keywords

Keyword	Meaning	Position on distance time graph
Accelerate	Speeding up	1
Decelerate	Slowing down	2
Constant speed	Staying the same speed	3
Stationary	Not moving	4
Speed	Distance covered in a certain time	The steepness of the line



5. Acceleration

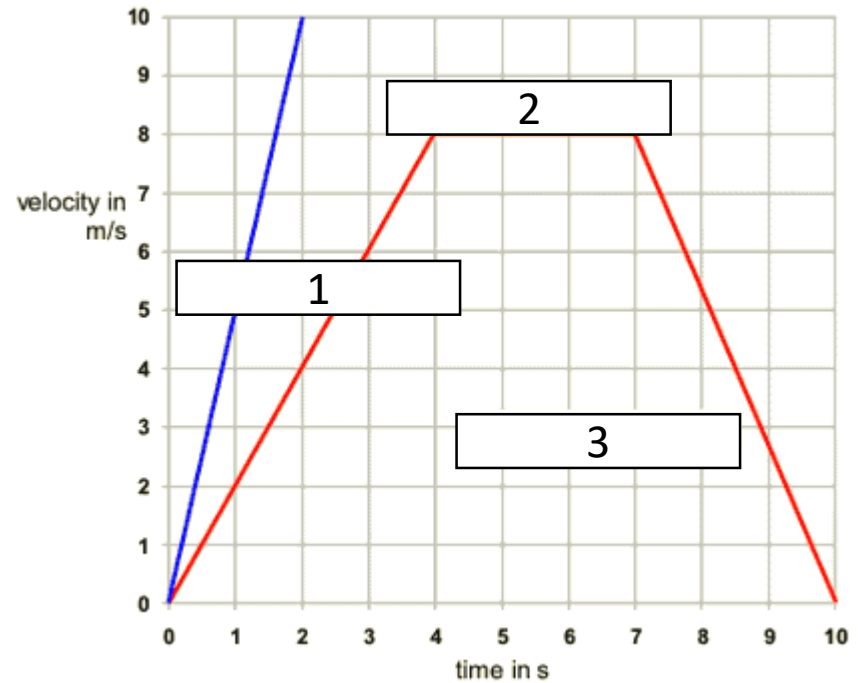
a	Acceleration (m/s ²)	$a = \frac{\Delta v}{t}$
Δv	Change in velocity (m/s)	$\Delta v = at$
t	Time (s)	$t = \frac{\Delta v}{a}$
$a = \frac{\Delta v}{t}$		

7. Uniform acceleration

$$v^2 - u^2 = 2as$$

v	Final velocity (m/s)
u	Start velocity (m/s)
a	Acceleration (m/s ²)
s	Distance (m)

6. Velocity-time graphs



1	Constant acceleration
2	Constant speed/velocity
3	Constant deceleration
HT	Area under graph = total distance travelled

8. Newtons laws of motion

1 st	If the resultant force on an object is zero the object either remains stationary or at a constant speed
2 nd	Force = mass x acceleration
3 rd	When two objects interact the forces are equal and opposite

9. Forces and braking

Stopping distance	The thinking distance + braking distance
Thinking distance	The distance travelled in the time it takes to react (typically 0.2s)
Factors affecting thinking distance	<ol style="list-style-type: none"> 1. Tiredness 2. Drugs 3. Alcohol 4. Distractions (phones)
Braking distance	The distance travelled under a braking force
Factors affecting braking distance	<ol style="list-style-type: none"> 1. Road conditions (ice, water) 2. Tyre condition 3. Brake condition

10. Momentum (HT ONLY)

p	Momentum (Kgm/s)	$p=mv$
m	Mass (Kg)	$m=p\div v$
v	Velocity (m/s)	$v=p\div m$
Conservation of momentum	The total momentum before = the total momentum after	

11. Changes in momentum (PHYSICS ONLY)

$$F = \frac{m\Delta v}{\Delta t}$$

F	force	N
$m\Delta v$	Change in momentum	Kgm/s
Δt	Change in time	s
To reduce the force we need to extend the collision time		

Level 1/2 Hospitality and Catering: Unit 1: Contributing factors to the success of hospitality and catering provision (AC1.4)



Contributing factors

The hospitality and catering sector is very competitive, and many businesses fail in the first year of operation. There are many factors that must be managed carefully for hospitality and catering businesses to make a profit and continue to operate in the long term.

Basic costs

Labour: These costs include employee wages, National Insurance contributions and pension contributions.

Material: These costs include decoration, furnishings, kitchen and dining equipment, ingredients, printing and health and safety equipment.

Overheads: These costs include rent, rates, gas and electricity, insurance, licensing, training and maintenance.

Economy

The value of the pound (£) can affect the hospitality and catering sector. If the economy is good, people will be willing to spend more. If the economy is weak (recession), people may decide that eating out or going on holiday is a luxury and will spend less.

VAT (Value Added Tax) is added to the final cost of goods and services offered in the hospitality and catering sector. The money from VAT goes to the government to pay for services everyone uses for example the NHS.

Environmental impact

Running a hospitality or catering provision uses a lot of resources. Businesses are encouraged to **reduce, reuse, and recycle**. Energy efficient equipment such as low energy light bulbs can save a business money. Using local and seasonal ingredients reduces the amount of CO₂ released into the atmosphere during transport. All waste should be separated and recycled or composted when possible.

Profit

Gross Profit: The difference between how much a menu item costs to make and how much it sells for. Ingredient costs should not be more than 30% of the gross profit. If the ingredient cost for a chocolate brownie dessert is £1.50 and the menu price is £4.50, the gross profit is £3.00.

Gross Profit % = $(3.00 \div 4.50) \times 100 = 66.6\%$

Net Profit = What is left from the gross profit once all costs (as listed above) are covered.

New technology

New technologies have benefitted the sector in positive ways. These include:

- **cashless systems** such as contactless cards and mobile payment apps
- **digital systems** such as online booking/ordering and key cards
- **office software** such as stock ordering systems.

Media

The hospitality and catering sector is very competitive, so most businesses try to make good use of the media to advertise. Most businesses will have their own **website**, which customers can use to view menus and make bookings.

- **Print Media:** Ads in magazines and newspapers, flyers and money-off vouchers.
- **Broadcast media:** Television, radio and online ads.
- **Social media:** Customer feedback and reviews.

Consumers are increasingly using smartphones to book, order, pay and review.



Standards and ratings: You will need to be able to know the importance of standards and ratings within the hospitality and catering industry, they are hotel and guest house standards, and restaurant standards.

Hotel and guest house standards

Hotels and guest houses standards are awarded and given star ratings. You should know what criteria is needed to be met for an establishment to receive each star rating.

Star rating 1 = Basic and acceptable accommodation and facilities. Simple rooms with no room service offered.

Star rating 2 = Average accommodation and facilities, a small establishment, and would not offer room service or have a restaurant.

Star rating 3 = Good accommodation and facilities. One restaurant in the establishment, room service available between certain hours, and Wi-Fi in selected areas are provided. The establishment could have a pool and gym.

Star rating 4 = Very good accommodation and facilities. Large hotel & reception area of a very good standard. Certain hours of room service, with a swimming pool and valet parking offered.

Star rating 5 = Excellent standard of accommodation, facilities, and cuisine. Offer valet parking, 24 hr room service, spa, swimming pool, gym, and concierge service.

Restaurant standards

Restaurant standards have three main possible awards or ratings that you should know. They are listed below:

AA Rosette award

Ratings between one and five rosettes could be awarded based on the following:

- different types and variety of foods offered
- quality of the ingredients used
- where the ingredients are sourced
- how the food is cooked, presented and tastes
- skill level and techniques used as well as the creativity of the chef.

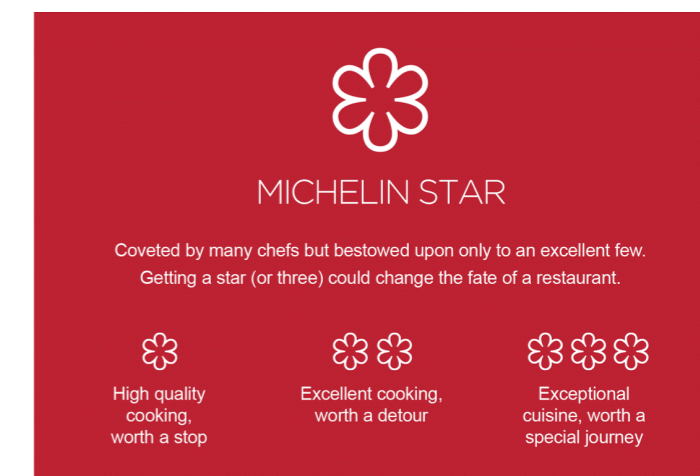


<https://www.stirkhouse.co.uk/about-us/awards/attachment/award-rosette>

Michelin star

A rating between one and three Michelin stars could be awarded based on the following:

- quality of ingredients used
- cooking and presentation techniques
- taste of the dishes
- standard of the cuisine
- value for money.



<https://guide.michelin.com/us/en/california/to-the-stars-and-beyond>

Good food guide

A rating between one and 10 could be awarded based on the following:

- cooking skills
- quality of ingredients
- techniques and cooking skills shown.



Hospitality and catering providers

You must understand, be able to name, and explain the two different provisions in hospitality and catering.

Commercial: the business aims to **make profit** from the hospitality and catering provision that they provide.

Non-commercial: the service provider **doesn't aim** to make a profit from the service they provide.



Commercial (residential)

Commercial (residential): meaning the hospitality and catering provision aims to create a profit from the service they provide, but also offers accommodation.

For example:

- hotels, motels & hostels
- B&B, guest houses and Airbnb
- holiday parks, lodges, pods, and cabins
- campsites and caravan parks.

Non-commercial (residential)

Non-commercial (residential): the hospitality and catering provision offers accommodation but does not aim to make a profit from the service they provide.

For example:

- hospitals, hospices, and care homes
- armed forces
- prisons
- boarding schools, colleges, and university residences.

Commercial (non-residential)

Commercial (non-residential): catering establishments that aim to make a profit from their service, but no accommodation is provided.

For example:

- restaurants and bistros
- cafes, tea rooms and coffee shops
- takeaways
- fast food outlets
- public houses and bars
- airlines, cruise ships, long distance trains
- pop up restaurants
- food and drink provided by stadiums, concert halls and tourist attractions
- mobile food vans and street food trucks
- vending machines.

Non-commercial (non-residential)

Non-commercial (non-residential): catering establishments with no accommodation provided and don't aim to make a profit from their service.

For example:

- schools, colleges, and universities
- meals on wheels
- canteen in working establishments (subsidised)
- charity run food providers.





Types of service in commercial and non-commercial provision

You need to be able to understand and know the different types of service within commercial and non-commercial provision. They are split into two main categories of food service and residential service.



Food service

The different types of food services in the catering sector are listed below. You should know the meaning of each one and be able to provide examples. For instance;

Table service

- Plate: the food is put on plates in the kitchen and served by waiting staff. Good portion control and food presentation consistent.
- Silver: a waiter will transfer food from a serving dish to the customer's plate using a silver spoon and fork at their table.
- Banquet: a range of foods suitable for large catered events such as weddings, parties, or award ceremonies.
- Family style: the food is placed on serving bowls on the customer's table for customers to share between them.
- Gueridon: is served from a trolley to the customer's table, the food is then cooked and/or finished and presented in front of the customer. Creates an atmosphere of sophistication and entertainment.

Counter service

- Cafeteria: all types of food and drink are shown on a long counter for customers to move along with a tray for them to choose what they want to eat.
- Fast food: the food and drink is displayed on a menu behind the counter, often with pictures. Quick, simple, and usually served with disposable packaging.
- Buffet: a range of foods served on a big serving table where customers walk up to collect their plate and help themselves to food and drink. The food can be hot or cold, and some items could be served by waiting staff.

Personal service

- Tray or trolley: the meals are served on trays from a trolley and customers sometimes order items in advance.
- Home delivery: the customer's order is made over the phone or online, and is then delivered by the business to their address.
- Takeaway: food that's cooked by the business onsite and then eaten elsewhere.

Residential service

Listed below are the different types of residential types of service in the hospitality and catering sector. You should know the different types of service offered in various hospitality provisions.

Rooms:

- single/ double/ king/ family
- suite (en-suite bath/ shower room, shared facilities).

Refreshments:

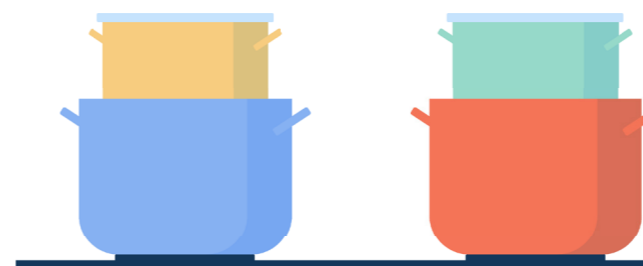
- breakfast/ lunch/ evening meal
- 24-hour room service/ restaurant available.

Leisure facilities:

- spa
- gym
- swimming pool.

Conference and function facilities:

- large rooms
- overhead projector and computer
- pens and paper provided
- refreshments available.



Level 1/2 Hospitality and Catering - Unit 1-1.1.2: Personal attributes, qualifications and experience

You need to be able to know and understand the different personal attributes, qualifications and experience that an employer would look for to fulfil different job roles in the hospitality and catering industry.

Personal attributes

The list below names the different personal attributes that employees could need to fulfil different jobs in the industry:

- Team player
- Organised
- Flexible
- Good communicator
- Friendly
- Calm under pressure
- Willingness to learn and develop
- Pleasant
- Hygienic
- Punctual
- Hardworking
- Reliable
- Approachable
- Good listener
- Leadership qualities
- Sense of humour
- Ability to be proactive
- Good attention to detail
- High standard of personal appearance.



Qualifications

Apprenticeships and experience in the role or sector are two ways to fulfil certain job roles. Named below are some of the qualifications that could be required to fulfil certain jobs within the hospitality and catering sector.

Hospitality sector

- Level 1 Certificate in Business and Administration (office administration).
- Level 2 Certificate in Front of House Reception (hospitality and catering).
- Level 2 Diploma in Reception Operation and Services (hospitality and catering).
- GCSE English / Maths / Hospitality and Catering / Business / IT.

Catering sector

- Diploma in Catering.
- NVQ Food preparation and cooking.
- Bachelor's degree/catering management.
- City & Guilds diplomas in professional cookery.
- BTEC HND in professional cookery.
- A foundation degree in culinary arts.
- Health and safety and food hygiene certificates/food hygiene.
- Level 1/2 hospitality and catering.
- GCSE Food and Nutrition.
- Level 3 Food Science and Nutrition.
- First aid.





Types of employment roles and responsibilities within the industry

There are four main areas within the industry that you should know the roles and responsibilities within. They are listed below:



Front of house

- Front of house manager: oversees all staff at the restaurant, provides training, hiring of staff, and ensures good customer service.
- Head waiter: oversees the waiting staff of the restaurant in high-end eating establishments.
- Waiting staff: greets customers, shows them their table, takes food and drink orders from customers, and serves them their order. Makes sure customers' needs are met, and that the food order is made correctly.
- Concierge: advises and helps customers with trips and tourist attractions. Books taxis for customers and parks customer cars.
- Receptionist: takes bookings, deals with questions and complaints from customers, checks-in customers, takes payment, and provides room keys.
- Maître d'hôte: oversees the service of food and drinks to customers. They greet customers, check bookings, reservations, and supervise waiting staff.

Kitchen brigade

- Executive chef: in charge of the whole kitchen, developing menus and overlooking the rest of the staff.
- Sous-Chef: the deputy in the kitchen and is in charge when the executive chef isn't available.
- Chef de partie: in charge of a specific area in the kitchen.
- Commis chef: learning different skills in all areas of the kitchen. Helps every chef in the kitchen.
- Pastry chef: prepares all desserts, pastry dishes and bakes.
- Kitchen assistant: helps with the peeling, chopping, washing, cutting of ingredients, and helps washing dishes and stored correctly.
- Apprentice: an individual in training in the kitchen and helps a chef prepare and cook dishes.
- Kitchen porter/ plongeur: washes the dishes and other cleaning duties.

Housekeeping

- Chambermaid: cleans guests' rooms when they leave, and restocks products that have been used, they also provide new bedding and towels.
- Cleaner: cleans hallways and the public areas of the establishment.
- Maintenance: repairs and maintains the establishment's machines and equipment, such as heating and air conditioning. These responsibilities could also include painting, flooring repair or electrical repair.
- Caretaker: carries out the day to day maintenance of the establishment.



Management

- Food and beverage: responsible for the provision of food and drink in the establishment which will include breakfast, lunch, dinner, and conferences.
- Housekeeping: ensuring laundering of bed linen & towels, ordering of cleaning products and overseeing housekeeping staff duties.
- Marketing: promotes events and offers to increase custom at the establishment, and is responsible for the revenue of the business.

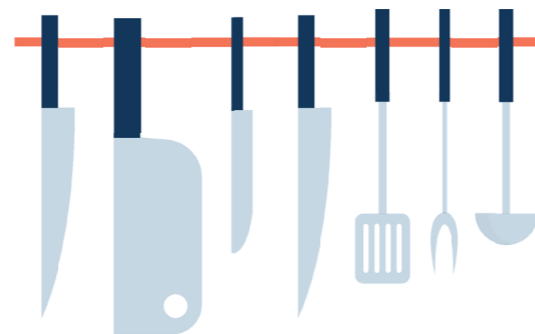




Types of employment contracts and working hours

You need to know the following types of employment contracts and working hours.

- **Casual:** this type of contract could be provided through an agency and used to cover employees that are absent from work due to illness. There is no sick pay or holiday entitlement with this type of employment.
- **Full time (permanent):** working hours including start and finishing times are fixed and stated in this type of contract. A contract of this nature allows the employee to have sick pay and holiday entitlement.
- **Part-time (permanent):** working hours mean that the employee works on certain days of the week. Work times are stated in the contract, including the starting and finishing times that are fixed in this type of contract. The employee has sick pay and holiday entitlement in this type of contract.
- **Seasonal:** this type of contract is used when a business needs more staff due to busy times throughout the year, such as the Christmas period. The contract will state for the employee to work for a specific time frame only. Also, the contract would not expect further or regular work after the contract is complete.
- **Zero hours contract:** this type of contract is chosen between the employer and the employee. This means that the employee can sign an agreement to be available for work when the employer needs staff. No number of days or hours is stated in the contract and the employer doesn't require to ask the employee to work, and neither does the employee have to accept the work offered. No sick pay or holiday entitlement is offered for this type of contract.



Pay and benefits in the industry

The following pay and benefits are what you should be aware of in the industry.

- **A salary:** this type of pay is a fixed amount of money paid by the employer monthly, but is often shown as an annual sum on the contract.
- **Holiday entitlement:** employees are entitled to 28 days paid a year. Part-time contracts are entitled less depending to their contract hours.
- **Pension:** on retirement age, an employee qualifies for a pension contribution by the employer and the government.
- **Sickness pay:** money paid to the employee with certain contracts when they are unable to go to work due to illness.
- **Rates of pay:** national minimum wage should lawfully be offered to all employees over 18 years of age. This rate is per hour and is reviewed each year by the government.
- **Tips:** money given to an employee as a 'thank you' reward for good service from the customer.
- **Bonus and rewards:** given from an employer to the employee as a way of rewarding all the hard work shown from the employee throughout the year, and helping make the business a success. Also known as remuneration.

Working hours

The working hours directive in the UK states that employees on average cannot work more than 48 hours which is worked out over a period of 17 weeks. Employees can choose not to follow this and work more hours if they want to.

People under the age of 18 cannot work more than eight hours a day and 40 hours a week.

Employees that work six hours or more a day must have a break of 20 minutes, and have the right to have at least one day off every week.

Level 1/2 Hospitality and Catering - Unit 1-1.1.4: Positive and negative uses of media

You need to be able to know and understand the different types of media, as well as the positive and negative impacts they can have on the hospitality and catering industry.

Different types of media

The list below names the different types of media that can be used to promote the hospitality and catering industry.

- **Printed media:** Different types of printed media can include:
 - ◇ magazines
 - ◇ newspapers
 - ◇ billboards
 - ◇ business cards
 - ◇ posters.
- **Broadcast:** Different types of broadcasting media include:
 - ◇ television
 - ◇ radio.
- **Internet:** Ways of promoting through the internet include:
 - ◇ social media, e.g. Facebook, Instagram, Twitter, etc.
 - ◇ Websites, e.g. TripAdvisor
 - ◇ ads on podcasts
 - ◇ blogs
 - ◇ email.
- **Competitive:** This could include being competitive with other establishments to attract and retain customers through competitions, deals, special offers and themed events.

Positive and negative uses of media

Named below are some of the positives and negative impacts the media can have on the hospitality and catering sector.

Positive impacts:

- Social media is free and isn't an extra cost for the business.
- Able to contact a larger and wider audience quickly.
- Attracts new customers.
- Builds business awareness.
- Customers can feel more of a personal connection with the business.
- Creates and builds customer loyalty.
- Media can target specific groups easily.

Negative impacts:

- Advertising in media is expensive, e.g. printed media and broadcasting.
- Having a bad or negative review/comment on social media can rapidly decrease the reputation of a business, e.g. through a comment retweet or share.
- Rapid spread of negative reviews, comments and/or feedback can be detrimental to the success of a business, leading the business potentially having to close.
- Having a bad reputation would decrease customer loyalty and less likely to attract new customers.





Customer needs

Customers can be divided into three groups:

- Business customers
- Leisure customers
- Local residents

Customer needs may include catering, equipment and/or accommodation.

Customer needs: Local residents

Local residents may use the facilities hospitality and catering provisions offer without using overnight accommodation. Examples include restaurants, bars, spas, and golf courses.

Hospitality and catering businesses will want to ensure that noise and parking issues are addressed if the provision is in a residential area.

Customer needs: Customer rights and inclusion

By law, hospitality and catering provision must provide for customer rights, inclusion and disabilities. No business can discriminate against a person because of:

- Age
- Disability
- Sexual orientation
- Ethnicity
- Gender
- Race and culture
- Pregnancy and maternity

Customer needs: Business customers

These customers use hospitality and catering provisions for work purposes. Examples include conferences, meetings, and training.

Catering:

- tea, coffee and food facilities for meetings
- early breakfast
- 24-hour room service.

Conference facilities:

- whiteboards, projectors, screens, flip charts, pens and notepaper, free Wi-Fi
- parking.

Accommodation:

- a quiet floor to work
- express check-in and check-out
- iron and ironing board or trouser press
- access to leisure facilities
- discount/loyalty points.

Customer needs: Leisure customers

These customers use hospitality and catering provisions for holidays, sight-seeing, travelling or when attending sporting and theatrical events.

The needs of leisure customers vary depending on their reason for travel. Some customers will want basic accommodation with value for money and some customers will look for a luxury experience.

Catering:

- drinks facilities in room
- snack/mini bar
- breakfast: included or at extra cost
- room service
- restaurant
- bar
- special dietary needs and children's menu options.

Accommodation:

- different room sizes
- disability access
- en-suite facilities
- free Wi-Fi
- concierge service
- cots
- extra pillows and bedding
- toiletries.



Successful hospitality and catering provisions change to meet their customers' needs and expectations. Customer needs can change depending on their lifestyle, dietary requirements and income. Customers have an expectation that a hospitality and catering provision will keep up with current trends. An example is mobile apps which can be used for everything from booking a room to ordering and paying for food.

Customer requirements/needs

Understanding customer needs and requirements helps hospitality and catering provisions to attract more customers and make more profit.

Lifestyle: Successful hospitality and catering provisions analyse the needs of their customers based on their lifestyles, budgets, eating patterns, and interests such as sports and hobbies.

Nutritional needs: Successful hospitality and catering provisions will offer a range of dishes to suit the nutritional needs of their customers. Many menus will include nutritional information available to help their customers make informed choices.

Dietary needs: Most menus will offer a range of dishes to suit special dietary needs such as coeliac disease. Most menus will include vegetarian and vegan options as well as children's menus.

Time available: Some customers will want fast food, and some will prefer a leisurely meal.

Customer expectations

Customers will visit a range of hospitality and catering provisions, from fast food to fine dining, with expectations of an enjoyable experience.

Service: Customers will expect polite efficient service regardless of the type of provision they are visiting.

Value for money: Customers will expect meals that are nutritious, filling and sold at the right price for the type of provision they are visiting.

Trends: Customers will expect hospitality and catering provisions to keep up with trends such as mobile ordering apps.

Awareness of competition from other providers: Customers will expect hospitality and catering provisions to adapt their menus to attract new customers.

Media influence/interest: Customers will expect hospitality and catering provisions to match reviews.

Environmental concerns: Customers will expect eco-friendly hospitality and catering provisions.

Seasonality: Customers will expect dishes made with seasonal, local ingredients.

Customer demographics

Successful hospitality and catering provisions conduct marketing research by asking questions to find out the requirements, needs and expectations of potential customers. The information is used by the provision to create a USP (unique selling point).

Age: Do potential customers want fast food or a luxury experience? Do they need child-friendly facilities?

Location: Is your provision located in a residential area? On a high street? In a business area?

Accessibility: Is there parking? Is it accessible to people with mobility issues?

Money available: Do potential customers have a large amount of disposable income? Are they on a tight budget?

Access to establishments/provisions: Are they competing with similar provisions? Is there limited competition in the area?

Level 1/2 Hospitality and Catering - Unit 1-1.3.1: Safety documents in hospitality and catering

Different documentation is required to be completed for potential health and safety risks and hazards to be avoided within the hospitality and catering industry. Accident forms and risk assessments are explained below, stating their importance and how to complete each document.

Accident forms

If an accident happens, it is vital that an accident form is completed correctly to develop control measures for potential risks and to avoid them from happening again. It should be reviewed and used to manage any health and safety risk. It is law to complete an accident form for accidents in the workplace. Below is an example of an accident form and how it should be completed.

Accident form	
Name of person in accident:	Date:
Description of accident & injury:	Description should include as many details as possible about what happened and how, e.g. slipped/fallen on oil spillage and broken arm as a result.
What was the hazard?	Named hazards could be spillage/liquid on floor or broken handrail, etc.
How could this accident have been prevented?	Suggested prevention could include: <ul style="list-style-type: none"> • correct storage • ensuring all staff had health and safety training • relevant health and safety posters visible in the workplace • correct usage of wet floor signs and clear spillages immediately.
Further action:	Points could include: <ul style="list-style-type: none"> • investigating the accident further • completing/updating risk assessment • reviewing storage of products • first aid that has been given to be logged • correct PPE to be worn, e.g. anti-slip footwear.
Signed:	

Risk assessment

A risk assessment should be completed and reviewed frequently for the document to be kept up to date. New risks should have control measures to reduce the risk of happening or not happen at all. Within the document hazards need to be identified, likelihood of the risk happening is stated and the control measure of how to avoid or reduce the risk is noted. Below are definitions of the main key words and an example of a risk assessment document.

Hazard: An object or something that can physically harm someone or cause harm to someone's health.

Level of risk: The likelihood of the hazard happening and being harmed or causing injury. Level of risks named could be low, medium or high.

Control measure: Steps or action taken to avoid or reduce the hazard from happening and causing injury.

Risk assessment			
Assessment carried out by:		Date of assessment:	Date of next review:
What are the hazards?	Level of risk	Control measure	Who needs to carry out action?
Examples could include, slips, trips, falls, burns from oven, electric shocks, etc.	Low / medium / high If it is a low risk, then the hazard is less likely to cause injury or harm compared to a high risk.	Examples could include providing training and PPE for employees, having appropriate safety posters and signs, e.g. wet floor signs.	Named employer and/or employees to reduce the hazard from happening.

Remember: Employers are responsible for the health and safety training needs of all staff.

Level 1/2 Hospitality and Catering: Unit 1-1.3.1 - Health and safety in hospitality and catering provisions



Control of Substances Hazardous to Health Regulations (COSHH) 2002

What employers need to do by law	What paid employees need to do
Control substances that are dangerous to health.	Attend all training sessions regarding COSHH.
Provide correct storage for those substances and appropriate training for staff.	Follow instructions carefully when using the substances.
Some examples of substances that are dangerous to health include cleaning products, gases, powders & dust, fumes, vapours of cleaning products and biological agents.	Know the different types of symbols used to know different types of substances and how they can harm users and others when used incorrectly.

Health and Safety at Work Act 1974 (HASAWA)

What employers need to do by law	What paid employees need to do
Protect the health, wellbeing and safety of employees, customers and others.	Take reasonable care of their own health and safety and the health and safety of others.
Review and assess the risks that could cause injuries.	Follow instructions from the employer and inform them of any faulty equipment.
Provide training for workers to deal with the risks.	Attend health and safety training sessions.
Inform staff of the risks in the workplace.	Not to misuse equipment.

Personal Protective Equipment at Work Regulations (PPER) 1992

What employers need to do by law	What paid employees need to do
Provide PPE e.g. masks, hats, glasses and protective clothes.	Attend training and wear PPE such as chef's jacket, protective footwear and gloves when using cleaning chemicals.
Provide signs to remind employees to wear PPE.	
Provide quality PPE and ensure that it is stored correctly.	

Report of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 2013

What employers need to do by law	What paid employees need to do
Inform the Health and Safety Executive (HSE) of any accidents, dangerous events, injuries or diseases that happen in the workplace.	Report any concerns of health and safety matters to the employer immediately. If nothing is resolved, then inform the HSE.
Keep a record of any injuries, dangerous events or diseases that happen in the workplace.	Record any injury in the accident report book.

Manual Handling Operations Regulations 1992

What employers need to do by law	What paid employees need to do
Provide training for staff.	Ask for help if needed.
Assess and review any lifting and carrying activities that cannot be avoided.	Squat with feet either side of the item. Keep back straight as you start to lift. Keep the item close to your body whilst walking. Make sure you can see where you're going.
Store heavy equipment on the floor or on low shelves.	
Provide lifting and carrying equipment where possible.	

Risks to health and security including the level of risk (low, medium, high) in relation to employers, employees, suppliers and customers

Review and assess level of risks in the workplace e.g. slips, trips, falls, burns etc by completing a risk assessment to avoid from happening.



Hazard Analysis and Critical Control Points (HACCP)

Every food business lawfully needs to ensure the health and safety of customers whilst visiting their establishment. To ensure this, they need to take reasonable measures to avoid risks to health. HACCP is a food safety management system which is used in businesses to ensure dangers and risks are noted and how to avoid them.

All food businesses are required to:

- assess and review food safety risks
- identify critical control points to reduce or remove the risk from happening
- ensure that procedures are followed by all members of staff
- keep records as evidence to show that the procedures in place are working.

Food Hazards

A food hazard is something that makes food unfit or unsafe to eat that could cause harm or illness to the consumer. There are three main types of food safety hazards:

- **Chemical** – from substances or chemical contamination e.g. cleaning products.
- **Physical** – objects in food e.g. metal or plastic.
- **Microbiological** – harmful bacteria e.g. bacterial food poisoning such as Salmonella.

HACCP table

Here is an example of a HACCP table – it states some risks to food safety and some control points.

Hazard	Analysis	Critical Control Point
Receipt of food	Food items damaged when delivered / perishable food items are at room temperature / frozen food that is thawed on delivery.	Check that the temperature of high-risk foods are between 0°C and 5°C and frozen are between -18°C and -22°C. Refuse any items that are not up to standard.
Food storage (dried/chilled/frozen)	Food poisoning / cross contamination / named food hazards / stored incorrectly or incorrect temperature / out of date foods.	Keep high-risk foods on correct shelf in fridge. Stock rotation – FIFO. Log temperatures regularly.
Food preparation	Growth of food poisoning in food preparation area / cross contamination of ready to eat and high-risk foods / using out of date food.	Use colour coded chopping boards. Wash hands to prevent cross-contamination. Check dates of food regularly. Mark dates on containers.
Cooking foods	Contamination of physical / microbiological and chemical such as hair, bleach, blood etc. High risk foods may not be cooked properly.	Good personal hygiene and wearing no jewellery. Use a food probe to check core temperature is 75°C. Surface area & equipment cleaned properly.
Serving food	Hot foods not being held at correct temperature / foods being held too long and risk of food poisoning. Physical / cross-contamination from servers.	Keep food hot at 63°C for no more than 2 hours. Make sure staff serve with colour coded tongs or different spoons to handle food. Cold food served at 5°C or below. Food covered when needed.

There are several food legislations and laws that you need to be aware of, which are food labelling laws, food safety legislation and food hygiene.

Food labelling laws

By law, the following must be shown on food packaging and labels:

- name of the food
- list of ingredients
- allergen information noted clearly and in bold on the packaging or label
 - ◇ The 14 possible allergens include: celery, cereals containing gluten (e.g. wheat, oats and barley), crustaceans (e.g. lobster, prawns and crab), eggs, fish, lupin, milk, molluscs (e.g. oysters and mussels), mustard, peanuts, sesame, soybeans, tree nuts (e.g. almonds, hazelnuts, walnuts, Brazil nuts, cashews, pecans, pistachios and macadamia nuts) and sulphur dioxide and sulphites (information from www.food.gov.uk).
- storage instructions
- name and address of manufacturer
- nutrition information
- cooking instructions
- weight of ingredients
- use by dates and/or best before dates.

The label must not be misleading and must be clear and easy to understand.



Food safety legislation

Under the Food Safety Act 1990, any businesses that prepare, cook and sell food must meet the following criteria:

- make sure the food is safe to eat
- the food packaging or label must not be misleading in any way, e.g. if the packaging states the product is suitable for vegetarians it must not contain any meat
- the food product is what the consumer expects it to be.

Food hygiene

The Food Hygiene Regulations 2006 ensures that food at any time of production, apart from primary production (e.g. catching fish, milking animals, etc.), is handled and sold in a hygienic way.

These regulations also aim to do the following:

1. identify potential food safety hazards
2. enables to identify where exactly in the process that things could go wrong – these are called **critical control points**
3. put controls in place to prevent food safety risks from happening
4. ensure that the control measures that exists are always followed and are reviewed frequently.



Level 1/2 Hospitality and Catering: Unit 1:

The operation of front and back of house: Front of house (AC2.2)



Operational requirements

To run a successful hospitality and catering business, it is important that the front of house is welcoming to all customers. A logical layout and workflow will mean that the customers will be able to enjoy organised, efficient service.

In a catering establishment such as a café, the front of house is where the customers are served.

In a residential establishment such as a hotel, the front of house is where guests are received before checking in to their room.

Catering and residential establishments have common front of house areas, which help to ensure a smooth operation of the business.

Front of house dress code

The front of house dress creates a first impression. In some establishments a **uniform** may be worn. In other establishments, employees may be required to wear colours such as black and white. In addition:

- clothing must be clean and ironed
- if worn, jewellery, perfume and make-up must be minimal
- personal hygiene must be maintained
- name badges may be required.

Restaurant workflow

The workflow should be organised so that orders can be filled, and food can be passed from the kitchen as quickly as possible.

Reception: Guests are greeted and shown to their seats in the dining area.

Seating/dining area: In a large restaurant, this area is divided into **stations**. Each station is managed by a waitperson.

Counter service: Food is on display for customers to choose and pay at the end. Some restaurants also offer seated counter service.

Bar: An area for socialising or eating in a less formal space.

Equipment station: Small items such as cutlery and serviettes and food items such as condiments should be available to wait staff.

Toilets: Customer toilets should be clean and welcoming.

Safety Equipment: First aid boxes and fire extinguishers must be easily accessed.

Hotel workflow

The workflow of a hotel should be organised so that guests can be checked in as quickly as possible.

Reception: Guests are checked in and receive keys/key cards for their room.

Lobby/waiting area: This area should have comfortable seating for the guests. Drinks may be available in the lobby.

Stairs/Lifts: These provide access to rooms and other facilities.

Toilets: Customer toilets should be clean and welcoming.

Administration and documents

Businesses may employ an administrator who keeps track of:

- staff employment and training records
- stock orders, delivery records and invoices
- health and safety documents
- financial information
- customer feedback
- advertising.

Level 1/2 Hospitality and Catering: Unit 1:

The operation of the kitchen: Equipment (AC2.1)



Kitchen equipment

It is important that a business invests in good quality kitchen equipment to produce food safely. Even though good quality equipment is expensive, for example stainless steel pots and pans, in the long run they will pay for themselves as they should not need to be replaced often. Good quality electrical equipment will cost less to run, which will also save money and increase profits.

Large equipment

Storage:	walk-in fridge, freezer, blast chiller, glass chiller.
Preparation:	floor standing food mixer.
Cooking:	conventional oven, deep fat fryer, hot water urn, standing <i>bain-marie</i> , hot plate/griddle, steamer, grill/salamander.
Cleaning:	pass-through dishwasher, glass washer.

Mechanical equipment

Preparation:	weighing scales, electric whisk, food processor, blender, mincer, meat slicer, vegetable peeler, juicer, ice cream maker.
Cooking:	temperature probes.
Specialist equipment:	conveyor toaster, panini maker, coffee maker, pizza oven, <i>sous vide</i> , pasta maker.

Small equipment

Preparation:	mixing bowls, measuring jugs and spoons, whisks, spatulas, sieves, knives, chopping boards, zester, juicer, piping bags and tips, graters.
Cooking:	pots and pans, baking dishes, baking trays, tongs, colanders.
Serving:	plates, bowls, glassware.

Cleaning and safety materials and equipment

Cleaning:	detergents, cleaning chemicals, scouring pads, cloths, mops, dustpan and brush, buckets, recycling and waste bags and bins.
Preparation:	date labels for food storage, foil, baking paper.
Safety:	fire extinguisher/blanket, smoke/CO ₂ alarm, first aid box, oven gloves.

Level 1/2 Hospitality and Catering: Unit 1:

The operation of the kitchen (AC2.1)



Operational requirements

To run a successful hospitality and catering business, it is important that the back of house is well designed to allow safe working conditions for the kitchen staff. A good workflow also allows the safe movement of front of house staff between the kitchen and dining room so that customers enjoy efficient food service.

Kitchen workflow

Delivery area	Located at the kitchen entrance. Deliveries are checked against the order and temperatures of high-risk foods are recorded.
Storage area	Cool area: contains fridges and freezers for storing high-risk foods, as well as space for storing fresh fruit and vegetables. Dry area: for storing canned and dry goods.
Staffing area	A separate area where employees can change into work clothing. Staff toilets and hand washing facilities are provided. This area may also be used as a breaktime lounge.
Preparation area	A large kitchen will have separate areas for the preparation of meat and poultry, fish, fruits and vegetables and pastries and desserts.
Cooking area	A large kitchen will have separate cooking areas for hot wet foods such as soups, sauces and steamed vegetables and a dry cooking area for roasting, baking, grilling and frying.
Serving area	A large kitchen will have separate areas for plating and presenting hot and cold foods. Waiters will collect orders from “the pass” to deliver to customers in the restaurant.
Cleaning area	This area should be separate from the main kitchen. Dirty crockery and cutlery as well as pots and pans from the kitchen are cleaned and stored in this area.
Waste area	This area should be separate from the main kitchen. Food waste and recyclable and non-recyclable waste is sorted and then disposed in the correct bins, which should be located outside.

Back of house dress code

The traditional chef's uniform is designed to show authority in the kitchen. Known as “chef's whites”, they come in many colours. Key uniform items are: a long-sleeved, double-breasted jacket, long trousers, head covering, apron, and non-slip, toe-protected shoes. The clothing and shoes protect the wearer from injury while the head covering protects the food from hair and sweat.

Level 1/2 Hospitality and Catering: Unit 1:

The operation of the kitchen (AC2.1)



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Level 1/2 Hospitality and Catering: Unit 1:

Food related causes of ill health (AC4.1)



Food related causes of ill health

Ill health could be caused by any of the following:

- **bacteria**
- **allergies**
- **intolerances**
- **chemicals** such as:
 - detergent and bleach
 - pesticides and fertilisers.

Intolerances

Some people feel unwell when they eat certain foods. Common foods that cause intolerance include:

- milk (lactose)
- cereals (gluten)
- artificial sweeteners (Aspartame)
- flavour enhancers (MSG).

Food poisoning bacteria

The main causes of food poisoning bacteria are:

- **Bacillus cereus:** found in reheated rice and other starchy foods.
- **Campylobacter:** found in raw and undercooked poultry and meat and unpasteurised milk.
- **Clostridium perfringens:** found in human and animal intestines and raw poultry and meat.
- **E-coli:** found in raw meat, especially mince.
- **Listeria:** found in polluted water and unwashed fruit and vegetables.
- **Salmonella:** found in raw meat, poultry and eggs.
- **Staphylococcus aureus:** found in human nose and mouth.

Food and the law

Food can cause ill-health if it is stored, prepared and/or cooked incorrectly or if a person unknowingly eats a food that they are allergic or intolerant to. All hospitality and catering provision need to follow laws that ensure food is safe to eat. They are:

- **Food Labelling Regulations (2006):** A label must show all ingredients including allergens, how to store and prepare the food, where it came from, the weight of the food and a use-by or best-before date.
- **Food Safety (General Food Hygiene Regulations) 1995:** This law makes sure that anyone who handles food - from field to plate – does so in a safe and hygienic way. The **HACCP** system is used throughout the hospitality and catering sector.
- **Food Safety Act 1990:** This law makes sure that the food people it is safe to eat, contains ingredients fit for human consumption and is labelled truthfully.

Food allergies

An allergy is a reaction to something found in food. In the case of a severe allergy, the reaction can lead to death.

Common allergens include:

Cereals	Eggs	Seeds
Soya	Fish and shellfish	Strawberries
Peanuts	Wheat	Milk and dairy
Celery	Tree nuts	Mustard



Symptoms and signs of food-induced ill-health:

An “upset tummy” is a familiar symptom for someone who thinks they might have food poisoning; this is known as a non-visible symptom. There are many other signs and symptoms that could show that a person might be suffering from ill-health due to the food they have eaten. Some of the symptoms can be seen (visible symptoms) such as a rash. It is important to be able to recognise visible and non-visible symptoms to help someone suffering from food-induced ill-health.

Visible symptoms

Visible symptoms of food poisoning, chemical poisoning, allergic reaction and food intolerance include:

- **Diarrhoea:** a common symptom of most types of food poisoning bacteria and can also be a symptom of lactose intolerance.
- **Vomiting:** a common symptom of most types of food poisoning bacteria, but may could also be caused by taking in chemicals accidentally added to food.
- **Pale or sweating/chills:** a high temperature is a common symptom of E-coli and Salmonella.
- **Bloating:** a symptom of lactose intolerance.
- **Weight loss:** a symptom of gluten intolerance (coeliac disease).

Allergic/anaphylactic reaction

- **Visible symptoms:** red skin, a raised rash, vomiting, swelling of lips and eyes and difficulty breathing.
- **Non-visible symptoms:** swelling of tongue and throat, nausea (feeling sick) and abdominal pain.
- **Anaphylaxis:** a severe reaction to eating an allergen that can lead to death. An injection of adrenaline (for example, an EpiPen) is the treatment for an anaphylactic reaction.

Non-visible symptoms

Non-visible symptoms of food poisoning, chemical poisoning, allergic reaction and food intolerance include:

- **Nausea (feeling sick):** the most common symptom for all types of food-induced ill-health.
- **Stomach-ache/cramps:** abdominal pain is common symptom of lactose intolerance as well as a sign of an allergic reaction. Cramps may happen at the same time as diarrhoea.
- **Wind/flatulence:** a common symptom of lactose intolerance.
- **Constipation:** a symptom of Listeria food poisoning.
- **Painful joints:** a symptom of E-coli food poisoning.
- **Headache:** a symptom linked to Campylobacter, E-coli and Listeria.
- **Weakness:** non-stop vomiting, and diarrhoea can leave a person feeling weak. Gluten intolerance (coeliac disease) can leave a person feeling tired because their bodies can't absorb the correct amount of nutrients.



Preventing cross-contamination

Food poisoning bacteria can easily be transferred to high-risk foods. This is called cross-contamination. It can be controlled by:

- washing hands before and after handling raw meat and other high-risk foods.
- using colour-coded chopping boards and knives when preparing high-risk foods.
- washing hands after going to the toilet, sneezing, or blowing your nose and handling rubbish.

Preventing physical contamination

Physical contamination is when something which is not designed for eating ends up in your food. Physical contaminants include hair, seeds, pips, bone, plastic packaging, plasters, broken glass, flies and other insects, tin foil and baking paper, soil, and fingernails.

Physical contamination can be controlled by:

- food workers following personal hygiene rules
- keeping food preparation and serving areas clean
- checking deliveries for broken packaging
- thoroughly washing fruits and vegetables before preparation
- using tongs or gloves for handling food.

Temperature control

Delivery	Storage	Preparation	Service
<p>The temperature of high-risk foods must be checked before a delivery is accepted. The food should be refused if the temperatures are above the safe range.</p> <p>Refrigerated foods = 0-5°C Frozen foods = -22°C to -18°C</p>	<p>High-risk foods must be covered and stored at the correct temperature. Temperatures must be checked daily.</p> <p>Refrigerator = 0-5°C Freezer = -22°C to -18°C</p> <p>Unwashed fruit and vegetables must be stored away from other foods.</p>	<p>High risk-foods need to be carefully prepared to avoid cross-contamination. A food probe can be used to make sure that high-risk foods have reached a safe core (inside) temperature, which needs to be held for a minimum of two minutes.</p> <p>Core temperature = 70°C</p>	<p>Food needs to be kept at the correct temperature during serving to make sure it is safe to eat. Hot food needs to stay hot and cold food needs to stay chilled.</p> <p>Hot holding = 63°C minimum Cold holding = 0-5°C</p>



Role of the Environmental Health Officer (EHO)

The role of the Environmental Health Officer (EHO) is to protect the health and safety of the public. They are appointed by local authorities throughout the UK. In the hospitality and catering industry, they are responsible for enforcing the laws linked to food safety. They inspect all businesses where food is prepared and served to members of the public, advise on safer ways of working and can act as enforcers if food safety laws are broken.

EHO inspections

The EHO can carry out an inspection of any hospitality and catering premise at any time during business hours – they do not need to make an appointment. During an inspection, the EHO will check to make sure that:

- the premises are clean
- equipment is safe to use
- pest control measures are in place
- waste is disposed properly
- all food handlers have had food hygiene and safety training
- all food is stored and cooked correctly
- all food has best-before and use-by dates
- there is a HACCP plan to control food hazards and risks.

The EHO is allowed to:

- take photographs of the premises
- take food samples for analysis
- check all record books, including fridge and freezer temperatures, cleaning schedules and staff training
- offer advice on improving food hygiene and safety in the business.

EHO and the law

If the EHO discovers problems with the food safety and hygiene in the premise, they are allowed by law to:

- remove any food that may be hazardous so it can't be sold
- tell the owners to improve hygiene and safety within a set time and then come back and re-inspect
- close the premises if there is a risk to health of the public
- give evidence in a court of law if the owners are prosecuted for breaking food hygiene and safety laws.

Complaints by the public

The EHO will immediately investigate any complaints of suspected food poisoning linked to a particular premise.

Hygiene ratings

When an inspection has been carried out, the EHO will give the business a food hygiene rating. The ratings are published on the Food Standards Agency website as well as on stickers displayed at the business. A rating of 5, or very good, represents the highest standard of food hygiene.

Year 10 HT3 and HT4 Knowledge Organiser - Component 2 Taking Part and Improving Other Participants' Sporting Performance



Sports Provision



Public - Facilities are usually owned by the local council or local authority.

Private - Facilities are usually for private members only. They aim to provide an excellent service to people who pay a joining fee.

Voluntary - Has the largest number of people involved. Volunteers who enjoy sport, develop clubs and teams.

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. $\text{Power} = \frac{\text{Force (kg)} \times \text{Distance (m)}}{\text{time (min or s)}}$

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 and HT4 Knowledge Organiser - Component 2 Taking Part and Improving Other Participants' Sporting Performance

Key Terms

Skills - Are learned abilities that athletes acquire through training and practice.

Skill may be defined as the ability to perform at a high standard effectively and efficiently.

Strategies - A plan of action designed to achieve a long-term or overall aim.

Isolated Practice - Practices that focus on one skill at a time. These are to be completed on your own with no pressure of an opponent.

Competitive Situation - Play it in a real game situation with the number of players, area of play and presence of an official to represent competition standard of play.

Officials - They are in charge of sporting events, games and competitions to ensure that the rules and regulations are followed and a winner is determined.

Complete the table below by giving an example of how muscular strength would be used by each performer. **(3 marks)**

Performer	How is muscular strength used?
Sprinter	
Rugby player	
Gymnast	

Look at the image of the rowing crew competing in a race.

Describe why these athletes need good muscular endurance for their event. **(2 marks)**

Explain why tennis players need **muscular endurance** and **coordination** to perform in their sport **(4)**



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 absorb 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.



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.

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.

Contingencies

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

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.

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.

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.

Sequencing or dovetailing

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

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.

Mise en place

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

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.

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.

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.

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).



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.

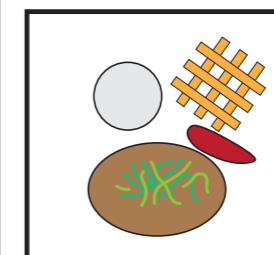
Sweet: chocolate dipped strawberries, tuile biscuits, chopped nuts, tempered chocolate work, spun sugar work, edible flowers.

Decoration

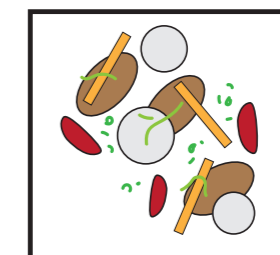
Decoration adds drama to the finished dish but it is not meant to be eaten or add to the overall flavour of the dish. Examples include:

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

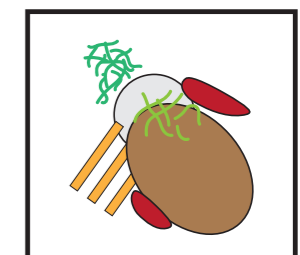
Plating styles



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.



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: Point, Evidence, Explain

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?



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.

Organisation

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.



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?



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.

ASSESSMENT OBJECTIVE 1

CONTEXTUAL UNDERSTANDING: DEVELOP IDEAS THROUGH INVESTIGATIONS, DEMONSTRATING CRITICAL UNDERSTANDING

MIND MAPPING: IDEAS PRESENTED AROUND YOUR THEME

TOPIC/THEME
IN THE CENTER OF THE PAGE, USE IMAGES AND TEXT TO REPRESENT YOUR CHOSEN THEME.

BRANCHES
KEY THEMES, ADD TO EACH MAIN BRANCH BY ADDING OTHER BRANCHES.



KEYWORDS

EACH BRANCH REPRESENTS A KEY IDEA, ONE WORD PER BRANCH, ONE WORD CREATES MORE ASSOCIATIONS.

COLOUR CODING

ALLOWS YOU TO CATEGORISE. MAKES YOUR WORK LOOK MORE APPEALING.

INCLUDE IMAGES

COMMUNICATES MORE THAN WORDS, PROCESSED INSTANTLY, VISUAL STIMULI

MOODBOARD: COLLAGE IDEAS USING COLLECTED IMAGES

CONSIDER YOUR THEME
ARE YOU COLLECTING IMAGES FOR A THEME OR OF AN ARTISTS WORK?

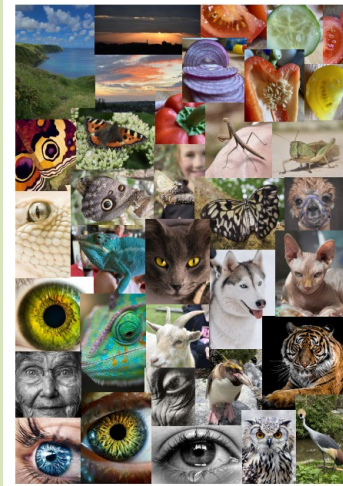
SOURCES

WHEN RESEARCHING A THEME COLLECT IMAGES, PHOTOS, WALLPAPER SAMPLES, MAGAZINE CUTTINGS, LETTERING ETC.

WHEN RESEARCHING AN ARTIST ENSURE ALL THE IMAGES ARE RELEVANT.

PRESENTATION

PULL IT ALL TOGETHER BY STICKING TO A PARTICULAR STYLE AND/OR COLOUR SCHEME. USE DAFONT FOR YOUR TITLES



FILL THE SPACE
YOUR MOODBOARD WILL DIRECTLY LINK TO THE DEVELOPMENT OF YOUR PROJECT. FILL ANY EMPTY SPACE WITH ANNOTATION AND SKETCHES.

DON'T LIMIT YOURSELF
EVEN IF IT DOESN'T LINK TO YOUR STARTING POINT IT MAY RELATE TO YOUR THEME. ADD ANNOTATIONS AND SKETCHES TO SHOW YOUR THOUGHT PROCESS.

ARTIST RESEARCH: SHOW YOUR UNDERSTANDING

BIOGRAPHICAL INFO

BIRTH, DEATH, STYLE, EDUCATION, IMPORTANT WORKS

SOCIAL, HISTORICAL, ECONOMIC INFLUENCES

WHAT WAS HAPPENING AT THE TIME?
WAS THE WORK IN RESPONSE TO ANYTHING?

COLLECTED IMAGES

MOODBOARD- ANNOTATION YOUR THOUGHTS

COPIED IMAGES

SHOW YOUR UNDERSTANDING BY REPRODUCING EXAMPLES OF THEIR WORK.



ANALYSING ARTWORK

ANALYSE ARTISTS AND YOUR OWN WORK USING FORM, CONTENT, PROCESS, MOOD, NEXT STEPS

IN THE STYLE OF

CREATE YOUR OWN VERSION OF THE ARTISTS WORK. YOU SHOULD WORK IN THE STYLE OF THE ARTIST WORK WITH YOUR OWN IMAGERY.

ARTISTIC INFLUENCES

WHO INFLUENCED THEIR WORK?
DID THEIR WORK INFLUENCE ANYONE ELSE?
WHAT IS YOUR VIEW/OPINION OF THE WORK AT FIRST GLANCE.

ANALYSING: ART & DESIGN WORK

CONTENT

(LOOKING AT THE SUBJECT OF THE WORK)

- WHAT IS THE WORK ABOUT?
- IS THE WORK REALISTIC/ABSTRACT/SURREAL? EXPLAIN HOW THIS IMPACTS THE VIEWER.
- HAVE ANY PARTS BEEN EXAGGERATED OR DISTORTED? IF SO, WHY/HOW?
- ARE THERE ANY REOCCURRING FEATURES WITHIN THE ARTIST WORK? DESCRIBE.
- WHAT IS THE THEME OF THE WORK?
- WHAT MESSAGE DOES THE WORK COMMUNICATE?

FORM

(LOOKING AT THE FORMAL ELEMENTS)

- WHAT COLOURS DOES THE ARTIST USE? WHY?
- WHAT SHAPES DOES THE ARTIST USE? WHY?
- WHAT MARK-MAKING TECHNIQUES DOES THE ARTIST USE? WHY?
- HOW BIG IS THE WORK? WHY DID THE ARTIST CHOOSE THIS SCALE?
- DOES THE ARTIST HAVE A RECOGNISABLE STYLE. IF SO, EXPLAIN WHAT MADE YOU THINK THIS.

PROCESS

(HOW HAS THE WORK BEEN MADE AND DEVELOPED)

- WHAT MEDIA/MATERIALS/TOOLS HAS THE ARTIST USED? WHAT IS THE EVIDENCE FOR THIS?
- HOW HAS THE ARTIST COMMUNICATED THEIR DECISION MAKING/CREATIVE JOURNEY/NARRATIVE?
- HOW HAS THE WORK BEEN MADE?

MOOD

(LOOKING AT THE COMMUNICATION OF MOODS AND FEELINGS)

- HOW DOES THE WORK MAKE YOU FEEL? EXPLAIN.
- DOES THE COLOUR, TEXTURE, FORM, THEME, COMPOSITION EFFECT YOUR MOOD?
- DOES THE WORK REMINISCE ABOUT A DREAM OR YOUR PAST OR A PERSON EXPERIENCE? EXPLAIN.

NEXT STEPS

(HOW ARE YOU GOING TO USE THIS KNOWLEDGE TO DEVELOP YOUR OWN WORK)

- HOW WILL YOU DEVELOP YOUR WORK IN RESPONSE?
- WHAT FEATURES WILL YOU TRY TO REPLICATE?

KEY TERMS

PROPORTION
COMPOSITION
ACCURACY
QUALITY OF LINE
WEIGHT OF LINE
TONE
TINTS
BLENDING
DEPTH
DEFINITION
MARK-MAKING
CIRCULAR
MOTION
SMOOTH
TRANSITION
MEDIA
HUES
ABSTRACT
FIGURATIVE
LAYERING
CONTINUOUS LINE
SCALE

Year 11 BTEC Dance- Autumn 1 Subject Term Knowledge Organiser

Component 2 - Developing Skills and Techniques in the Performing Arts

Application of skills and techniques during rehearsal

Students will apply skills and techniques during the rehearsal and development process to support their development.

Such as:

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

Examine professional practitioners' performance work

Analyse repertoire from three performance styles in dance and musical theatre

- consider the roles and responsibilities, creative intention, key influences and purpose
- make comparisons between stylistic qualities, using examples to back up your knowledge
- consider how practitioners contribute to the performance process and how their roles and responsibilities differ depending on the performance, style and outcome.



Rappers Delight

Hip hop as a musical phenomenon are subject to debate, but its roots as a commercial phenomenon are much clearer. They trace back directly to January 5, 1980, when the song "Rapper's Delight" became the first hip hop single ever to reach the Billboard top 40.



Historical Context

Street dance, also more formally described as vernacular dance, originated in New York in the 1970s. Evolving on the streets of Manhattan and the Bronx, it was developed as an improvised, social dance form, reacting against traditional, high-art dance styles



Dance styles

Locking

Locking combines short, sharp movements with "locks," or pauses, all synchronized to funk music. Locking was created by a man named Don Campbell.

Popping

Popping is a dance style that is based on rapid contractions and release of the muscles so it appears that they are, "popping" in synch with the beat of the music. Under the umbrella of Popping are the dance styles like Tutting, Strobing, Ticking, Dime-stopping, Waving, Roboting, and Electric Boogaloo. Popping is a funk style of dance originating in California in the African American community during the 1960s. Popping is still very popular today and it is done to variety of music genres.

Waacking

Waacking is a dance style that was created in the nightclubs of Los Angeles in the 1970s. Waacking consist of movements of the arms and hands done typically to disco music.



Year 11 HT1 Drama Knowledge Organiser

Summary of topic

They must understand the GCSE requirements of the devising plays unit and understand what constitutes successful devised work

Aims of the topic

To use given stimuli to create and develop a devised piece of theatre

Devising Rules

- Every actor should have a monologue that is at least 90 seconds long and everyone should have an equal part.
- Divide the work up evenly – script writing (everyone write/plan their own scene), sourcing costume, planning technical theatre (staging, music, lights)
- Help each other out – but only when your own work is done. Even though this is a group project, you still get marked individually.
- Find an idea that every person is happy with and don't rule anything out.
- Try to get it on its feet early – the best ideas come from when you try to act something out, not sit there discussing it.

Devising Plays Knowledge Organiser Y10 GCSE

Assessment & Rehearsal Tips

- **You will be offered 4 pieces of stimuli given to us by the exam board. 1 song, 1 quote, 1 phrase and 1 picture.**
- **In your given groups, you will generate ideas for each stimuli**
- **You will then decide on a stimuli and an idea. Then you will decide on a practitioner to use for your idea**
- **In your groups you will create a piece of drama around your idea, linked to the stimuli and using practitioner techniques**
- **Try everything – even if something doesn't work, you may discover something useful.**

'It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair.'

Charles Dickens, A Tale of Two Cities

2. 'Best Day of my Life' – American Authors

3. 'We realise the importance of our voices only when we are silenced' – Malala Yousafzai

4.

<https://images.app.goo.gl/Kxp2XA2HGPooKVP H7>



Skills & Definitions

Ensemble – Collaborated group performance.

Characterisation – The creating, development and performance of a created character.

Improvisation – Spontaneous acting and suggestions that further develop a performance.

Devised – Original created performance material, often using a stimulus.

Stimuli – The starting point set by exam board e.g. picture, quote, word or song. You chose one.

Practitioner – Brecht or Artaud and how they influenced the performance.

Brecht – Famous for Political and Epic Theatre. (See practitioner knowledge organiser). Made the audience think and bring real change.

Artaud – Famous for Theatre of Cruelty (See practitioner knowledge organiser). Made the audience feel uncomfortable.

Genre – Physical theatre is NOT a practitioner, it is a STYLE of drama focused upon storytelling using movement.

Techniques – The key skills which are relevant to the practitioner or genre (see practitioner knowledge organiser).

Final performance – The end performance of the piece.

Rehearsal – The process of creating and developing your piece of theatre

Monologue – A one person speech in character. Often around 2 minutes in length.



Education Post-16 & Jobs, Career Choices and Ambitions Knowledge Organiser



(Theme 3: Units 11 & 12)

Jobs

l'ingénieur	engineer
le mécanicien/ la mécanicienne	mechanic
l'avocat(e)	lawyer
le chanteur/ la chanteuse	singer
le coiffeur/ la coiffeuse	hairdresser
le/la comptable	accountant
le dessinateur/ la dessinatrice	designer
le fermier/ la fermière	farmer
l'infirmier/ l'infirmière	nurse
l'instituteur/ l'institutrice	primary school teacher
le/la journaliste	journalist
le mannequin	model
le/la professeur	teacher
le/la secrétaire	secretary
le vendeur/ la vendeuse	shop assistant
le/la vétérinaire	vet
le serveur/ la serveuse	waiter/ waitress
le facteur/ la factrice	postman/ postwoman
l'homme/la femme au foyer	househusband/ housewife
le conseiller/ la conseillère d'orientation	careers adviser

Superlatives (most)

Le/la/les + plus + adjective	
Il est la plus intelligent	He is the most intelligent
Irregular- 'meilleur(e)(s)' (best)	
Elle est la meilleure mécanicienne	She is the best mechanic

False friends	
passer un examen	to take an exam
réussir un examen	to pass an exam
les notes	marks
décevant(e)	disappointing
la formation	training
avoir mal au coeur	to feel sick
la mode	fashion
le stage	work experience
le travail	work
travailler	to work

Adjectives	
ancien(ne)	former/ex
décevant(e)	disappointing
dur(e)	hard
motivé(e)	motivated
ravi(e)	delighted
bien payé(e)	well paid
varié(e)	varied
effrayé(e)	frightened
gourmand(e)	greedy
agéable	pleasant
bien organisé(e)	well-organised
bryant(e)	noisy
ennuyeux/se	boring
fatigant(e)	tiring
responsable	responsible
utile	useful
diplômé(e)	qualified
étonné(e)	astonished
élevé(e)	high
libre	free
salarié(e)	salaried

Education	
un apprenti/ une apprentie	an apprentice
l'apprentissage	apprenticeship
le diplôme	qualification
l'enseignement	education
les études	studies
la filière	option/choice
la formation	training
le lycée	sixth form college
l'université	university
le comportement	behaviour
la comptabilité	accountancy
le conseil de classe	progress meeting
la filière professionnelle	vocational course
la formation professionnelle	training
l'orientation	options
le redoublement	repeating the school year
le trimestre	term
l'étudiant(e)	student

Skills	
l'amélioration	improvement
la chance	luck
faible en	weak at
forte en	good at
le point faible	weakness
le point fort	strength
le travail d'équipe	team work
la confiance en soi	self confidence

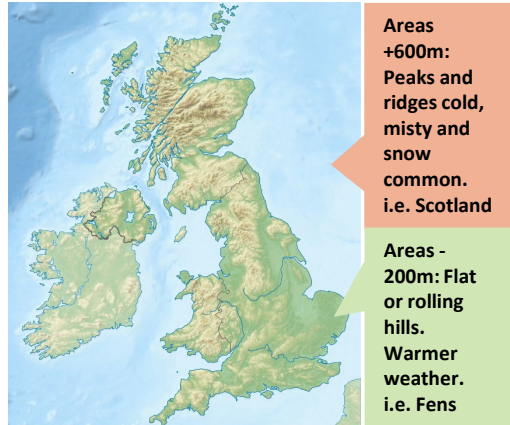
World of work	
à temps complet	full time
à temps partiel	part time
le travail	work/job
le domaine	area
le poste	position/job
le stage	course
le client/ la cliente	customer
le/la collègue	colleague
le/la malade	(medical) patient
le patron/ la patronne	boss
l'ambiance	atmosphere
le bureau/ le cabinet	office
la demande d'emploi	job application
le droit	law
l'embauche	recruitment
l'entreprise	business
l'entretien	interview
l'équipe	team
le métier	job
la petite annonce	job advert
la publicité	advertisement
le réseau social	social network
l'usine	factory
la carrière	career
le permis de conduire	driving licence

Comparatives (more/less/as)	
Plus/moins/aussi + adjective + que	
Elle est plus motivée que moi	She is more motivated than me
Irregular- 'mieux' (better)	
Il travaille mieux que moi	He works better than me



Verbs	
aller en fac	to go to university
en avoir marre de	to be fed up with
faire une année sabbatique	to have a gap year
passer le bac	to take A levels
travailler	to work
bavarder	to chat
embaucher	to take on/employ
faire le bilan	to evaluate/assess
faire un stage	to do a work placement
mériter	to deserve
se renseigner	to get information
suivre	to follow
aider	to help
apprendre	to learn
avoir horreur de	to hate
s'ennuyer	to get bored
s'entendre	to get on with
s'intéresser à	to be interested in
nettoyer	to clean
se passionner pour	to love
soigner	to care for
supporter	to endure
avouer	to confess
compter sur	to rely on
se débrouiller	to cope
exercer	to carry out
franchir une étape	to go to the next level
lancer	to launch
manquer	to lack
poursuivre	to pursue
provoquer	to cause
recruter	to recruit
gagner	to earn
se débrouiller	to cope

What is a landscape?		Relief of the UK	
A landscape has visible features that make up the surface of the land. Landscapes can be broken down into four 'elements'.		Relief of the UK can be divided into uplands and lowlands. Each have their own characteristics.	
Landscape Elements			
Physical		Biological	
<ul style="list-style-type: none"> Mountains Coastlines Rivers 	<ul style="list-style-type: none"> Vegetation Habitats Wildlife 		
Human		Variable	
<ul style="list-style-type: none"> Buildings Infrastructure Structures 	<ul style="list-style-type: none"> Weather Smells Sounds/Sights 		
		Key	
		Lowlands	
		Uplands	

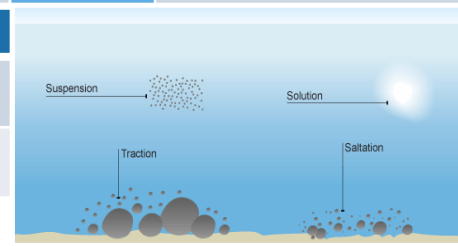


Erosion	
The break down and transport of rocks – smooth, round and sorted.	
Attrition	Rocks that bash together to become smooth/smaller.
Solution	A chemical reaction that dissolved rocks.
Abrasion	Rocks hurled at the base of a cliff to break pieces apart.
Hydraulic Action	Water enters cracks in the cliff, air compresses, causing the crack to expand.

Transportation	
A natural process by which eroded material is carried/transported.	
Solution	Minerals dissolve in water and are carried along.
Suspension	Sediment is carried along in the flow of the water.
Saltation	Pebbles that bounce along the sea/river bed.
Traction	Boulders that roll along a river/sea bed by the force of the flowing water.

Glaciation in the UK	
Over many thousands of years, glaciation has made an impression on the UK's landscape. Today, much of upland Britain is covered in u-shaped valleys and eroded steep mountain peaks.	
During the ice age	
Ice covered areas eroded and weathered landscapes to create dramatic mountain scenery.	
After the ice age	
Deep valleys and deposition of sediment revealed	

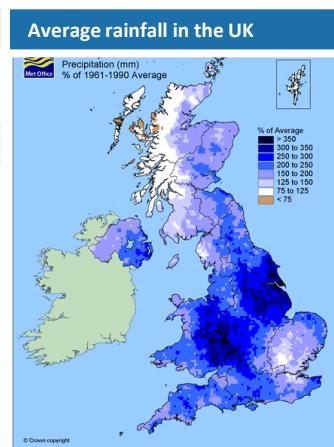
Human activity on Landscape		
Farming has changed the vegetation which grows there.	Much of the rural landscape has been replaced by urban sprawls.	Infrastructure such as roads and pylons cover most of the UK.
Over thousands of years, much of the UK's woodlands have gone.	Increasing population of the UK means more houses are needed.	UK's marshes and moorlands are heavily managed by people.



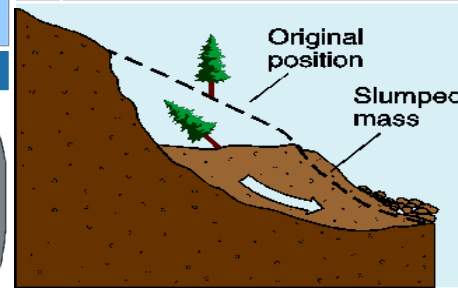
Distinctive Landscapes

Geology of the UK	
The UK is made from a variation of different rock types. The varied resistance of these rocks influences the landscape above.	
Igneous Rock Volcanic/molten rock brought up to the Earth's surface and cooled into solid rock.	
Sedimentary Rock Made from broken fragments of rock worn down by weathering on Earth's surface.	
Metamorphic Rock Rock that is folded and distorted by heat and pressure.	

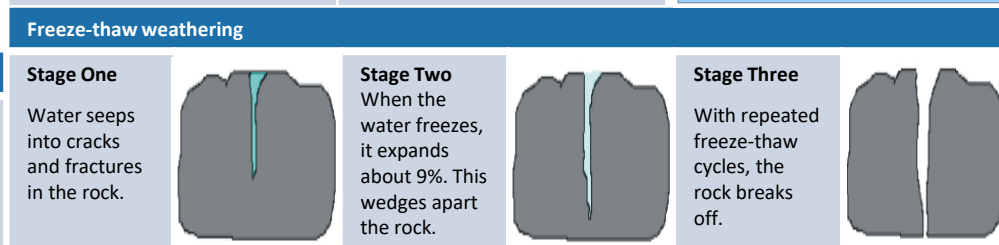
Climate and Weather in the UK	
The variations of climate and weather means there are different influences on the UK's landscape.	
Climate	Weathering
The rainfall map of the UK shows variations in average rain. <ul style="list-style-type: none"> Less precipitation occurs in low land areas. East England Most precipitation occurs in upland areas. Scotland. 	Mechanical Caused by the physical action of rain, frost and wind. Chemical Action of chemicals within rain dissolving the rock. Biological Rocks that have been broken down by living organisms.
<i>These differences mean...</i> Uplands experience more weathering, erosion and mass movement.	



Mass Movement	
A large movement of soil and rock debris that moves down slopes in response to the pull of gravity in a vertical direction.	
1	Rain saturates the permeable rock above the impermeable rock making it heavy.
2	Waves or a river will erode the base of the slope making it unstable.
3	Eventually the weight of the permeable rock above the impermeable rock weakens and collapses.
4	The debris at the base of the cliff is then removed and transported by waves or river.



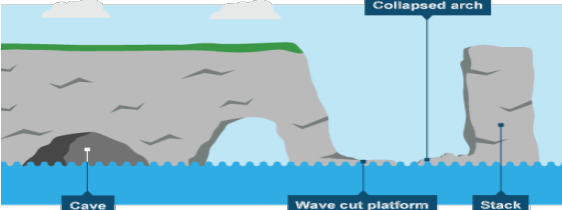
Soil & Landscape	
<ul style="list-style-type: none"> Soils are created from weathered rocks, organic material and water. Rock types have influence over fertility of soil. Low-laying areas such as the Cambridgeshire Fens have deep soil whereas uplands have thin soil. Deep soil is more often associated with deciduous woodland rather than coniferous woodlands. 	



Deposition

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

Formation of Coastal Stack



Example: Old Harry Rocks, Dorset

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

Coastal Defences

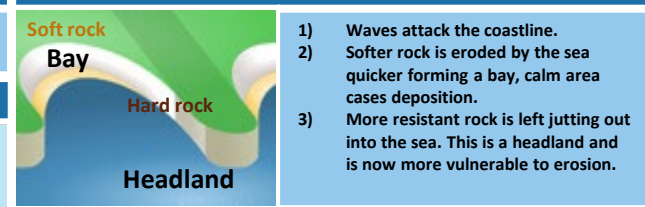
Hard Engineering Defences

Groynes	Wood barriers prevent longshore drift, so the beach can build up.	<ul style="list-style-type: none"> ✓ Beach still accessible. ✗ No deposition further down coast = erodes faster.
Sea Walls	Concrete walls break up the energy of the wave. Has a lip to stop waves going over.	<ul style="list-style-type: none"> ✓ Long life span ✓ Protects from flooding ✗ Curved shape encourages erosion of beach deposits.
Gabions or Rip Rap	Cages of rocks/boulders absorb the waves energy, protecting the cliff behind.	<ul style="list-style-type: none"> ✓ Cheap ✓ Local material can be used to look less strange. ✗ Will need replacing.

Soft Engineering Defences

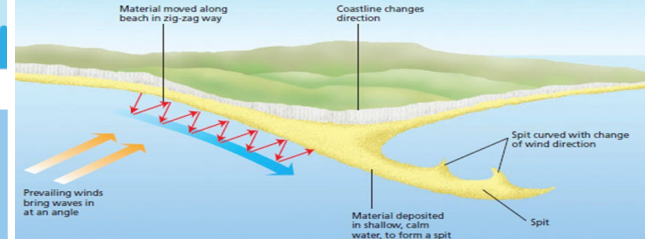
Beach Nourishment	Beaches built up with sand, so waves have to travel further before eroding cliffs.	<ul style="list-style-type: none"> ✓ Cheap ✓ Beach for tourists. ✗ Storms = need replacing. ✗ Offshore dredging damages seabed.
Managed Retreat	Low value areas of the coast are left to flood and erode naturally.	<ul style="list-style-type: none"> ✓ Reduce flood risk ✓ Creates wildlife habitats. ✗ Compensation for land.

Formation of Bays and Headlands



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

Formation of Coastal Spits - Deposition



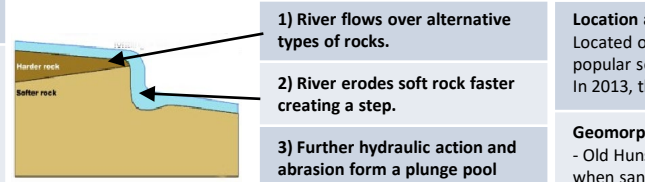
Example: Spurn Head, Holderness Coast

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

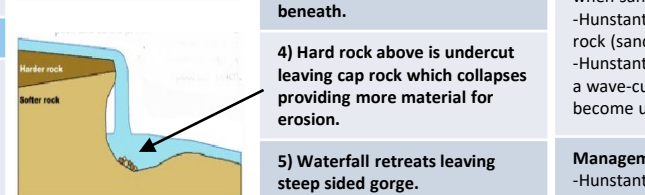
Upper Course of a River

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

Formation of a Waterfall



- 1) River flows over alternative types of rocks.
- 2) River erodes soft rock faster creating a step.
- 3) Further hydraulic action and abrasion form a plunge pool beneath.

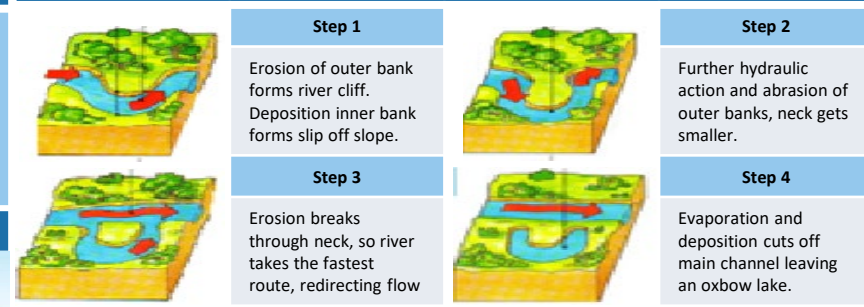


- 4) Hard rock above is undercut leaving cap rock which collapses providing more material for erosion.
- 5) Waterfall retreats leaving steep sided gorge.

Middle Course of a River

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

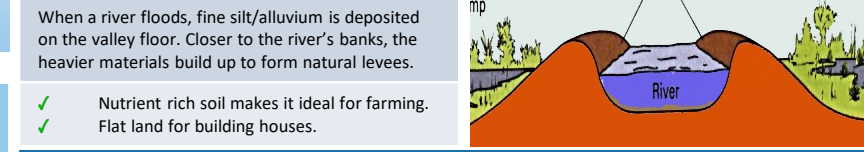
Formation of Ox-bow Lakes



Lower Course of a River

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

Formation of Floodplains and levees



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

River Management Schemes

Soft Engineering	Hard Engineering
<ul style="list-style-type: none"> Afforestation – plant trees to soak up rainwater, reduces flood risk. Demountable Flood Barriers put in place when warning raised. Managed Flooding – naturally let areas flood, protect settlements. 	<ul style="list-style-type: none"> Straightening Channel – increases velocity to remove flood water. Artificial Levees – heightens river so flood water is contained. Deepening or widening river to increase capacity for a flood.

Case Study: Hunstanton Coast

Location and Background
Located on the North-West coast of Norfolk. The town is a popular sea resort for tourists to visit all year round. In 2013, the town suffered damage from a storm surge.

Geomorphic Processes
- Old Hunstanton is dominated by dunes that are formed when sand is trapped and built up behind objects.
- Hunstanton Cliffs are made from three different bands of rock (sandstone, red chalk and white chalk).
- Hunstanton Cliff are exposed to cliff retreat. This is when a wave-cut notch develops enough for the cliff face to become unstable and eventually collapses.

Management
- Hunstanton is protected by a number of groynes. These trap sand to build up the beach for better protection.
- The town is also protected by large sea walls to prevent flooding and deflect the waves energy.
- \$15 million has been spent on beach nourishment to add sediment to beach for increased protection against flooding.

Case Study: The River Tees

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

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

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

Year 11 MUSIC GCSE HT1 Knowledge Organiser

Pop

Rock & Roll of the 1950s and 1960s
Rock Anthems of the 1970s and 1980s
Pop ballads of the 1970s, 1980s and 1990s
Solo artists from 1990 to the present day



Music from films and computer games

Music composed especially for films but also classical music used in films

Need to get good at describing music elements and how they're blended

Film

Listening



India & Punjab
Israel and Palestine
Africa
Caribbean & South America

OCR GCSE music



- Composing 30%
- Listening 40%
- Performing 30%

Exam –

There will be questions on all these areas but only some of the selected pieces you have studied.

Some standard listening questions like “what instrument is playing the melody?” and others where it will ask you to fill in the missing notes.



Music from the Baroque, Classical and Romantic eras

Lots of orchestral music



Concerto

Year 11 Subject Term Knowledge Organiser: Computer Science

Programming

We need to know what an algorithm is and how they relate to programming, A discrete set of precise instructions that have an input and return an output

Be able to obtain user input from the keyboard.

Be able to output data and information from a program to the computer display.

We will need to know how to use nested selection and nested iteration structures

An example of nested iteration would be:

```
WHILE NotSolved # loop 1
```

```
    ... Instructions here ...
```

```
    FOR i ← 1 TO 5 #loop 2
```

```
        ... Instructions here ...
```

```
    ENDFOR
```

```
    ... Instructions here ...
```

```
ENDWHILE
```

We will need to know how to use and understand the following statement types :

- variable declaration
- constant declaration
- assignment
- iteration
- selection
- subroutine (procedure/function).

Examples of iteration and selection are below

- FOR i ← 1 TO 5

- ... Instructions here ...

- ENDFOR

- An example of indefinite (condition controlled) iteration with the condition at the start would be:

- WHILE NotSolved

- ... Instructions here ...

- ENDWHILE

- Examples of indefinite (condition controlled) iteration with the condition at the end would be:

- REPEAT

- ... Instructions here ...

- UNTIL Solved

- DO

- ... Instructions here ...

- WHILE NotSolved

We will be able to use the following mathematics within our programmes and algorithms

addition

subtraction

multiplication

real division

integer division, including remainders.

We need to know and understand the concept of a data type.

With focus on the following

integer

real

Boolean

character

string.

We will be able to use the following operators within our programming and algorithms:

- equal to ==

- not equal to !=

- less than <

- greater than >

- less than or equal to <=

- greater than or equal to.>=

Year 11 Subject Term Knowledge Organiser: Computer Science

Programming

We will need to know how data is stored and accessed in programmes, this is called data structures

Understand the concept of data structures. Why we use lists and arrays.

Use arrays (or equivalent) in the design of solutions to simple problems. Storing multiple values in one variable

Only one and two-dimensional arrays are required.

We will be able to handle and manipulate strings within our code. We will be able to understand and be able to use pre defined terms /instructions within our code to find and do the following

- length
- position
- substring
- concatenation
- convert character to character code
- convert character code to character
- string conversion operations.

Understand what is meant by testing in the context of algorithms and programs.

Be able to identify and correct errors within our programs.

Understand what test data is and describe the following types of test data:

normal (typical)

boundary (extreme)

erroneous data.

Boundary data would be for example:

If the allowed range is 1 to 10, then boundary data is 0, 1, 10, 11, ie either side of the allowed boundary.

Be able to select and justify the choice of suitable test data for a given problem.

Understand that there are different types of error:

syntax error

logic error.

Be able to identify and categorise errors within algorithms and programs.

Be able to write simple data validation programmes (is the data correct).

The following validation checks are examples of simple data validation:

- Checking if an entered string has a minimum length
- checking if a string is empty
- checking if data entered lies within a given range (eg between 1 and 10).

This will allow us to to write simple authentication routines.

We need to understand the concept of subroutines.

Explain the advantages of using subroutines and functions in programs.

Describe the use of parameters to pass data within programs.

Use subroutines that return values to the calling routine.

Know that subroutines may declare their own variables, called local variables, and that local variables usually:

only exist while the subroutine is executing are only accessible within the subroutine.

Use local variables and explain why it is good practice to do so.

Describe the structured approach to programming.

THEMES: Human Rights

Key terms

Censorship	Limiting and suppressing what people can say, write, see or hear.
Discrimination	The act of treating a person differently to others.
Prejudice	Judging people to be inferior or superior without any reason behind it.
Extremism	Supporting ideas that most people consider unreasonable.
Human Rights	The basic entitlements of all human beings.
Personal Conviction	Where a person feels strongly about something.
Social Justice	Promoting a fair society and challenging injustice. Ensuring everyone is equal.
Absolute poverty	Deprivation. Where a person cannot access the most basic of human needs.
Relative poverty	How poor a person is compared to another.

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 are Human Rights

The Universal Declaration of Human Rights is the most important document outlining human rights. It was agreed upon by the United Nations in 1948, as a response to the terrible events of the Second World War.

The Universal Declaration of Human Rights outlines the rights enjoyed by every human being regardless of gender, race, language, religion, politics, or wealth.

The Universal Declaration of Human Rights is not a law itself. It is a statement of the world's commitment to human rights. Many of its articles have been included in the laws of countries around the world.

MLK

Discrimination against black people in America goes back to the days of slavery. From the late 18th century onwards slavery was made illegal in the USA, but equal rights were not quick to follow. In some of the States in the late 1800s black people outnumbered whites and yet they had virtually no rights.

King was instrumental in co-ordinating protests and sit-ins, boycotts and speeches to promote racial equality without the use of violence. These actions were highly publicised, and slowly the segregation laws began to disappear.

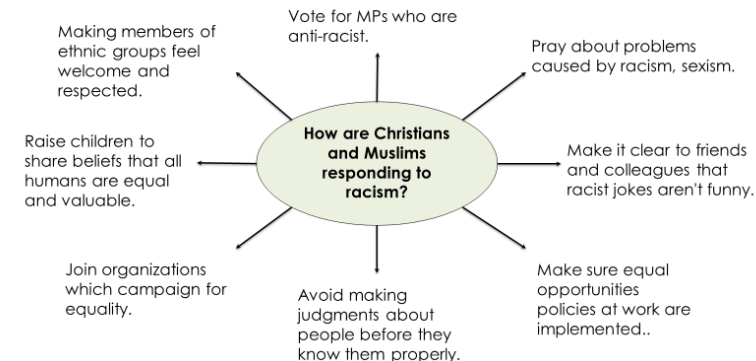
Westboro Baptist church

Westboro Baptist Church in Kansas, became well known for its forceful opposition to homosexuality and the gay rights movement, as expressed on picket signs carried by church members at funerals and other events. The church also demonstrated against other religions, most notably Judaism.

It condoned tragedies as the 9/11 attacks (2001) and the mass shooting at an elementary school in Connecticut (2012), **as God's retribution for sin.**



Racism



Malala

As a young girl of 11, the Pakistani student wrote an anonymous diary about what life was like under the rule of an extreme group called the Taliban in north-west Pakistan.

She talked about how she wanted to stay in education and about how girls should be able to go to school. The Taliban wanted to ban girls' education.

But the Taliban didn't like this. And because of what she said in her diary - in October 2012, she was shot by their soldiers.

Still, she continued her work and became the youngest person ever to win the world-famous Nobel Peace Prize.

Poverty and Wealth

Most poverty is found in less economically developed countries (LEDCs). These countries are non-industrialised, e.g Afghanistan and Sudan. People living in these countries are more likely to have high rates of child mortality, poor life expectancy, inadequate housing and poor educational standards.

Contrast this with those who live in more economically developed countries (MEDCs). Examples of MEDCs include the UK, USA and Canada. People living in MEDCs often have a much better chance of living in relative wealth. These countries have a more developed economy and have a greater income due to their technological and industrial abilities.

THEMES: Human Rights

Key terms

Censorship	Limiting and suppressing what people can say, write, see or hear.
Discrimination	The act of treating a person differently to others.
Prejudice	Judging people to be inferior or superior without any reason behind it.
Extremism	Supporting ideas that most people consider unreasonable.
Human Rights	The basic entitlements of all human beings.
Personal Conviction	Where a person feels strongly about something.
Social Justice	Promoting a fair society and challenging injustice. Ensuring everyone is equal.
Absolute poverty	Deprivation. Where a person cannot access the most basic of human needs.
Relative poverty	How poor a person is compared to another.

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 are Human Rights

The Universal Declaration of Human Rights is the most important document outlining human rights. It was agreed upon by the United Nations in 1948, as a response to the terrible events of the Second World War.

The Universal Declaration of Human Rights outlines the rights enjoyed by every human being regardless of gender, race, language, religion, politics, or wealth.

The Universal Declaration of Human Rights is not a law itself. It is a statement of the world's commitment to human rights. Many of its articles have been included in the laws of countries around the world.

MLK

Discrimination against black people in America goes back to the days of slavery. From the late 18th century onwards slavery was made illegal in the USA, but equal rights were not quick to follow. In some of the States in the late 1800s black people outnumbered whites and yet they had virtually no rights.

King was instrumental in co-ordinating protests and sit-ins, boycotts and speeches to promote racial equality without the use of violence. These actions were highly publicised, and slowly the segregation laws began to disappear.

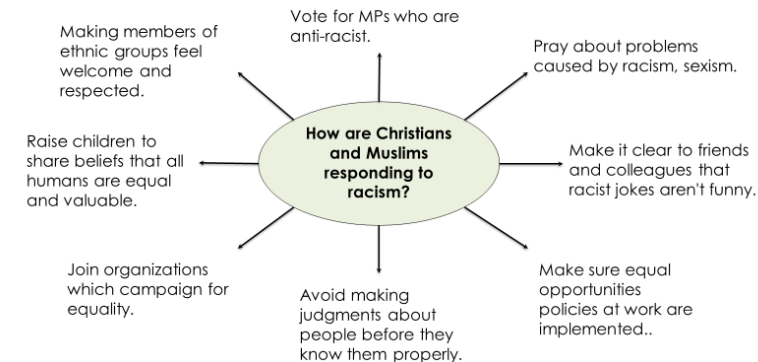
Westboro Baptist church

Westboro Baptist Church in Kansas, became well known for its forceful opposition to homosexuality and the gay rights movement, as expressed on picket signs carried by church members at funerals and other events. The church also demonstrated against other religions, most notably Judaism.

It condoned tragedies as the 9/11 attacks (2001) and the mass shooting at an elementary school in Connecticut (2012), **as God's retribution for sin.**



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Year 11 3D Design Knowledge Organiser

ASSESSMENT OBJECTIVE 1 Contextual Understanding: Develop Ideas Through Investigations, Demonstrating Critical Understanding.

Mind Mapping: Ideas Presented Around Theme

Topic/theme

In the center of the page, use images and text to represent your chosen theme.

Branches

Key themes, add to each main branch by adding other branches.



Keywords

Each branch represents a key idea, one word per branch, one word creates more associations.

Colours coding

Allows you to categorise. Makes your work look more appealing.

Include images

Communicates more than words, Processed instantly, Visual stimuli

Mood board: Collage Ideas Using Collected Images

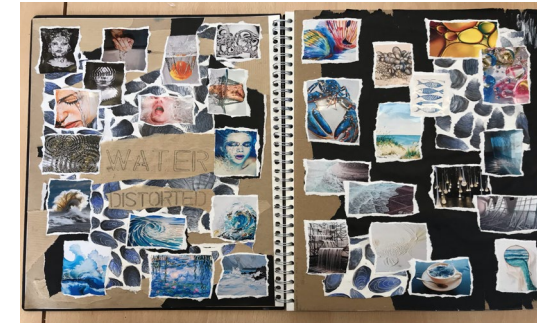
Consider your theme

Are you collecting images for a theme or of an artists work?

Sources

When researching a theme collect images, photos, wallpaper samples, magazine cuttings, lettering etc.

When researching an artist ensure all the images are relevant.



Presentation

Pull it all together by sticking to a particular style and/or colours scheme. Use font for your titles

Fill the space

Your mood board will directly link to the development of your project. Fill any empty space with annotation and sketches.

Don't limit yourself

Even if it doesn't link to your starting point it may relate to your theme. Add annotations and sketches to show your thought process.

Artist Research: Show Your Understanding

Biographical info

Birth, death, style, education, important works

Social, historical, economic influences

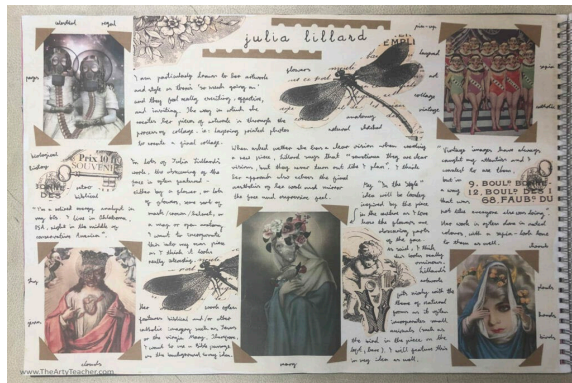
What is happening at the time? Was the work in response to anything?

Collected images

Mood board- annotation your thoughts

Copied images

Show your understanding by reproducing examples of their work.



Analyzing artwork

Analyze artists and your own work using form, content, process, mood, next steps

In the style of

Create your own version of the artists work. You should work in the style of the artist work with your own imagery.

Artistic influences

Who influenced their work? Did their work influence anyone else? What is your view/opinion of the work at first glance.

Analysing: 3D Design Work

Content

(Looking at the subject of the work)

- What is the work about?
- Is the work realistic/abstract/surreal? Explain how this impacts the viewer.
- Have any parts been exaggerated or distorted? If so, why/how?
- Are there any reoccurring features within the artist work? Describe.
- What is the theme of the work?
- What message does the work communicate?

Form

(Looking at the formal elements)

- What colours does the artist use? Why?
- What shapes does the artist use? Why?
- What mark-making techniques does the artist use? Why?
- How big is the work? Why did the artist chose this scale?
- Does the artist have a recognizable style. If so, explain what made you think this.

Process

(How has the work been made and developed)

- What media/materials/tools has the artist used? What is the evidence for this?
- How has the artist communicated their decision making/creative journey/narrative?
- How has the work been made?

Mood

(Looking at the communication of moods and feelings)

- How does the work make you feel? Explain.
- Does the colour, texture, form, theme, composition effect your mood?
- Does the work reminisce about a dream or your past or a person experience? Explain.

Next steps

(How are you going to use this knowledge to develop your own work)

- How will you develop your work in response?
- What features will you try to replicate?

Key Terms

- Proportion
- Composition
- Accuracy
- Quality Of Line
- Weight Of Line
- Tone
- Tints
- Blending
- Depth
- Definition
- Mark-making
- Circular Motion
- Sculpture
- Sculpt
- Smooth Transition
- Media
- Hues
- Abstract
- Figurative
- Layering
- Continuous Line
- Scale

Mi ciudad



Places in town



Town descriptions



Activities



Shops

My city	<p>En mi ciudad/pueblo hay... - In my city/town there is...</p> <p>Mi ciudad/pueblo tiene... - My city/town has...</p>	<p>un ayuntamiento - a town hall</p> <p>un bar/muchos bares - a bar/lots of bars</p> <p>un castillo (en ruinas) - a (ruined) castle</p> <p>un cine - a cinema</p> <p>un mercado - a market</p> <p>una piscina - a swimming pool</p> <p>un supermercado - a supermarket</p> <p>una playa - a beach</p> <p>un museo - a museum</p> <p>una plaza mayor - a town square</p> <p>un parque - a park</p> <p>una plaza de toros - a bull ring</p> <p>un polideportivo - a sports centre</p>	<p>una pista de hielo - an ice rink</p> <p>un puerto - a port/harbour</p> <p>una oficina de correos - a post office</p> <p>un restaurante - a restaurant</p> <p>una bolera - a bowling alley</p> <p>un teatro - a theatre</p> <p>una iglesia - a church</p> <p>una biblioteca - a library</p> <p>una comisería - a police station</p> <p>una estación de trenes/autobuses - a train/bus station</p> <p>un gran almacén - a department store</p> <p>un centro comercial - a shopping centre</p> <p>muchos lugares de interés - lots of sights</p>	<p>Vivo en <u>Liverpool</u>, una ciudad <u>grande</u></p> <p>I live in <u>Liverpool</u>, a big <u>city</u></p>
	<p>Es una ciudad/un pueblo _____</p> <p>- It's a _____ city/town</p>	<p>histórico/a - historic</p> <p>tranquilo/a - calm/quiet</p> <p>animado/a - lively</p> <p>turístico - touristy</p> <p>famoso/a - famous</p>	<p>moderno/a - modern</p> <p>ruidoso/a - noisy</p> <p>aburrido/a - boring</p> <p>industrial - industrial</p> <p>conocido/a por... - known for...</p>	<p>que <u>está situado</u> en el <u>noroeste de Inglaterra</u>,</p> <p>which <u>is situated</u> in the <u>Northwest of England</u></p>
	<p>Está situado - it's situated...</p>	<p>al lado del río - next to the river</p> <p>está rodeado de... - it's surrounded by</p>		<p>al lado del río <u>Mersey</u>.</p> <p>next to the river <u>Mersey</u>.</p>
	<p>Tiene unos impresionantes paisajes naturales - it has some amazing natural landscapes</p> <p>Tiene varios influencias culturales - it has various cultural influences</p> <p>Tiene el bullicio de la ciudad - it has the hustle and bustle of the city</p> <p>Es mi ciudad natal - it's my home town</p> <p>Hay mucho que hacer/hay mucha marcha - there's lots to do</p> <p>No hay nada que hacer - there's nothing to do</p> <p>Hay una zona peatonal - there's a pedestrian zone</p>			<p>Vivo en <u>las afueras</u> y</p> <p>I live in <u>the outskirts</u> and</p>
	<p>Se puede... - you can</p>	<p>estar mucho tiempo al aire libre - spend a lot of time in the open air</p> <p>subir la torre - go up the tower</p> <p>hacer un recorrido en autobús - do a bus tour</p> <p>disfrutar de las vistas - enjoy the views</p> <p>apreciar la arquitectura variada - appreciate the variety of the architecture</p> <p>aprovechar del buen tiempo - make the most of the good weather</p> <p>probar platos típicos - try local dishes</p> <p>practicar deportes acuáticos - do water sports</p> <p>practicar senderismo - go hiking/trekking</p> <p>ir de compras - go shopping</p>		<p>me <u>chifla</u> mi barrio porque hay mucho para los habitantes.</p> <p><u>I love</u> my neighbourhood because there is lots for the residents.</p>
Shops	<p>Un estanco - a tobacconist's</p> <p>Un banco - a bank</p> <p>Una cafetería - a café</p> <p>Una carnicería - a butcher's</p> <p>Una farmacia - a pharmacy/chemist's</p> <p>Una frutería - a greengrocer's</p> <p>Una joyería - a jeweller's</p> <p>Una librería - a bookshop</p> <p>Una panadería - a bakery</p>	<p>Una papelería - a stationery shop</p> <p>Una pastelería - a cake shop</p> <p>Una peluquería - a hairdresser's</p> <p>Una pescadería - a fishmonger's</p> <p>Una tienda de ropa - a clothes shop</p> <p>Una zapatería - a shoe shop</p> <p>Una juguetería - a toy shop</p> <p>Una tienda de comestibles - a grocery store/supermarket</p>		<p>Por ejemplo, se puede <u>visitar los museos</u>, <u>hacer un recorrido en autobús</u> o <u>ir de compras</u></p> <p>For example, you can <u>visit the museums</u>, <u>go on a bus tour</u> or <u>go shopping</u></p>
				<p>ya <u>que</u> hay un centro comercial enorme.</p> <p><u>because</u> there is an enormous shopping centre.</p>
				<p>También hay un lago donde se puede hacer esquí acuático.</p> <p>Also, there is a lake where you can go water skiing.</p>
				<p><u>Desafortunadamente</u> no hay <u>piscina</u>.</p> <p><u>Unfortunately</u> there is no <u>swimming pool</u>.</p>
				<p><u>¡Qué pena!</u> Me flipa hacer natación.</p> <p><u>What a shame!</u> I'm crazy about swimming.</p>
			<p>En mi opinión Liverpool es muy <u>turística</u> <u>dado que</u></p> <p>In my opinion Liverpool is very <u>touristy</u> <u>because</u></p>	
			<p>hay muchos <u>museos</u>, dos <u>catedrales</u></p> <p>there are lots of <u>museums</u>, two <u>cathedrals</u></p>	
			<p>y <u>es conocido por los Beatles</u></p> <p>and <u>it's known for the Beatles</u></p>	
			<p>y <u>el fútbol!</u> ¡Hay dos <u>estadios de fútbol!</u></p> <p>and <u>football!</u> There are <u>two football stadiums!</u></p>	
			<p>Tiene <u>el bullicio de la ciudad</u> y</p> <p>It has <u>the hustle and bustle of a city</u> and</p>	
			<p>varios influencias culturales.</p> <p>various cultural influences.</p>	
			<p>Es mi ciudad natal</p> <p>It's my home town</p>	
			<p>y me encanta.</p> <p>and I love it.</p>	

↑ ↑ ↑
A model text on my city

Mi ciudad



Advantages
and
disadvantages



Changes



In the past

Advantages and disadvantages	Lo mejor de vivir en la ciudad es que... - the best thing about living in the city is that...	<p>es tan fácil desplazarse - it's so easy to get around</p> <p>hay una red de transporte público - there's a public transport network</p> <p>hay tantas diversiones - there's so much to do</p> <p>hay muchas posibilidades de trabajo - there are lots of job opportunities</p> <p>la vida es más interesante - life is more interesting</p>		Lo mejor de vivir en la ciudad es que	The best thing about living in the city is that		
	Lo peor que que... - the worst thing is that...	<p>el centro es tan ruidoso - the centre is so noisy</p> <p>hay tanto tráfico - there's so much traffic</p> <p>se lleva una vida tan frenética - life is so hectic</p> <p>la gente no se conoce - people don't know each other</p> <p>hay demasiado contaminación - there's too much pollution</p>		es tan fácil desplazarse ya que	it's so easy to get around		
	En el campo... - in the countryside	<p>el transporte público no es fiable - the public transport isn't reliable</p> <p>hay bastante desempleo - there's quite a lot of unemployment</p> <p>yo conozco a todos mis vecinos - I know all of my neighbours</p> <p>se puede aprovechar del aire libre - you can enjoy the fresh air</p> <p>la vida es más tranquila - life is calmer</p> <p>la vida es más aburrida - life is more boring</p>		hay una red de transporte público muy fiable.	because there is a really reliable public transport network.		
Changes	Si fuera posible - if it were possible	introduciría transporte público gratis - I would introduce free public transport				Además, merece la pena madrugar porque	Moreover, it's worth getting up early because
		renovaría los edificios viejos - I would renovate the old buildings				hay mucho que hacer.	There's a lot to do.
		mejoraría el sistema de transporte público - I would improve the public transport system				Hay cines, tiendas y boleras y	There are cinemas, shops and bowling alleys and
		crearía más trabajos - I would create more jobs				mucha gente dice que la vida es más interesante.	lots of people say that life is more interesting.
		crearía más espacios verdes - I would create more green spaces				En mi opinión, se lleva una vida tan frenética en la ciudad	In my opinion life is so hectic in the city
		invertiría en la educación - I would invest in education				y por eso, preferiría vivir en el campo.	therefore I would prefer to live in the countryside.
		plantaría más árboles - I would plant more trees				Me parece que hay bastante desempleo	It seems that there is a lot of unemployment
		constuiría más tiendas en el centro - I would build more shops in the centre				sin embargo la vida es más tranquila y	however life is calmer and
		reduciría la contaminación - I would reduce pollution				se puede aprovechar del aire libre.	you can enjoy the fresh air.
		prohibiría los coches - I would ban cars				Si fuera posible cambiaría muchas cosas de mi ciudad.	If it were possible I would change a lot of things in my city.
My city in the past	En el pasado - in the past	la ciudad era - the city was	más/menos que hacer - more/less to do				
	Hace (10) años - 10 years ago	había - there was	mucho despempleo - there was a lot of unemployment				
En los años sesenta - in the 60s	tenía - it had	más/menos pobreza - more/less poverty					
Mis padres/mis abuelos dicen que - my parents/grandparents say that...	los Beatles se volvían famosos - the Beatles became famous		más/menos industrial - more/less industrial				
		Liverpool era la capital de cultura durante el año dos mil ocho (2008) - Liverpool was the Capital of Culture in 2008			un puerto importante - an important port		
		la ciudad ha cambiado a lo largo de los siglos - the city has changed throughout the centuries					
		plantaría más árboles ya que			plant more trees because		
		en el pasado era muy industrial.			in the past it was very industrial.		

A model text on advantages and disadvantages of the city

Year 11 Subject Term Knowledge Organiser: Business Studies

Unit 2.3 Making Operational Decisions:

= means connective

Types of Production

Job Production: Making **one product at a time**. This is used to make **one off products** which are different each time:

- + Highly skilled workers = High quality goods = excellent reputation = more sales & profit = more money to make the business better.
- + Goods can be made exactly how the customers wants them = high levels of customers satisfaction
- High staff wages as the employees are highly skilled = higher unit costs = less overall profit = less money to make the business better
- Doesn't allow for economies of scale = costs per unit are higher = overall costs are higher = less profit to spend making this business better

Flow Production:

This is when the **same** product is made **continuously using dedicated machinery**

- + Low skilled workers = lower wages = lower cost per unit which is important as profit margins are low = more overall profit per unit = more profit to make the business better
- + Can benefit from economies of scales as they can buy in bulk = costs per unit are lower = the price of the product can be lowered to beat competitors
- Workers are low skilled and the job can be boring = lack of motivation = might leave and go elsewhere = money spent on recruitment and training = less profit = less to make business better
- Cost of buying the machinery is high = take a long time to pay it back = higher expenses = less profit = less money to spend making the business better

Batch production

When companies produce one product for a period of time, and then switch to a **similar but different product** e.g. a bread company will make all white bread and then stop change the machine to make brown bread

- + Allows different batches to be made = more variety = can keep more customers happy = larger customer base = more sales = more profit = more profit to make business better.
- + can benefit from economies of scale if the business is producing a large quantity of each batch = lower cost per unit = can charge a higher price
- lots of down time for the machines when changing between batches = lost time = lower productivity = higher costs per unit = lower profit per unit = less profit to make the business better.

Just In Time:

Only ordering stock when you need it.

- + You don't need to pay for a warehouse to hold your stock so costs are lower = profit higher = more money to spend making the business better
- + Won't have lots stock that then goes out of stock = you won't have to reduce the price or make a loss on the items as they are no longer popular = saves money = more profit.
- Can't meet unexpected demand = disappointed customers = customers may go to your competitors and not return = less sales and profit = less money to spend making business better
- Customers may be let down and have to wait as you don't have the stock to replace any broken or faulty items = poor customer satisfaction = bad reputation = less sales and profit

Key Word:

Economies of Scale: The more the business makes of it's items the lower the costs per items become for example they are able to buy raw materials in bulk and get a discount.

Year 11 Subject Term Knowledge Organiser: Business Studies

Unit 2.3 Making Operational Decisions: Supplier Relationships and Quality

Procurement: Getting the right supplies from the right supplier, at the right price and at the right time

Factors that a business would need to consider in the Procurement of its supplies

- Cost of the items
- The delivery – including the cost/speed and reliability of delivery
- The quality of the materials
- The availability of the materials
- The trust between the supplier and the business

*This question could also worded “Factors a business must consider before choosing a supplier”

WAGOLL:

Explain one factor a business, would have to consider during the procurement of their stock (3)

A business would consider the quality of the raw materials. This is because if the quality of the raw materials is low then the quality of the overall product will be low. This would result in a damaged reputation and a loss of sales and profit.

Or

A business must consider the cost of the items. The business must ensure that the cost isn't too high as otherwise this may mean that the business has to charge a higher price which would mean they may lose customers who go to a cheaper competitor

Explain the benefits of having a good relationship with suppliers(6)

Suppliers are more likely to give the business **discounts** on raw materials. This means that the variable costs per unit may fall. Therefore more profit will be made on each item and this leads to more money to spend making the business better.

Suppliers are likely to become **more reliable**. Therefore, supplies of raw materials are more likely to arrive on time. As a result customer needs will be satisfied and therefore the business will get a good reputation which lead to more sales and profit

Impact on of poor supplier reliability

- Orders will not be met = customers let down = bad reputation = loss of customers = less sales and profit
- May only be able to offer limited choice = customers will feel dissatisfied = are less likely to return and go to a competitor = less sales and profit

Impact of an unprofessional supplier

- Deliveries are late
- Quality is poor

Benefits of producing high quality items

Can charge a higher price = more profit per item = more profit overall = more money to spend making the business better

Happier customers = more likely to return and therefore become loyal = more sales and profit

Drawback of producing high quality items

Expensive as the raw materials used to produce the goods must also be good quality = higher costs per unit = higher overall costs = less profit = less money to spend making the business better.

Quality control

Checking the product at the end of the production process

Quality Assurance:

Checking the product throughout the production processes

Exam Hint: A question about quality control is **NOT** simply asking the benefits or the drawbacks of having high quality goods.

Year 11 Subject Term Knowledge Organiser: Business Studies

Unit 2.5 Making human resource decisions: Training

= means connective

Advantages of Quality Control

Quicker and less time consuming as you are not stopping to check products – higher levels of productivity as more items are produced in a day – higher productivity = lower unit costs = more profit per unit- more money to reinvest back into the business

As products are checked right at the end faulty or poor quality products should not end up with the customer – no unhappy customers – no damage to reputation – keep loyal customers – keep competitive advantage

Disadvantage of Quality Control

Lots of wastage as the whole product is made before fault is spotted – high wastage – high costs – less profit

Hard to get all staff to feel they are part of the quality system and part of the process which can impact motivation = more likely to make mistakes = more costly = less profit

Advantages of Quality Assurance

Costs are lower as there is less wastage as products are checked regularly and mistakes are picked up quickly – lower costs mean more profit – more money to invest and make the business better

More motivational to employees as they feel trusted and responsible for their part in ensuring the product is good quality – they don't want to be the person that lets the team down – therefore work harder to ensure the product is good quality – in turn less faults – therefore less wastage – therefore lower costs

Disadvantages of Quality Assurance

Less productive - as more stops in the production line- less made – higher costs per unit – may have to have higher selling price – makes good more expensive – lower target market as less can afford – less sales – less profit.

Staff need trained = costly = less profit = less money to spend making the business better

Productivity

Productivity is output per worker. It measures how much each worker produces over a period of time. If you increase productivity you get workers to produce more in the same time period. Being more productive reduces costs. And makes the COST per Unit lower. This means

- a) You can make more profit per unit
- b) You can charge a lower selling price

You can improve productivity by

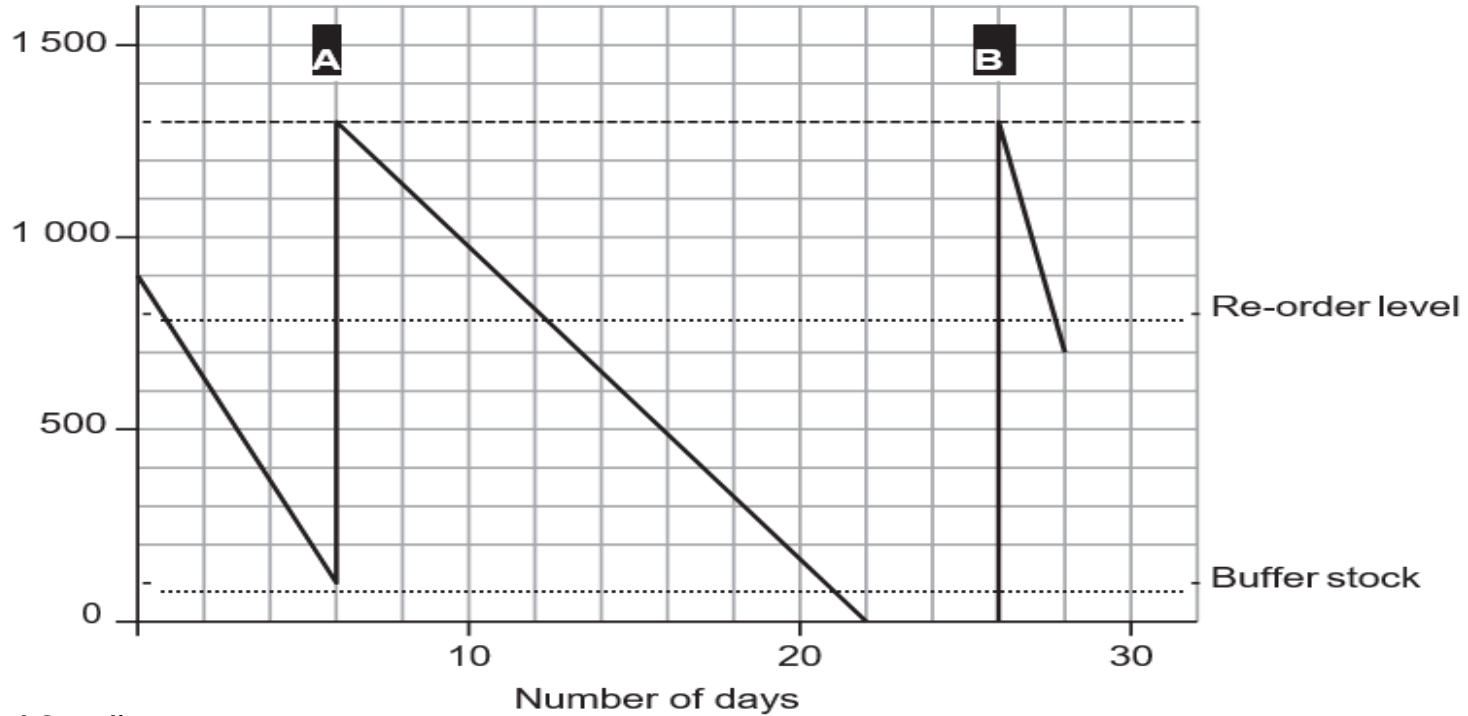
- o Motivating workers
- o Training workers
- o Having better machinery

Year 11 Subject Term Knowledge Organiser: Business Studies

Unit 2.5 Making human resource decisions: Training

= means connective

Portions of chicken



Other potential Questions:

State 2 pieces of information found on a bar gate stock graph
Maximum Stock Level/Minimum Stock Level/Reorder Level/ Lead Time

Maximum Stock Level 1,300
Minimum Stock/Buffer level 100
Reorder level: 800
Days for order B to arrive/Lead Time : $26 - 12 = 14$ days
Order that arrived: Order A: On day 6 when the order arrived they had 100 portions of chicken, this then shot up to 1300, therefore they ordered 1200 portions
Days without Chicken: $26 - 22 = 4$ days

Year 10 Subject Term Knowledge Organiser: Enterprise and Marketing

L01: Understand how to target a Market: Market Segmentation

We need customer segmentation because: Customers are

DIFFERENT.

They are different in

- **Benefits** they want
- Amount of **money** they are able/willing to pay
- **Quality** of goods they require
- **Quantity** of goods they require

WAYS to Segment the Market:

- Age
- Gender
- Occupation
- Income
- Geographic
- Lifestyle

The **BENEFITS** of market segmentation

- Can make more **profit**
- Happier **Customers**
- Allows for better **advertising**
- Ensures products fully meet the needs of customers

The purpose of **Market Research**

- To reduce **risk**
- To help with **decision making**
- To gain **customers' views** and understand what they **want**

L01: Understand how to target a Market: Market Research

Primary Research/Field Research

Advantages:

- Relevant and Up to date
- Specific to the organisation
- Only your business has the information, your competitor don't

Disadvantages:

- Costly
- Time Consuming

Secondary/Desk Research

Gathering data and information that has **ALREADY** been collected before

- Books/newspapers/magazines
- Sales Data
- Competitors' data
- Government statistics
- Purchased research material (e.g. Mintel)
- The internet

Secondary Research/Desk Research

Advantages:

- Cheap
- Quick to get

Disadvantages:

- May not be up to date or reliable
- Competitors can get the same information as you.
- Not Specific to your business

Primary Research/Field Research

Gathering data and information that has **NOT** been collected before

- Observations
- Questionnaires
- Surveys
- Focus groups
- Consumer trials

Year 10 Subject Term Knowledge Organiser: Enterprise and Marketing

L01: Understand how to target a Market: Primary Market Research

Observations

Advantages:

- **Accurate** as it shows someone how they truly behave

Disadvantages:

- **Doesn't give reasons** for the behaviour you are watching e.g. why does the customer not go up a super market aisle
- Time Consuming
- Expensive

Consumer Trials

Advantages:

You can get **honest and reliable** information as you can see their reaction

Disadvantages:

- Expensive as you have to give away free products

Focus Group

Advantages:

The information is **detailed** and you can find out the **WHYs** and their detailed opinions

Disadvantages:

- Expensive and Time consuming
- Don't get a lot of responses as it's normally only a small group

Telephone Survey

Advantages:

- Can cover **all over the UK**

Disadvantages:

- Many people don't answer and hang-up
- Expensive and Time Consuming

Personal Survey/Face to Face

Advantages:

Information can be **clarified** by the interviewer if the person being asked doesn't understand

Disadvantages:

- Time Consuming
- Expensive

Internet Survey

Advantages:

- **Quick and cheaper** than the other methods

Disadvantages:

- May be **ignored**

Postal Survey

Advantages:

- Less Time Consuming than Face to Face

Disadvantages:

- Many people just put them in the **bin**

Questionnaire

Advantages:

Business can ask the **questions they want**

Disadvantages:

- Time Consuming
- Expensive
- People **may not** want to answer the questions

Year 10 Subject Term Knowledge Organiser: Enterprise and Marketing

L01: Understand how to target a Market Research: Secondary Market Research

Internal Sales Data

Advantages:

Can clearly **see trends** over a set amount of time

Disadvantages:

- Only gives **limited information** – doesn't give the why.

Books and Magazines

Advantages:

Cheap

Disadvantages:

- **Out of date** quickly

Purchased Research Materials – e.g. Mintel

Advantages:

Is **very detailed**

Disadvantages:

- Have to **pay for it**

Competitors Data

Advantages:

Can find it **quickly** on the internet

Disadvantages:

- **Out of date** quickly

Government Statistics

Advantages:

Free to access on the internet

Disadvantages:

- **Out of date** quickly

L01: Understand how to target a Market Research: Customer Feedback Techniques

Methods

- Social media
- Online surveys
- Customer comment cards
- Comments made to staff members
- Telephone/email surveys
- Email contact forms

Social Media

Advantages:

Free to access on the internet

Disadvantages:

- If it's negative may damage your reputation

Customer Comments Cards

Advantages:

- **Cheap** method as the customer fills it in themselves

Disadvantages:

- **Easily ignored/** not filled in

Customer Comments to staff

Advantages:

- Costs **nothing**

Disadvantages:

- No guarantee the staff member will pass the information on to management

Online Survey/Telephone and email survey – see above .

L01: Understand how to target a Market: Data

Types of Data

QUANTITative Data (think **QUANTITY**). This is numerical data made up of numbers e.g. from **surveys** e.g. 95% of people like Business or looking at **Sales data** e.g. a business made £20,000 last month

QUALITative Data (think **QUALITY**). This is data made up of people's opinions. You get the "Why behind the people's answers. This is from **Focus groups or Interviews**