



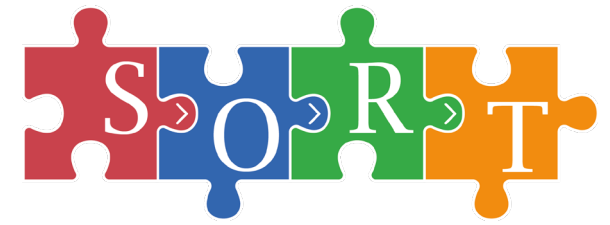
Year 11

Learning Cycle 1

Preparing for Assessment

Student Name: _____

Instructions on how to use your learning cycle booklet:



At Poltair we **SORT** it!

The aim is for all students to be fully prepared and ready for all assessments in all subjects.

To help them with this we have a whole school revision/study strategy – SORT.

There will be two learning cycles throughout Year 11. At the beginning of each learning cycle students will be issued with a booklet that details all knowledge they will be expected to know and recall in the assessments.

Each day, for home learning, students will be set a task of memorising a part of a knowledge organiser from two subjects.

Summarise	Organise	Recall	Test
Summarise and condense any class notes, revision guides and revision.	Organise your revision materials by topic/subtopic. Traffic light your PLC sheets to identify areas of weakness or gaps (Red/Amber) that need to be prioritised.	Use active recall and spaced repetition to memorise your knowledge organisers until you can recall the information eg. Look, cover, write or self-testing	Use low stakes online tests/quizzes and answer high stakes past paper/sample questions to check and apply knowledge and understanding
Strategies			
<ul style="list-style-type: none"> • Cornell Notes • Flash cards • Mind mapping • Revision clocks • Dual coding 	<ul style="list-style-type: none"> • How to use your PLC • How to schedule your home learning and stick to it! 	<ul style="list-style-type: none"> • Look cover & test • Leitner system • Blurt it • Transform it 	<ul style="list-style-type: none"> • Low stakes • Self-quizzing • Quiz each other • Online quizzes • High stakes • Exam style questions

Instructions on how to use your learning cycle booklet:

Learning cycle 1 will focus on all the SORT strategies:



Summarise	Organise	Recall	Test
<ul style="list-style-type: none">• Cornell Notes• Flash cards• Mind mapping	<ul style="list-style-type: none">• How to use your PLC• How to schedule your home learning and stick to it!	<ul style="list-style-type: none">• Look cover & test• Leitner system	<ul style="list-style-type: none">• Self-quizzing

Using the PLC

- Review each key idea on the PLC
- In the **Organise** column write R, A or G depending on your understanding. **Red** = no understanding, **Amber** = Some understanding but needs work, **Green** – Secure understanding
- When you complete a **Summarise** activity for each key idea, tick the S column
- When you complete a **Recall** activity for each key idea, tick the R column
- When you **Test** by self-quizzing or complete an online-quiz for each key idea, tick the T column

Videos explaining all of the SORT strategies can be found on the Student SharePoint

Homework timetable

	Mon A	Tue A	Wed A	Thu A	Fri A
Core activity	Complete Maths goal	Complete Maths goal	Complete Maths goal	Complete Maths goal	Complete Maths goal
Subject 1	Science	English	Science	English	Option B
Subject 2	Option C	Option D	Maths	Option A	Independent revision using the knowledge organisers
	Mon B	Tue B	Wed B	Thu B	Fri B
Core activity	Complete Maths goal	Complete Maths goal	Complete Maths goal	Complete Maths goal	Complete Maths goal
Subject 1	Science	English	Science	English	Option B
Subject 2	Option C	Option D	Maths	Option A	Independent revision using the knowledge organisers

My computer passwords

Platform	User Name	Password
School system		
Complete Maths		
Educake		
Memrise		

#revise25

REVISE FOR 25

Record every 15 minutes that you revise. You are aiming to complete a minimum of 25 hours ahead of your PPEs. This can include time spent in planned revision sessions, or independent study.

#revise25

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

Year 11 Learning Cycle 1 Personal Learning Check lists

English

Key Ideas	S	O	R	T
Who was William Shakespeare and what was life like when he wrote and set the play?				
Who are the main characters in the play?				
What are the key themes across the play?				
What happens in act one?				
What happens in act two?				
What happens in act three?				
What happens in act four?				
What happens in act five?				
What are the key quotations that I have to know? What can I say about them?				
Can I write a thesis driven essay on the play?				

Maths

Key Ideas	S	O	R	T
Expand Quadratics				
Sequences				
Factorise Quadratics				
Angles in Parallel Lines				
Interior & Exterior Angles				
Plans & Elevations				
Bearings				
Trigonometry inc Non-Calc				
Surface Area & Volume				
Sampling				

Maths (Higher only)

Key Ideas	S	O	R	T
Interior and Exterior Angles				
Plans & Elevations				
Bearings				
Sampling				
Vectors				
Simultaneous equations				
Recurring Fractions				
Quadratic Sequences				
Coordinate Geometry				
Transformations				

Year 11 Learning Cycle 1 Personal Learning Check lists

Science

Key Ideas	S	O	R	T
Describe the function of the nervous system				
Describe the function of the endocrine system				
Explain how glucose levels in the blood remain constant				
Explain the role of hormones in reproduction.				
Identify scalars and vectors				
Recall and apply the equations for weight and work done.				
Explain Newton's 1st, 2nd and 3rd law and apply to given examples.				
Recall and apply the equation for Hooke's Law.				
Recall typical values for speed.				
Recall and apply the speed equation.				
Determine speed from a d-t graph				
Draw and interpret velocity-time graphs				
Recall and apply equations for acceleration.				
Explain the factors that affect braking distance.				
Explain electromagnetic effects and how they are used in a variety of devices.				

Geography

Key Ideas	S	O	R	T
Describe economic and social measures of development				
Explain the stages of the Demographic Transition Model and levels of development				
Explain the causes & consequences of uneven development				
Evaluate strategies used to reduce the development gap				
Explain the location and importance of Nigeria				
Explain the changing industrial structure and the role of manufacturing, e.g., TNC's				
Explain the role of international aid and impacts on Nigeria				
Explain effects of economic development on the environment and quality of life				

History

Key Ideas	S	O	R	T
Roles in Native American society				
Definition of Manifest Destiny				
What happened to the Donner Party				
What happened to the Mormons				
Details of the 1851 Fort Laramie Treaty				
Details of the Homestead Act				
Joseph McCoy and Abilene				
How the role of cowboys changed				
Why there was rivalry between Homesteaders and Ranchers				

Year 11 Learning Cycle 1 Personal Learning Check lists

Spanish/ French

Key Ideas	S	O	R	T
I know my non-negotiable verbs for the past, present and future tenses				
I know at least 5 interesting adjectives that I can apply to my work				
In the writing exam, I understand the format that each of the tasks takes				
I can write a success criteria for these tasks from memory				
In the Speaking exam, I understand the format of each of the three tasks				
I feel confident with the key vocab for the role-play				
I use Memrise regularly to learn the key vocab for the reading and listening exams				

Computing

Key Ideas	S	O	R	T
Computational thinking				
I can explain the principles of computational thinking: <ul style="list-style-type: none"> Abstraction Decomposition Algorithmic thinking Designing, creating and refining algorithms				
I can identify the inputs, processes, and outputs for a problem				
I can create structure diagrams and explain their purpose.				
I can create, interpret, correct, complete, and refine algorithms using: <ul style="list-style-type: none"> Pseudo code Flowcharts (flowchart symbols) Reference language/high-level programming language I can identify common errors				
I can create trace tables				
Searching and sorting algorithms				
I can explain standard searching algorithms: <ul style="list-style-type: none"> Binary search Linear search I can explain standard sorting algorithms: <ul style="list-style-type: none"> Bubble sort Merge sort Insertion sort 				

Key Ideas	S	O	R	T
Programming fundamentals				
I can explain the differences between variables, constants, operators, inputs, outputs and assignments and use them in code.				
I can use the three basic programming constructs used to control the flow of a program: <ul style="list-style-type: none"> Sequence Selection Iteration (count- and condition-controlled loops) I can use the common arithmetic operators				
I can use the common Boolean operators AND, OR and NOT				
Data types				
I can use data types: <ul style="list-style-type: none"> Integer Real Boolean Character and string Casting 				

Year 11 Learning Cycle 1 Personal Learning Check lists

Art

Key Ideas	R	A	G
Explain how to select, present and evaluate resource materials.			
Explain how to experiment with materials to realise intentions.			
Record and refine ideas.			
Explain how to develop ideas through contextualisation.			
Present a personal and meaningful response realising intention.			

Nutrition

Key Ideas	S	O	R	T
I can describe functions of nutrients in the body (U2, LO1, AC1.1)				
I can compare nutritional needs of specific groups (U2, LO1, AC1.2)				
I can explain characteristics of unsatisfactory nutritional intake (U2, LO1, AC1.3)				
I can explain how nutritional methods impact on nutritional value (U2, LO1, AC1.4)				
I can explain factors to consider when proposing dishes for menus (U2, LO2, AC2.1)				
I can explain dishes on a menu address environmental issues (U2, LO2, AC2.2)				
I can explain how men dishes meet customer needs (U2, LO2, AC2.3)				
I can use techniques in preparation of commodities (U2, LO3, AC3.1)				
I can assure quality of commodities to be used in food preparation (U2, LO3, AC 3.2)				
I can use techniques in cooking of commodities (U2, LO3, AC3.3)				
I can complete dishes using presentation techniques (U2,LO3AC3.4)				
I can use food safety practices(U2, LO3, AC3.5)				

Engineering

Key Ideas	R	A	G
I can calculate volume and area			
I can describe the main polymer manufacturing processes of injection moulding, blow moulding and extrusion.			
I can use hand drawing skills to produce a range of ideas.			
I can write a specification which is well justified.			
I can use CAD to create a sketches and parts.			
I can use CAD to create assemblies of components.			
I can use CAD to create Orthographic drawings.			

Year 11 Knowledge Organiser – William Shakespeare’s ‘Romeo and Juliet’

Context

1a = Queen Elizabeth I – She was queen while Shakespeare was writing ‘Romeo and Juliet’, and supported him. Elizabeth I made Protestantism the official religion of England, which angered many Catholics, and led to much conflict. Shakespeare may be referencing this in ‘Romeo and Juliet’, with the two warring families.

1b = Patriarchy – patriarchal societies are ones where men are dominant, and have control over women e.g. by choosing who they would marry.

1c = Nurses – employed by wealthy families to feed and care for their children.

1d = The Humours – Elizabethans believed the body contained four ‘humours’: blood, phlegm, yellow bile and black bile. The amount you had of each determined your personality. People with too much phlegm are emotional. People with too much blood are irresponsible and gluttonous. People with too much yellow bile are violent and vengeful. People with too much black bile are depressed and self-centred.

1e = Fate - the belief that your life is mapped out for you, or ‘written in the stars’. Many Elizabethans believed God decided your fate, and that astrology could help you identify your course in life.

1f = Bubonic Plague/Black Death – a plague that killed many people. Sufferers were quarantined in their houses, with a red ‘X’ painted on the door, and left to die.

Main Characters

2a = Romeo – One of the protagonists of the play, along with Juliet. He is the male heir to the dynasty of House Montague, which is in a long-standing feud with House Capulet. A young man of about sixteen, Romeo is **handsome, intelligent, and sensitive**. Though impulsive and immature, his idealism and passion make him an extremely likable character. Although he lives in the middle of a violent feud between his family and the Capulets, but he is not at all interested in violence.

2b = Juliet Capulet appears to be **a shy and innocent girl at the beginning of the play, but the depth of her character shows as she meets Romeo, defies her father, marries Romeo, and ultimately commits suicide**. While appearing quiet and obedient, Juliet displays inner strength, intelligence, bravery, wit, and independence.

2c = Mercutio - With a lightning-quick wit and a clever mind, Mercutio is a scene stealer and one of the most memorable characters in all of Shakespeare's works. Though he constantly puns, jokes, and teases—sometimes in fun, sometimes with bitterness—Mercutio is not a mere jester or prankster. With his wild words, Mercutio punctures the romantic sentiments and blind self-love that exist within the play. He mocks Romeo's self-indulgence just as he ridicules Tybalt's hauteur and adherence to fashion. Unlike the other characters who blame their deaths on fate, Mercutio dies cursing all Montagues and Capulets. Mercutio believes that specific people are responsible for his death rather than some external impersonal force.

2d = The nurse - The Nurse's main role in the play is that of a secondary mother figure for Juliet. The Nurse clearly enjoys a closer relationship with Juliet than Lady Capulet does. This isn't surprising, given the amount of responsibility she had in caring for Juliet since her birth. The Nurse's affection for Juliet stems from the fact that she had a daughter named Susan who was the same age as Juliet, but who died young. Thus, just as she is a surrogate mother for Juliet, so too is Juliet a surrogate daughter for the Nurse.

2e = Friar Lawrence - He occupies a strange position in *Romeo and Juliet*. He is a kind-hearted Franciscan monk who helps Romeo and Juliet throughout the play. He performs their marriage and gives generally good advice, especially in regard to the need for moderation. He is the sole figure of religion in the play. But Friar Lawrence is also the most scheming and political of characters in the play: he marries Romeo and Juliet as part of a plan to end the civil strife in Verona; he spirits Romeo into Juliet's room and then out of Verona; he devises the plan to reunite Romeo and Juliet through the deceptive ruse of a sleeping potion that seems to arise from almost mystic knowledge.

2f = Benvolio - The peacemaker, amongst a group of hot headed characters, Benvolio Montague, cousin to Romeo, is a character who significantly moves the plot along, helping Romeo along the way to discover his true love.

Year 11 Knowledge Organiser – ‘Romeo and Juliet’

Plot

3a = Prologue: A sonnet, recited by the chorus, outlines the play. **Act 1 Act I, Scene 1:** Capulet and Montague servants fight in the streets. Benvolio tries to break them up, but Tybalt arrives and challenges him. The Prince arrives and declares that any further fighting will be punished with death. After this, the Montagues discuss Romeo's melancholy state and Benvolio learns Romeo is in love with Rosaline. **Act I, Scene 2:** Paris seeks Capulet's permission to marry his daughter Juliet. Capulet says she is too young, but Paris should try to win her affections at his banquet. Capulet's invitation list is intercepted by Benvolio and Romeo, who decide to attend the event. **Act I, Scene 3:** The Nurse and Lady Capulet tell Juliet about Paris, and she agrees to consider him as a potential suitor. **Act I, Scene 4:** Romeo, Benvolio, and Mercutio arrive at the banquet, and Mercutio banters with Romeo. **Act I, Scene 5:** Romeo and Juliet see each other and fall in love immediately. Tybalt sees Romeo and wants to fight him, but Lord Capulet stops him.

3b = Act 2 Act II, Scene 1: Romeo separates himself from his friends as they leave the party. **Act II, Scene 2:** Romeo listens to Juliet at her balcony, and they exchange vows to marry. Juliet says she will send a messenger to Romeo the next day to arrange the wedding. **Act II, Scene 3:** Romeo goes to see Friar Lawrence to ask for his help with marrying Juliet. The Friar agrees, hoping that their alliance will end their families' feuding. **Act II, Scene 4:** Benvolio and Mercutio discuss Tybalt, who has challenged Romeo to a duel. Romeo arrives and the friends banter about his love. The Nurse appears; Romeo's friends depart. Romeo gives the Nurse a message for Juliet: she is to go to Friar Lawrence that afternoon, and they shall be married. He arranges for the Nurse to receive a rope-ladder for Juliet to lower for him that night. **Act II, Scene 5:** The Nurse returns to an impatient Juliet. She teases her charge by withholding the message but then tells her the good news. **Act II, Scene 6:** Juliet comes to Romeo in Friar Lawrence's cell, and they greet each other joyfully. The Friar prepares to marry them.

3c = Act 3 Act III, Scene 1: Benvolio and Mercutio encounter Tybalt, and Mercutio mocks him. Romeo arrives and refuses to accept Tybalt's challenge to a duel (due to his secret marriage to Juliet). Mercutio thinks this is cowardly so fights on his behalf. Romeo tries to intervene and Mercutio is killed under his arm, cursing the families as he dies. Romeo fights and kills Tybalt to get revenge. At Benvolio's urging, Romeo flees. The Prince appears and interrogates Benvolio. Judging Tybalt to be guiltier than Romeo, he spares the latter the death sentence but banishes him from Verona. **Act III, Scene 2:** Juliet longs for night, when Romeo is to come. The Nurse brings her word of Tybalt's death and Romeo's banishment, and volunteers to bring Romeo to the distraught girl. **Act III, Scene 3:** Romeo is in a state of anger and disbelief, hiding with the Friar. The Nurse arrives with word of Juliet's distress. The Friar chastises Romeo for behaving so foolishly and proposes that, after a night with Juliet, Romeo should flee to Mantua until everything is cleared up. Romeo agrees and leaves. **Act III, Scene 4:** Capulet decides to marry Juliet to Paris in three days to cheer her up. **Act III, Scene 5:** Romeo and Juliet awake after spending the night together and Romeo leaves. Lady Capulet arrives and tells Juliet about her impending marriage. Juliet refuses and her parents fly into a rage. The Nurse advises that Juliet ignore her marriage to Romeo, which no one else knows about, and marry Paris.

3d = Act 4 Act IV, Scene 1: Juliet interrupts Paris talking to Friar Lawrence and, when he leaves, threatens to kill herself if the Friar doesn't help her. He agrees to provide her with a potion that will make her seem to be dead, until Romeo collects her from the family crypt. **Act IV, Scene 2:** Juliet apologizes to her father, promising to obey him and marry Paris. Capulet moves the wedding up a day to the next morning. **Act IV, Scene 3:** Juliet drinks the potion. **Act IV, Scene 4:** Capulet sends the Nurse to awaken Juliet on the morning of her wedding day. **Act IV, Scene 5:** The Nurse finds Juliet dead and the family grieve for her.

3e = Act 5 Act V, Scene 1: Balthasar arrives in Mantua and tells Romeo that Juliet has died. Romeo immediately plans to join her and buy a poison from an apothecary. **Act V, Scene 2:** Friar John reports to Friar Lawrence that he has been unable to deliver Lawrence's letter to Romeo. Lawrence sends John to fetch a crow bar, planning to open the vault and take Juliet into hiding in his own cell until Romeo can be summoned. **Act V, Scene 3:** Paris visits Juliet's tomb at night. Romeo appears with Balthasar, whom he sends away with a letter to Montague. Paris steps forth to challenge him. They fight, and Romeo kills Paris. Romeo then enters the crypt, drinks the poison, and dies. Friar Lawrence arrives tells Juliet what has happened and begs her to flee. She refuses and stays. She kisses her dead lover and stabs herself with his dagger. The watchmen appear, arresting Balthasar and the Friar as the Prince arrives, followed by both families. The Friar explains what has happened, and his tale is confirmed by Balthasar and by Romeo's letter to his father. Montague and Capulet make peace and vow to erect golden statues of the two lovers.

Year 11 Knowledge Organiser – ‘Romeo and Juliet’

Critical Tier 2 Vocabulary

Shakespeare presents the Montagues and their supporters as...

4a = Romeo

1. Melancholic – someone who is prone to moping and being depressed.
2. Quixotic – extremely idealistic: unrealistic and impractical.
3. Ardent – enthusiastic and passionate.

4b = Benvolio

1. Appeasing- someone who tries to pacify others.
2. Sincere - honest and genuine.
3. Stalwart – loyal and reliable.

4c = Mercutio

1. Anarchic – unruly and chaotic.
2. Impulsive – someone who acts on a whim, without thinking.
3. Precocious – someone who ‘shows off’ their intelligence arrogantly.

Shakespeare presents the Capulets and their supporters as...

4d = Juliet

1. Idealistic – someone who believes wholeheartedly in something, even if it is unrealistic.
2. Ingenuous – innocent, naïve and unworldly.
3. Resolute – someone who has made their mind up and whose opinion cannot be changed.

4e = Tybalt

1. Volatile – someone who could explode at any moment.
2. Tempestuous – someone who is unpredictable and has many conflicting emotions.
3. Righteous – someone who believes what they are doing is morally justifiable.

4f = Nurse

1. Maternal – motherly.
2. Submissive – will bend to a dominant authority and ‘do what they are told’
3. Uncouth – uncivilised and uncultured, potentially vulgar.

Authorial Intent

Shakespeare did not invent the story of *Romeo and Juliet*. He did not, in fact, even introduce the story into the English language. A poet named Arthur Brooks first brought the story of ‘Romeus and Juliet’ to an English-speaking audience in an epic poem that was itself not original. Many of the details of Shakespeare’s plot are lifted directly from Brooks’s poem, including the meeting of Romeo and Juliet at the ball, their secret marriage, Romeo’s fight with Tybalt, the sleeping potion, and the timing of the lover’s eventual suicides. Such appropriation of other stories is characteristic of Shakespeare, who often wrote plays based on earlier works. **However, he may have chosen to adapt Brook’s poem for the stage to...**

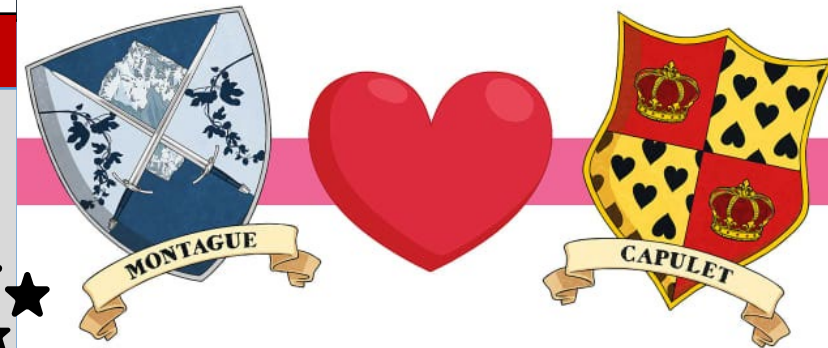
3a = To highlight...the subordinate position of women in a patriarchal society, and particularly the traditional view that daughters were a commodity and could be used in marriage to forge useful alliances.

3b = To recognise... the futility of generational conflict and the human cost of warring and civil unrest.

3c = To question... the idea of agency and fate and make people consider the implications of their actions.

Motifs in ‘Romeo and Juliet’

4a = Night and Day: *Romeo and Juliet* complicates traditional notions of light versus dark and day versus night. Light is typically a symbol of openness, purity, hope, and good fortune, while dark often represents confusion, obscurity, and doom. Shakespeare, however, turns these commonplace associations on their heads and inverts both symbols. In the world of this play, dawn, day, and bright lights are, overwhelmingly, negative—night, the only time Romeo and Juliet can be together in secret, is the time of day they both long for, and together they grow to lament the arrival of the days that pull them apart.



Key terms	Definition
Quadratic	A polynomial equation of degree 2 (reducible to $0 = ax^2 + bx + c$)
Function	A function relates an input to an output.
Expanding brackets	To expanding brackets means multiplying each term in the brackets by the expression outside the brackets.
Coefficient	A numerical or constant quantity placed before and multiplying the variable in an algebraic expression
Arithmetic	An arithmetic sequence is an ordered set of numbers that have a common difference between each consecutive term.
Geometric	A geometric sequence goes from one term to the next by always multiplying or dividing by the same value. The number multiplied (or divided) at each stage of a geometric sequence is called the common ratio.
Sequence	A list of numbers or objects in a special order.
Nth Term	The n th term is a formula that enables us to find any term in a sequence. The 'n' stands for the term number.
Polygon	A polygon is a two-dimensional geometric figure that has a finite number of sides. The sides of a polygon are made of straight-line segments connected to each other end to end.
Interior/Exterior	An Interior Angle is an angle inside a shape, the Exterior Angle is the angle between any side of a shape, and a line extended from the next side.
Tessellation	A tessellation or tiling is the covering of a surface, often a plane, using one or more geometric shapes, called tiles, with no overlaps and no gaps
Rotational symmetry	Rotational symmetry is the property a shape has when it looks the same after some rotation by a partial turn
Supplementary	Two angles sum to 180 degrees – also called co-interior or allied angles
Alternate	Two angles, formed when a line crosses two other lines, that lie on opposite sides of the transversal line and on opposite relative sides of the other lines. If the two lines crossed are parallel, the alternate angles are equal.
Corresponding	The angles which occupy the same relative position at each intersection where a straight-line crosses two others. If the two lines are parallel, the corresponding angles are equal.
Perpendicular	Lines that intersect each other forming a right angle
Regular	A polygon having sides of equal length and angles of equal measures
Trigonometry	Trigonometry is a branch of mathematics that studies relationships between side lengths and angles of triangles.
Discrete	Discrete data is a count that involves integers — only a limited number of values is possible.
Continuous	Continuous data is data that can take any value, eg height, weight and temperature
Qualitative	Qualitative data describes qualities or characteristics, eg hair colour, left/right-handed
Quantitative	Quantitative data is data that can be counted or measured in numerical values

Year 11 Maths Knowledge Organiser Learning Cycle 1

2

Algebra

$(2x+3)(5x-8)$

	$2x$	$+3$
$5x$	$10x^2$	$+15x$
-8	$-16x$	-24

$10x^2 + 15x - 16x - 24$
 $= 10x^2 - x - 24$

Factorising Quadratics

Factorise $y^2 + 2y - 15$

step 1: place y at the front of both brackets

step 2: the numbers will multiply to give -15 add to give 2

$15 \times -1 = -15$	$15 + -1 = 14 \times$
$-5 \times 3 = -15$	$-5 + 3 = -2 \times$
$-3 \times 5 = -15$	$-3 + 5 = 2 \checkmark$

$(y - 3)(y + 5)$

Tip: to check your answer, just expand the brackets

n^{th} term for Linear Sequences

Find the n^{th} term and the 100^{th} term of

$8, 11, 14, 17, 20 \dots$

$3n$ $3, 6, 9, 12, 15 \dots$

n^{th} term = $3n + 5$ 100^{th} term = $3 \times 100 + 5 = 305$

3

Geometry

Angles in Parallel Lines

Alternate Angles Corresponding Angles

Co-interior Angles Vertically Opposite Angles

Bearings

Bearings are a direction of travel

Find the bearing of Nottingham from Dublin

- Join Dublin and Nottingham
- Draw a north line at Dublin
- Measure the angle clockwise from north
- All bearings should have 3 figures

Angles in Polygons 1

Triangle: Angles add up 180°

Quadrilateral: Angles add up 360°

Pentagon: Angles add up 540°

Hexagon: Angles add up 720°

Heptagon: Angles add up 900°

Octagon: Angles add up 1080°

Sum of interior angles = $(n - 2) \times 180$
 where n is the number of sides

Angles in Polygons 2

Sum of Exterior Angles of Any Polygon = 360°

$360 \div 5 = 72^\circ$

Interior Angle + Exterior Angle = 180°

$180 - 72 = 108^\circ$

Year 11 Maths Knowledge Organiser Learning Cycle 1

4


Measures

Corbettm@ths

Exact Trig Values

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

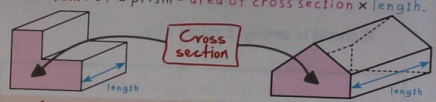
A prism is a 3D shape with the same cross section running through it:



The triangle runs all the way through the shape.

The **surface area** of a prism is calculated by finding the area of each of the faces and then adding them all together.

The **volume** of a prism = area of cross section \times length.

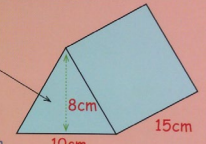


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Volume of a Prism

Volume = Cross-Sectional Area \times Length

Area of the Cross-Section
 = $\frac{1}{2}$ base \times height
 = $\frac{1}{2}$ (10) \times 8
 = 40cm²



Volume = Cross-Sectional Area \times Length
 = 40 \times 15
 = 600cm³

5

Co-ordinate Geometry

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Drawing Linear Graphs

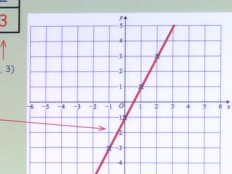
Draw $y = 2x - 1$

To find each y value, multiply by 2 and subtract 1

x	-2	-1	0	1	2
y	-5	-3	-1	1	3

(-2, -5) (-1, -3) (0, -1) (1, 1) (2, 3)

Plot the coordinates and draw a straight line through all the points



Corbettm@ths

Equation of a Line

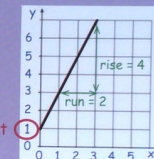
$y = mx + c$

Gradient m y - intercept c

Gradient = $\frac{\text{rise}}{\text{run}}$
 = $\frac{4}{2} = 2$

y - intercept = 1

$y = 2x + 1$



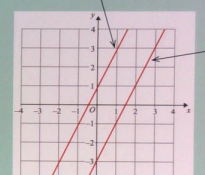
Corbettm@ths

Parallel Lines

Parallel lines have the same gradient

$y = 2x + 1$

$y = 2x - 3$



6

Further reading, websites

- www.completemaths.com
- www.justmaths.com
- www.corbettmaths.com
- www.mathsisfun.com

Key terms	Definition
Vector	A vector describes a movement from one point to another. A vector quantity has both direction and magnitude (size). A scalar quantity has only magnitude. A vector can be represented by a line segment labelled with an arrow.
Scalar	A physical quantity that is completely described by its magnitude; examples of scalars are volume, density, speed, energy, mass, and time. Other quantities, such as force and velocity, have both magnitude and direction and are called vectors.
Collinear	In geometry, collinearity of a set of points is the property of their lying on a single line. A set of points with this property is said to be collinear. In greater generality, the term has been used for aligned objects, that is, things being "in a line" or "in a row".
Simultaneous	Simultaneous equations are two or more algebraic equations that share variables e.g. x and y . They are called simultaneous equations because the equations are solved at the same time. If plotted the solution that satisfies both equations is where the two lines/curves intersect.
Change the subject	When changing the subject of a formula, we rearrange the formula so that we have a different subject. In other words, if you move a term from one side of the equals sign to the other, change the operation to do the opposite.
Congruence	Being the same size and shape - identical
Bisector	The line that divides something into two equal parts
Loci	A locus is a path formed by a point which moves according to a rule.

Year 11 (Higher only) Maths Knowledge Organiser Learning Cycle 1

2 Geometry and Measure

Corbettm0ths

Angles in Polygons 2

Sum of Exterior Angles of Any Polygon = 360°

$360 \div 5 = 72^\circ$

Interior Angle + Exterior Angle = 180°

$180 - 72 = 108^\circ$

Corbettm0ths

Bearings

Bearings are a direction of travel

Find the bearing of Nottingham from Dublin

- Join Dublin and Nottingham
- Draw a north line at Dublin
- Measure the angle clockwise from north
- All bearings should have 3 figures

Corbettm0ths

Vectors

OAB is a triangle. $\vec{OA} = a$ $\vec{OB} = b$

Find \vec{AB} in the terms of a and b

$\vec{AB} = \vec{AO} + \vec{OB}$

$\vec{AB} = -a + b$

$\vec{AB} = b - a$

3 Algebra and Number

Corbettm0ths

Simultaneous Equations

Solve the simultaneous equations

$$\begin{array}{r} 3x - y = 23 \quad \text{--- (1)} \\ 2x + 3y = 8 \quad \text{--- (2)} \end{array}$$

Multiplying (1) by 3 gives: $9x - 3y = 69$ --- (3)

To eliminate y , add together (2) and (3)

$$\begin{array}{r} 9x - 3y = 69 \\ \text{add } 2x + 3y = 8 \\ \hline 11x = 77 \\ x = 7 \end{array}$$

Substituting $x = 7$ into (2) gives: $14 + 3y = 8$ Check $x = 7$ and $y = -2$ in (1)

$$\begin{array}{r} 3y = -6 \\ y = -2 \end{array} \quad \begin{array}{r} 21 - 2 = 23 \quad \checkmark \end{array}$$

Corbettm0ths

n^{th} term for Quadratic Sequences

n^{th} term = $an^2 + bn + c$

Find the n^{th} term 5, 6, 11, 20, 33 ...

$a + b + c$	\rightarrow	(5)	6	11	20	33	Sequence
$3a + b$	\rightarrow	(1)	5	9	13		First Differences
$2a$	\rightarrow	(4)	4	4			Second Differences

$$\begin{array}{l} 2a = 4 \\ a = 2 \end{array} \quad \begin{array}{l} 3a + b = 1 \\ 6 + b = 1 \\ b = -5 \end{array} \quad \begin{array}{l} a + b + c = 5 \\ 2 - 5 + c = 5 \\ c = 8 \end{array}$$

n^{th} term = $2n^2 - 5n + 8$

Corbettm0ths

Recurring Decimals to Fractions

Write $0.\dot{4}5$ as a fraction

Let x equal the number being converted

$$x = 0.45454545\dots$$

Multiply by 100 so that digits after the decimal point are the same

$$100x = 45.45454545\dots$$

Subtract $x = 0.45454545\dots$

$$\begin{array}{r} 100x = 45.45454545\dots \\ \text{Subtract } x = 0.45454545\dots \\ \hline 99x = 45 \end{array}$$

Found by dividing both sides by 99

$$x = \frac{45}{99}$$

Simplify the fraction if possible

$$x = \frac{5}{11}$$

Year 11 (Higher) Maths Knowledge Organiser Learning Cycle 1

4

Transformation

Enlargements with Negative Scale Factors
Corbettmαths

Enlarge triangle B by scale factor -3 with Centre of Enlargement $(10, 4)$

Each point of triangle B will move three times as far away from the Centre of Enlargement in the opposite direction

Mark the Centre of Enlargement

Translations
Corbettmαths

$\begin{pmatrix} 5 \\ 1 \end{pmatrix}$

- 5 squares to the right
If negative, movement will be to the left
- 1 square upwards
If negative, movement will be downwards

Translate shape A by the vector $\begin{pmatrix} -4 \\ 3 \end{pmatrix}$

Shape A will be moved
4 squares to the left
3 squares upwards

Reflections
Corbettmαths

Reflect shape A in the line $x = 6$

Draw the mirror line

Rotations
Corbettmαths

Rotate shape A 90° clockwise about the origin

Mark the centre of rotation and trace triangle A onto the tracing paper

Rotate 90° clockwise, keeping the cross on the origin, the centre of rotation

Draw the triangle onto the grid

6

Further reading, websites

- www.completemaths.com
- www.justmaths.com
- www.corbettmaths.com
- www.mathsisfun.com

5

Non-Linear Graphs

Cubic Graphs
Corbettmαths

$y = x^3 - 3x - 1$

x	-3	-2	-1	0	1	2	3
y	-19	-3	1	-1	-3	1	17

Graphs of Exponential Functions
Corbettmαths

$y = 2^x$

x	-2	-1	0	1	2	3
y	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	8

Graphs of Reciprocal Functions
Corbettmαths

$y = \frac{1}{x}$

x	-4	-2	-1	$-\frac{1}{2}$	$\frac{1}{2}$	1	2	4
y	$-\frac{1}{4}$	$-\frac{1}{2}$	-1	-2	2	1	$\frac{1}{2}$	$\frac{1}{4}$

Year 11 Science Knowledge Organiser Learning Cycle 1 – Homeostasis and response

1	Key words	Definition
	Effector	The organ, tissue or cell that produces a response
	Receptors	Organs which recognize and respond to stimuli
	Reflex action	Automatic and rapid response to a stimulus
	Stimulus	A change in environment that sets off a reaction in the nervous system, for example, light, heat, sound and smell.
	Synapse	A gap at the junction between two nerve cells, which nerve signals must cross.
	Gland	An organ or tissue that makes a substance for release, such as a hormone.
	Hormone	Chemical messenger produced in glands and carried by the blood to specific organs in the body
	Negative feedback	A mechanism where changes to conditions cause an action to reverse the change, to keep conditions stable
	IVF	In vitro fertilization. This involves bringing the sperm and egg together to create an embryo, which is placed into the womb.

2 The nervous system

Neuron Labels:

- A Dendron
- B Nucleus
- C Axon
- D Nerve ending
- E Cytoplasm
- F Cell membrane

Nervous System Labels:

- Receptors (eg sense organs)
- Sensory neurones
- CNS
- Relay neurones
- Motor neurones
- Effectors (eg muscles, glands)

All information resourced from BBC bitesize

3 The endocrine system

Endocrine System Labels:

- Pituitary gland: The 'master gland', situated at the base of the brain
- Thyroid gland: Produces thyroxine
- Pancreas: Produces insulin
- Testes: Produce testosterone
- Adrenal glands: Produce adrenaline
- Ovaries: Produce oestrogen

Feedback Loop:

```

    graph TD
      A[Conditions in the body change from set point] --> B[Change detected]
      B --> C[Corrective mechanisms activated]
      C --> D[Conditions returned to set point]
      D --> E[Corrective mechanisms switched off]
      E --> A
    
```

4 Glucose regulation and diabetes

High Levels of Glucose:

- A Body cells
- B Insulin
- C Glucose
- D Too much glucose in blood
- E Pancreas produces insulin which enters blood
- F Insulin allows glucose to be absorbed by body cells
- G Blood glucose reduced

Low Levels of Glucose:

- A Body cells
- B Glucose
- C Normal levels of glucose in blood
- D Insulin not produced by the pancreas
- E Less glucose absorbed by body cells
- F Blood glucose remains the same

Action of insulin

	Low glucose	High glucose
Effect on pancreas	Insulin not secreted into the blood	Insulin secreted into the blood
Effect on liver	Does not convert glucose into glycogen	Converts glucose into glycogen
Effect on blood glucose level	Increases	Decreases

5 Hormones in reproduction, contraception and infertility

Uterus Lining Phases:

- Menstruation
- Lining of the uterus builds up
- Lining maintained
- Lining breaks down (menstruation)

Hormone Legend:

- Oestrogen (Red)
- FSH (Green)
- LH (Blue)

Hormone	Produced	Role
FSH (follicle stimulating hormone)	Pituitary gland	Causes an egg to mature in an ovary. Stimulates the ovaries to release oestrogen
Oestrogen	Ovaries	Stops FSH being produced (so that only one egg matures in a cycle). Repairs, thickens and maintains the uterus lining. Stimulates the pituitary gland to release LH.
LH (luteinising hormone)	Pituitary gland	Triggers ovulation (the release of a mature egg)
Progesterone	Ovaries	Maintains the lining of the uterus during the middle part of the menstrual cycle and during pregnancy.

6 Further reading

<https://www.bbc.co.uk/bitesize/guides/zt2yxfr/revision/1>

Year 11 Science Knowledge Organiser Learning Cycle 1 – Magnetism

1 Key words	Definition
Magnet	An object capable of exerting a magnetic force
Induced magnet	A temporary magnet, made from a magnetic material placed in a magnetic field. The induced magnetism is lost when moved out of the magnetic field
Magnetic field	Area surrounding a magnet that can exert a force on magnetic materials
Transformer	An electrical device that increases, or decreases, the potential difference (voltage) of an alternating current.
Solenoid	A straight coil of wire which can carry an electric current to create a magnetic field.
Motor effect	The effect where a force is exerted on a wire carrying a current in a magnetic field

2 Magnetic fields

A **magnet** can exert a force on another nearby magnet. Magnets have two poles:

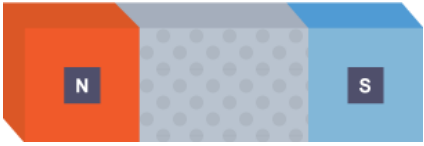
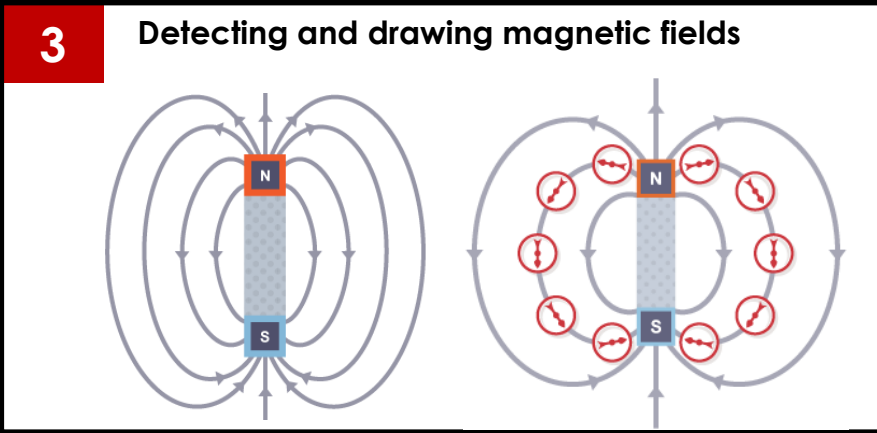
- a **north pole**
- a **south pole**

The **magnetic force** is strongest near the magnet's poles.

The rules of magnetism
Two magnets will either attract or repel each other in the following way:

- like poles (N-N or S-S) repel
- unlike poles (N-S or S-N) attract

Magnetic forces are **non-contact forces** - this means that magnets affect each other without touching.

4 Permanent and induced magnetism

A **permanent magnet** is often made from a magnetic material such as iron. A permanent magnet always causes a force on other magnets, or on magnetic materials. Key features of a permanent magnet:


- it produces its own magnetic field
- the magnetic field cannot be turned on and off - it is there all the time

Bar magnets and horseshoe magnets are examples of permanent magnets.

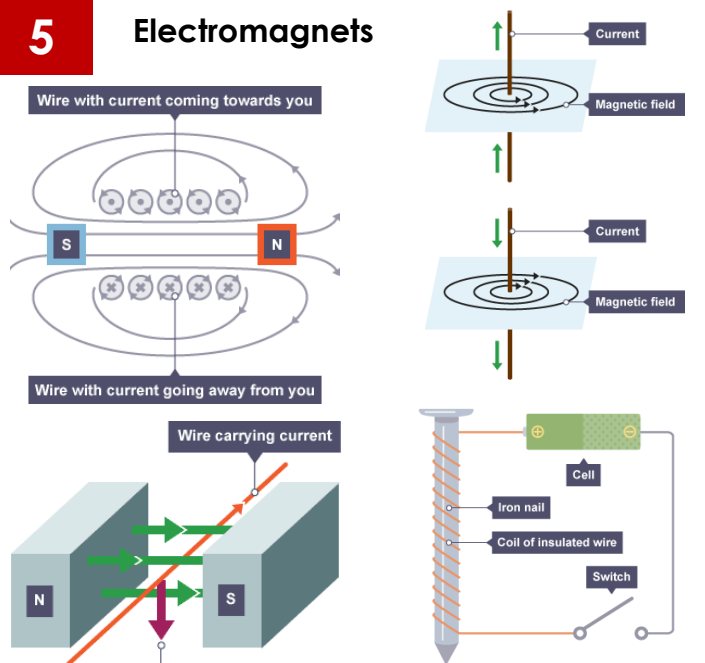
Unlike a permanent magnet, an **induced magnet** only becomes a magnet when it is placed in a magnetic field. The induced magnetism is quickly lost when the magnet is removed from the magnetic field.

The iron filings in the image become induced magnets when they are near the bar magnet. Like all induced magnets:

- they are only attracted by other magnets, they are not repelled
- they lose most or all of their magnetism when they are removed from the magnetic field



5 Electromagnets



force = magnetic flux density × current × length

Higher only
 $F = B I l$
This is when:

- F is force in newtons (N)
- B is magnetic flux density (magnetic field strength) in tesla (T)
- I is current in amperes – also referred to as amps – (A)
- l is length in metres (m)

6 Further reading

<https://www.bbc.co.uk/bitesize/topics/zkwkw6f>

Year 11 Science Knowledge Organiser Learning Cycle 1 – Forces

1

Key words

Definition

Scalar	A quantity with only magnitude (size).
Vector	A quantity having direction as well as magnitude.
Distance	The total movement of an object.
Magnitude	The size of a physical quantity.
Speed	is the rate of change of distance - it is the distance travelled per unit time. Like distance, speed does not have an associated direction, so it is a scalar quantity.
Velocity	The velocity of an object is its speed in a particular direction.
Acceleration	Acceleration is the rate of change of velocity. It is the amount that velocity changes per unit time.
Displacement	Displacement is a vector quantity and includes the distance travelled in a straight line from start to finish, and the direction of the straight line.

2

$$s = vt$$

Some typical values for speed in metres per second (m/s) include:

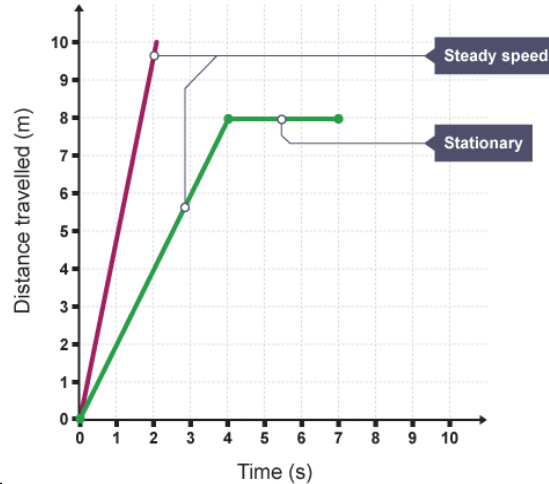
Method of travel	Typical speed (m/s)
walking	1.5
running	3
cycling	6
car	13-30
train	50
aeroplane	250

All information resourced from BBC bitesize

3



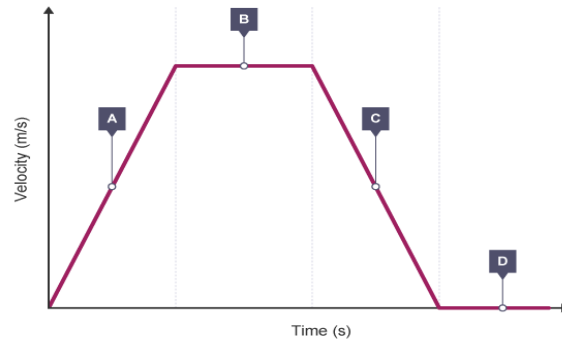
In a distance-time graph, the gradient of the line is equal to the speed of the object. The greater the gradient (and the steeper the line) the faster the object is moving.



Velocity-time graphs

Determining acceleration

If an object moves along a straight line, its motion can be represented by a velocity-time graph. The gradient of the line is equal to the **acceleration** of the object.



The table shows what each section of the graph represents:

Section of graph	Gradient	Velocity	Acceleration
A	Positive	Increasing	Positive
B	Zero	Constant	Zero
C	Negative	Decreasing	Negative
D (v = 0)	Zero	Stationary (at rest)	Zero

5

Acceleration

Acceleration is the rate of change of velocity. It is the amount that velocity changes per unit time.

The change in velocity can be calculated using the equation:

$$\text{change in velocity} = \text{final velocity} - \text{initial velocity}$$

$$\Delta v = v - u$$

The average acceleration of an object can be calculated using the equation:

$$\text{acceleration} = \frac{\text{change in velocity}}{\text{time taken}}$$

$$a = \frac{\Delta v}{t}$$

This is when:

- acceleration (a) is measured in metres per second squared (m/s^2)
- change in velocity (Δv) is measured in metres per second (m/s)
- time taken (t) is measured in seconds (s)

If an object is slowing down, it is decelerating (and its acceleration has a negative value).

This equation applies to objects in uniform acceleration:

$$(\text{final velocity})^2 - (\text{initial velocity})^2 = 2 \times \text{acceleration} \times \text{distance}$$

$$v^2 - u^2 = 2 a s$$

Year 11 Science Knowledge Organiser Learning Cycle 1 – Forces

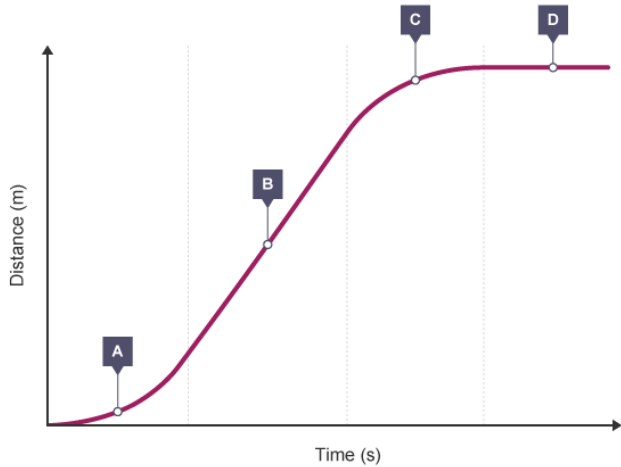
1

The **speed** of an object can be calculated from the **gradient** of a distance-time graph.

Distance-time graphs for accelerating objects - Higher

If the speed of an object changes, it will be **accelerating** or **decelerating**. This can be shown as a curved line on a distance-time graph.

Higher only



The table shows what each section of the graph represents:

Section of graph	Gradient	Speed
A	Increasing	Increasing
B	Constant	Constant
C	Decreasing	Decreasing
D	Zero	Stationary (at rest)

If an object is accelerating or decelerating, its speed can be calculated at any particular time by:

- drawing a **tangent** to the curve at that time
- measuring the gradient of the tangent

2

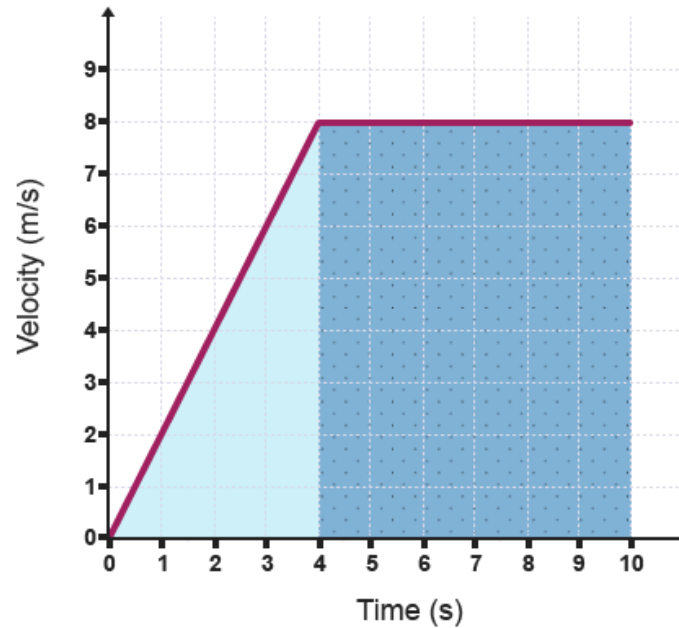
Calculating displacement - higher

The **displacement** of an object can be calculated from the area under a velocity-time graph.

The area under the graph can be calculated by:

- using geometry (if the lines are straight)
- counting the squares beneath the line (particularly if the lines are curved)

Higher only



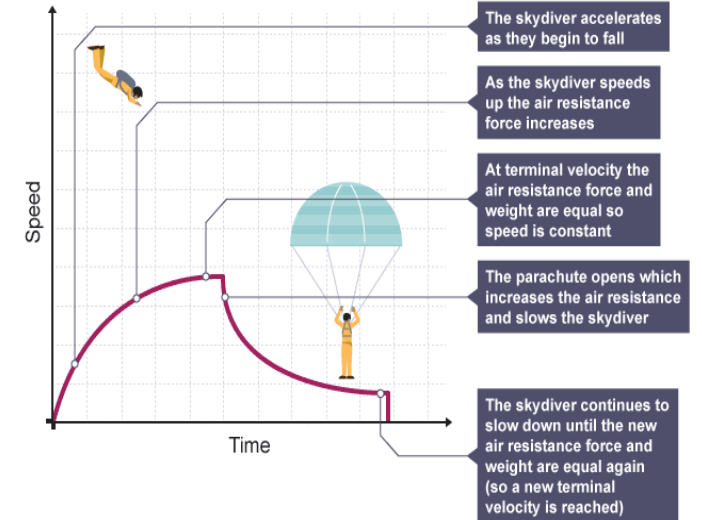
Here, the displacement can be found by calculating the total area of the shaded sections below the line.

3

Terminal velocity

Near the surface of the Earth, any object falling freely will have an acceleration of about 9.8 metres per second squared (m/s^2). Objects falling through a **fluid** eventually reach **terminal velocity**. At terminal velocity, the object moves at a steady speed in a constant direction because the **resultant force** acting on it is zero. For example, a skydiver falling spread-eagled through the air reaches a maximum speed of about 53 m/s.

The diagram shows what happens to the speed of a skydiver from when they leave the aircraft, to when they reach the ground after their parachute opens.



4

Further reading

<https://www.bbc.co.uk/bitesize/topics/ztmttv4>

Year 11 Science Knowledge Organiser Learning Cycle 1 – Forces

1 Key words	Definition
Centre of mass	The point representing the mean position of the matter in a body.
Free body diagram	A simplified drawing of an object or system showing the forces acting on it. The forces are shown acting away from the centre of a box or dot
Gravity	A non-contact force All objects with mass produce a gravitational field. The more mass an object has, the greater its gravitational field will be.
Mass	The amount of matter an object contains. Mass is measured in kilograms (kg) or grams (g).
Weight	The force acting on an object due to the pull of gravity from a massive object like a planet. The force acts towards the centre of the planet and is measured in newtons (N).
Newton	The unit of force.
Force	A push, pull or a twist
Reaction force	Force exerted in the opposite direction to an action force.
Resultant force	The single force that could replace all the forces acting on an object, found by adding these together. If all the forces are balanced, the resultant force is zero.
Momentum	The product of mass and velocity. It is a vector quantity.
Thinking distance	This is the distance a vehicle travels in the time it takes for the driver to apply the brakes after realising they need to stop.
Braking distance	This is the distance a vehicle travels in the time after the driver has applied the brake.

2 Newton's First Law

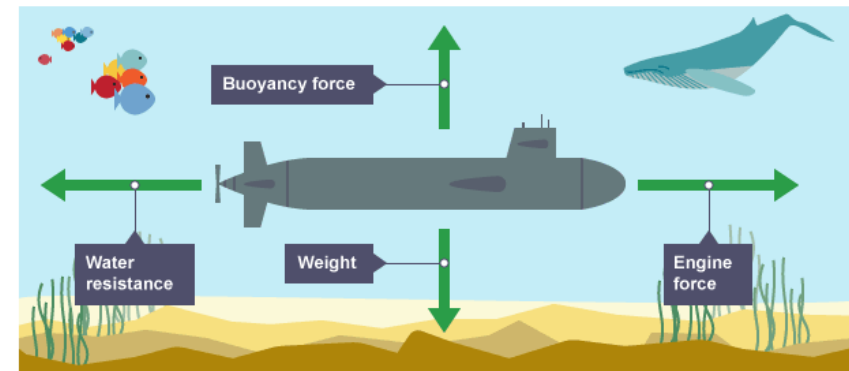
According to Newton's First Law of motion, an object remains in the same state of motion unless a **resultant force** acts on it. If the resultant force on an object is zero, this means:

- a stationary object stays stationary
- a moving object continues to move at the same **velocity** (at the same speed and in the same direction)

Inertia - Higher

The tendency of an object to continue in its current state (at rest or in uniform motion) is called **inertia**.

Forces on a submarine



3 Newton's Second Law Force, mass and acceleration

Newton's Second Law of motion can be described by this equation:

$$\text{resultant force} = \text{mass} \times \text{acceleration}$$

$$\mathbf{F = m a}$$

This is when:

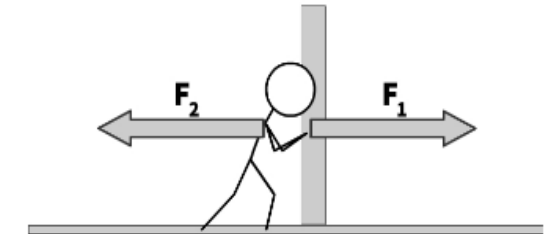
- force (F) is measured in newtons (N)
- mass (m) is measured in kilograms (kg)
- acceleration (a) is measured in metres per second squared (m/s^2)

4

Newton's Third Law

According to Newton's Third Law of motion, whenever two objects interact, they exert equal and opposite forces on each other. This is often worded as 'every action has an equal and opposite reaction'. However, it is important to remember that the forces act on two different objects at the same time.

Newton's Third Law



**Forces always Come in Pairs:
You Push on a Wall
the Wall Pushes Back**

5

Momentum is the product of **mass** and **velocity**. Momentum is also a **vector** quantity – this means it has both a **magnitude** and an associated direction.

Calculating momentum

Momentum can be calculated using the equation:
momentum = mass \times velocity

$$\mathbf{p = m v}$$

This is when:

- momentum (p) is measured in kilogram metres per second (kg m/s)
- mass (m) is measured in kilograms (kg)
- velocity (v) is measured in metres per second (m/s)

Year 11 Science Knowledge Organiser Learning Cycle 1 – Forces

1

Key words

Definition

Deformation	A change in shape
elastic	Deformation is reversed when the force is removed.
inelastic	Deformation is not reversed when the force is removed – the change in shape is permanent.
Extension	When an object increase in length
Compression	When an object such as a spring decreases in length
Spring constant	A measure of the stiffness of a spring up to its limit of proportionality or elastic limit.
Hooke's Law	The extension of a spring is directly proportional to the force applied, provided that the limit of proportionality is not exceeded.
Limit of proportionality	The point beyond which Hooke's law is no longer true when stretching a material

2

Energy stored in a spring

Work is done when a spring is **extended** or **compressed**.

Elastic potential energy is stored in the spring. Provided inelastic deformation has not happened, the work done is equal to the elastic potential energy stored.

The elastic potential energy stored can be calculated using the equation:

$$\text{elastic potential energy} = 0.5 \times \text{spring constant} \times (\text{extension})^2$$

$$E_e = \frac{1}{2} k e^2$$

This is when:

- elastic potential energy (E_e) is measured in joules (J)
- spring constant (k) is measured in newtons per metre (N/m)
- extension (e), referring to the increase in length, is measured in metres (m)

All information resourced from BBC bitesize and savemyexams

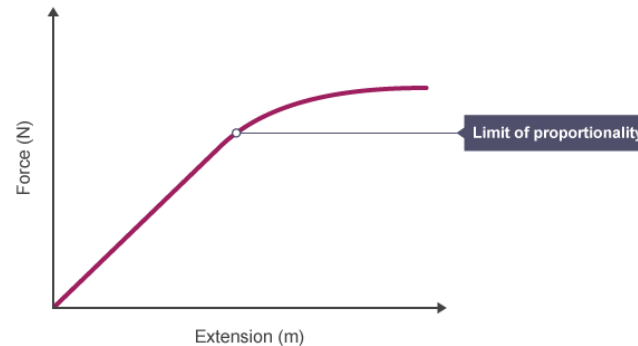
3

$$F = k e$$

Force-extension graphs

Linear extension and **elastic** deformation can be seen below the limit of proportionality.

Non-linear extension and **inelastic** deformation can be seen above the limit of proportionality. The limit of proportionality is also described as the 'elastic limit'. The gradient of a force-extension graph before the limit of proportionality is equal to the spring constant.



4

Required practical - how forces affect the extension of a spring

Investigate the relationship between force and extension for a spring

There are different ways to investigate the relationship between force and extension for a spring. In this practical activity it is important to:

- measure and record length accurately
- measure and observe the effect of force on the extension of springs
- collect the data required to plot a force-extension graph

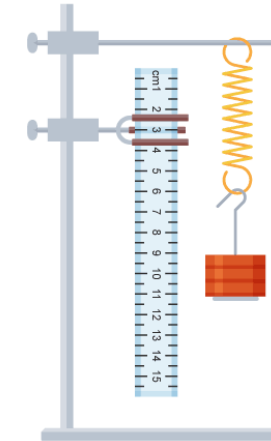
Aim of the experiment

To investigate the relationship between force and extension for a spring.

5

To investigate the relationship between force and extension for a spring.

Method



- Secure a clamp stand to the bench using a G-clamp or a large mass on the base.
- Use bosses to attach two clamps to the clamp stand.
- Attach the spring to the top clamp, and a ruler to the bottom clamp.
- Adjust the ruler so that it is vertical, and with its zero level with the top of the spring.
- Measure and record the unloaded length of the spring.
- Hang a 100 g slotted mass carrier - weight 0.98 newtons (N) - from the spring. Measure and record the new length of the spring.
- Add a 100 g slotted mass to the carrier. Measure and record the new length of the spring.
- Repeat step 7 until you have added a total of 1,000 g.

6

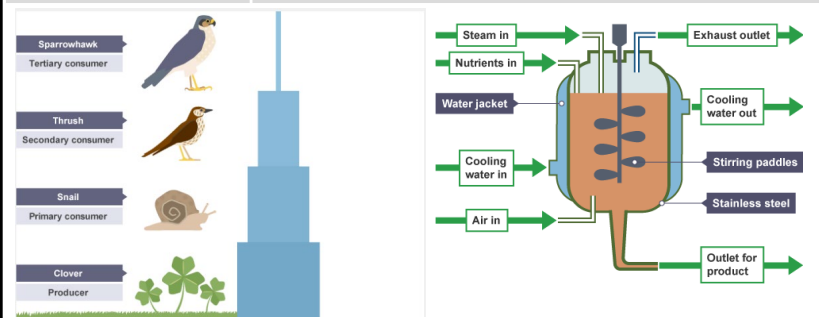
Further reading

<https://www.bbc.co.uk/bitesize/guides/zgv797h/revision/1>

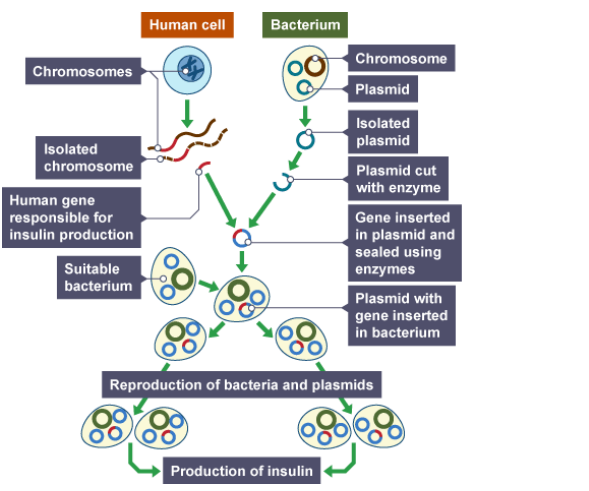
Year 11 Science Knowledge Organiser Learning Cycle 1 – Triple only

Biology

Key words	Definition
Producer	Green plants that photosynthesise.
Biomass	The dry mass of an organism
Trophic level	The position of an organism in a food chain, food web or pyramid.
Sustainable	An activity which does not consume or destroy resources or the environment.
Biotechnology	The use of selective breeding and genetic modification techniques in farming



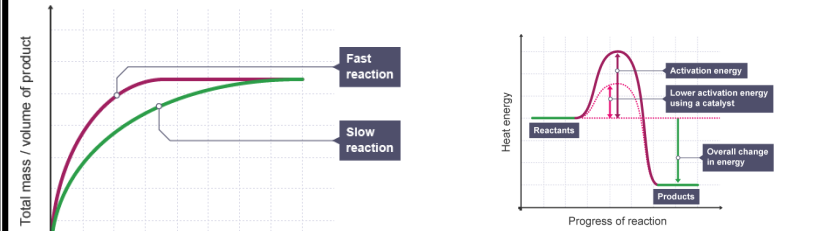
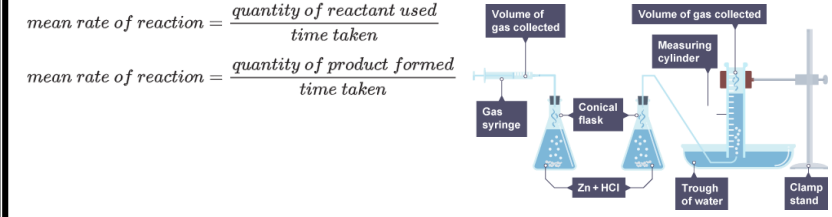
[Ecology - GCSE Biology \(Single Science\) Revision - AQA - BBC Bitesize](#)



All information resourced from BBC bitesize

Chemistry

Key words	Definition
Activation energy	The minimum amount of energy that colliding particles must have for them to react
Catalyst	A substance that changes the rate of a chemical reaction without being changed by the reaction itself
Reaction profile	Chart showing how the energy of reactants and products changes during a reaction



Le Chatelier's principle
The equilibrium position can be changed by changing the reaction conditions through:

- changing the **pressure**
- changing the **concentration**
- changing the **temperature**

When a change is made to a system at equilibrium, the position of equilibrium moves to counteract the change that was made. For example, if the temperature is increased, the position of equilibrium moves in the endothermic direction to **reduce the temperature**.

Changing the position of equilibrium... Higher... Reversible reactions... AQA - GCSE Chemistry (Single Science) Revision - AQA - BBC Bitesize

Physics

Key words	Definition
Pressure	Force exerted over an area. The greater the pressure, the greater the force exerted over the same area.
Moment	A turning effect of a force
Pivot	A point around which something can rotate or turn

$$pressure = \frac{force\ normal\ to\ a\ surface}{area\ of\ that\ surface}$$

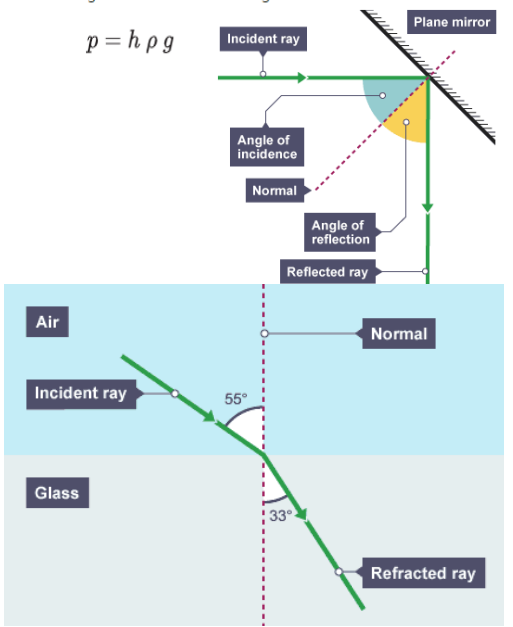
$$p = \frac{F}{A}$$

pressure = height of column × density of the liquid × gravitational field strength

$$p = h \rho g$$

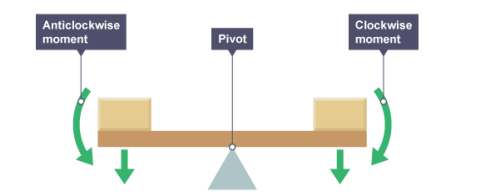
Pressure
Air molecules colliding with a surface cause atmospheric pressure. Atmospheric pressure at sea level is about 101,000 Pa (101 kPa) but just 27,000 Pa (27 kPa) at the cruising altitude of a passenger plane. Atmospheric pressure decreases as the height of a surface above ground level increases. This is because, as the altitude increases:

- the number of air molecules decreases
- the **weight** of the air decreases
- there is less air above a surface



[Moments - Moments, levers and gears - AQA - GCSE Physics \(Single Science\) Revision - AQA - BBC Bitesize](#)

[Waves - GCSE Physics \(Single Science\) Revision - AQA - BBC Bitesize](#)



Year 11 Geography Knowledge Organiser Learning Cycle 1

1

Measuring development – Economic and Composite Indicators

<p>Gross National Product/Income – goods and services of a country (including those made overseas). Broad measure of all economic activity</p>	<p>Literacy – the process of acquiring knowledge, understanding and skills.</p> <p>Adult literacy rates are used to outline the differences in educational standards between countries</p>
<p>Gross Domestic Product - monetary value of all finished goods and services made <u>within</u> a country during a specific period</p>	<p>Life Expectancy – End result of all factors contributing to the quality of life in a country. The main influence on life expectancy are; the incidence of disease, physical environment, human environment and personal lifestyle</p>
<p>Purchasing Power Parity - measures prices at different locations using a <u>common good or goods</u> to contrast <u>the real purchasing power</u> between different currencies</p>	<p>Infant mortality – both within and between countries.</p> <p>Big differences around the world depending on reported number and what is 'understood' as infant (2 or 5 years old)</p>
<p>Per Capita – Per person</p>	<p>Others measures – school years, doctors per 1000, energy consumption, urban population</p>
<p>HDI Health, education, living standards and political freedoms/ stability</p>	<p>Industrialization – the process of which a country moves away from agriculture as it's main industry sector to one that is increasingly dependent on manufacturing and service based. This happened the UK in the 1700s, the Industrial Revolution</p>

2a Stages of Development – as per the United Nations

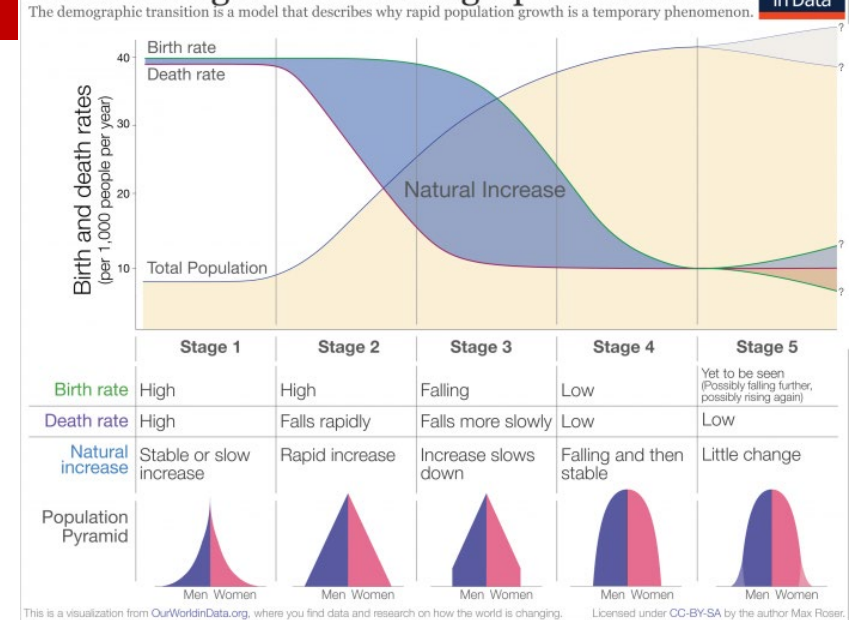
LiCs	EECs	HICs
Least Developed Countries	Newly industrializing Countries	Higher Income Countries
Haiti, Niger, Afghanistan	Vietnam, China, Brazil	UK, Australia, USA
Poor environmental conditions, climate not conducive for growing many crops, colonialism, political unrest, conflict, gender inequality, high rates of disease such as HIV/ Malaria, exploitation	Nations that have undergone rapid industrialization and moved up the development ladder. Investment in infrastructure, education and allowing for FDI has meant an increasing economy	Countries that are commonly made up of tertiary and quaternary service bases. High 'quality of life' indicators and high HDI outcome.

2b Types of Industry

Primary	Secondary	Tertiary	Quaternary
Exploits raw materials. Agriculture, fishing, quarrying and mining. Higher % in LIC countries Cattle farming, diamond mining	Manufacturing of raw materials into goods. Consumer goods – produced for sale to the public. Capital goods – produced for sale to other industries Higher % in NEE	Provides services to businesses and people Teachers, retail, architects, drivers Higher % in HICs	High-technology to provide information and expertise. R&D, aerospace engineers Increasing % in HICs

3

The five stages of the demographic transition



4

Physical and Human Factors

Landlocked countries have poorer trade potential. Small island are not that investment worthy. Tropical climates tend to reflect poorer health (tropical diseases – malaria) and unproductive farming (too much rain washes away nutrients). Abundant natural resources results in exploitation form richer places.

Open economies that welcome and encourage FDI develop more. Higher rates of saving and lower spending relative to GDP encourage growth. Increasingly better governance, lower crime rate and lower corruption within politics are signals of higher development.

5

Extra reading

[Strategies for reducing the development gap - Internet Geography](#)
[How can the growth of tourism reduce the development gap?](#)
[Jamaica Case Study - Internet Geography](#)

ALL YOU NEED TO KNOW ABOUT... TNC's In Nigeria

Definition: A trans-national corporation operating in more than one country

Location

The oil industry in Nigeria is located in the Niger Delta region.



The Niger River, where it flows into the gulf of guinea

Key facts

The oil boom in Nigeria took off in the 1970s

Companies such as royal Dutch shell (R/D), Chevron (USA), have interest in oil in Nigeria

The Niger Delta region contains important wetland and coastal ecosystems

Shell oil and the multiplier effect



Processes

The companies erected drilling platforms on the oil and gas fields around the Niger Delta

The platforms are linked by pipelines to export terminals in the gulf of Guinea

At the export terminal the crude oil is piped onto tankers

The oil is shipped to Europe and the USA where it is refined into petrol and other oil products

Advantages of shell oil

Shell provides direct employment for 65000 Nigerian workers and a further 250000 jobs in related industries

Shell has invested huge amounts of money and expertise into extracting oil in the Niger Delta

The managers of shell bring knowledge and expertise to Nigeria

Shell has supported the growth of Nigeria's energy sector through investment

In 2018, approximately \$59 million was invested in educational scholarships in Nigeria

Shell of currently supports 27 health facilities in the Niger Delta, including three new ones built in 2009

Disadvantages of shell oil

9 million oil barrels split in the last 50 years causing water and soil pollution, 75% of rural areas have no access to clean water

Frequent oil fires send toxic fumes into the air. Poverty is increased due to pollution

Rumours that Shell fund militant groups who try to disrupt oil supplies

The pollution reduces fishing yields as fish die in oil spills

Oil theft and sabotage are big problems. This reduces oil production and costs TNCs and the Nigerian government billions of dollars every year

Oil spills from leaking pipelines damage farmland so crops no longer grow

7

ALL YOU NEED TO KNOW ABOUT... Tourism In Jamaica

Location



In the continent of North America

Located in the Caribbean sea

Third largest Caribbean island

About 90 miles South of Cuba



Main tourist attractions

Beach resorts at Negril
Blue Mountains National park
Great Inks eco resort

Deep sea fishing at Port Antonio
Caring at Cockpit country

Bob Marley Museum
National art gallery

Tourism and the multiplier effect



Negatives of tourism in Jamaica

Improvements in roads and airports have been slower and some parts of the island remain isolated

Mass tourism can create environmental problems such as footpath erosion, excessive waste and harmful emissions

Large numbers of people live nearby tourist areas in poor housing with limited food supply and inadequate access to fresh water, health care and education

There has been mass migration from inland Jamaica due to their being a lack of jobs in these areas

Many of the jobs created are seasonal, so people can become unemployed

Local employees are paid by wages, whereas managers from other countries tend to earn more

Land for the massive hotels takes away land from farmers

Positives of tourism in Jamaica

Cruse ship visitors of which there are 2.5 million spend an average \$70 per day

Income from tourism is \$2 billion each year

Tourism is the main source of employment in Jamaica it provides jobs for 200,000 people either directly in hotels, transport, and food

attractions or indirectly in shops & manufacturing

Tourism has led to a high level of investment on the north coast, where much of the country's tourism is centred

New port and cruise liner facilities have been built at Trelawney together with new hotel accommodation

In 2014 tourism contributed 24 per cent of Jamaica's GDP - one of the highest proportions of any country in the world This is expected to rise to 32 per cent by 2024

Ecotourism & community tourism

Tourists stay with locals in their homes, directly benefiting locals, and ecotourism

There are also ecotourist lodges along the coastline. The features of these lodges include an approach to low or zero waste, solar panels to produce power very low visitor numbers (many resorts have less than 10 lodges or huts) and recycling of water

8

Measures to reduce the development gap

Investment	Large companies can locate part of their business in other countries. This helps a country to develop as the companies build factories, lay roads and install internet cables.
Aid	Aid is when one or more countries give money to other countries. The money has to be spent on things that will benefit the population.
Using intermediate technology	Intermediate technology is using equipment and techniques that are suitable for their country of use. Many poorer countries do not have the skills to maintain expensive equipment. Small-scale, basic solutions are usually more appropriate.
Fairtrade	Fairtrade is paying producers a reasonable price for the goods that they produce. Many farmers in LICs are paid very low wages. This means that they cannot escape poverty. Fairtrade gives farmers a better chance in life.
Debt relief	Many LICs owe money to other countries. Often the repayments and interest are so expensive that indebted countries have no money left to spend on development projects. Debt relief is when debts are either reorganised to make them more manageable, or reduced.
Microfinance loans	Microfinance loans are when money is lent to LICs to help them to develop. These are often small loans with reasonable interest rates. They are available to people and businesses who may normally struggle to get credit.

Year 11 History Knowledge Organiser Learning Cycle 1

Paper 2 Knowledge Toolkit

1

Plains Indians

Plains Indians live in **bands** (like families), each led by a Chief. Bands meet together once a year for **tribal meetings** to trade and discuss issues. They lived a **nomadic** lifestyle (moved around).

Men: Hunted and fought enemies

Women: Made clothes, prepared food and the tipi

Children: Learnt the skills of their parents

Elders: Respected, but may be left behind (exposure)



Plains Indians depended on **horses** (to hunt) and **buffalo** (they used every part) for their survival.

They believed that **land was sacred** and could not be owned.

Government policy towards the Indians:

1830 Indian Removal Act: Forced the Indians in eastern states to move west of the Mississippi River.

1832 Permanent Indian Frontier: Divided Indian territory from the eastern states. Whites not allowed to cross Indian land.

1851 Indian Appropriations Act: Government paid Indians to give up land that whites wanted and move on to reservations.

2

Westward Migration

Manifest Destiny: Belief that it is a God-given right for white Americans to settle all of America.

Oregon Trail: The route from Missouri that wagons could take all the way to Oregon, or California.

The Donner Party 1846-7: A group of travellers that tried a shortcut on the Oregon Trail in 1846. Snow came early and they ran out of food. Only 46 out of 87 people made it. This put some migrants off.

Mormon migration 1846-7: Mormons were persecuted in the East so they were motivated to move west. Their leader Brigham Young was very organised. They migrated to the Great Salt Lake. They were disciplined and everyone had a role. Their migration was successful.

Problems of farming on the Plains

Climate	Weather
Lack of timber	Prairie fires
Lack of water	Thick sod (soil)
Insect plagues	



3

Conflict and Tension

The Fort Laramie Treaty, 1851

As the number of migrants using the Oregon Trail to cross Indian lands grew, tensions increased between white settlers and Plains Indians. Here are the terms of the treaty and the consequences:

Territories were set out for the tribes -> **led to reservations**
White settlers were allowed into Indian territories and railroad surveyors and military posts were allowed on Indian territories -> **led to white settlement of the Plains**

Tribes received **resources** from the government (\$50,000 yearly payment) -> **led to loss of Indian independence**

Lawlessness

Law enforcement was stretched too thin to make sure the law was obeyed and lawbreakers were punished. Gangs emerged in San Francisco and claim jumping (taking over a claim to a mining area) became common.

4

The Homestead Act, 1862

After the Civil War, the Southern states split from the USA until 1865, allowing the Homestead Act to be passed into law. It aimed to encourage the settlement of the West by individual family farmers.

Homestead Act, 1862

People got 160 acres of land for \$10. They must work it for 5 years, then they could 'prove up' and own it for \$30.

Over 6 million acres of land was homesteaded by 1876. The promise of free land encouraged immigration to the USA and was significant in encouraging white settlement of the Plains.

However, there was a 60% dropout rate (people who did not 'prove-up' as some plots were too small for the dry environment).

The First Transcontinental Railroad, 1869

The Pacific Railroad Act (1862) gave two railroad companies the job of building the first transcontinental railroad.

By 1880 the railroad companies had settled 200 million acres in the West, as companies sold plots across their routes and used effective marketing to encourage people to move

5

The Cattle Industry

The growth in the cattle industry occurred as railroads provided a way to move cattle worth \$5 a head to Texas to the industrial cities of the North, which would pay \$40 a head.

Abilene, the first cow town

Joseph McCoy set the first cow town up, which included stockyards, hotels and spending \$5000 on marketing to encourage people to take their cattle there.

The Goodnight-Loving Trail

Charles Goodnight and Oliver Loving realised there was another market for Texan cattle: new settlements in the West. This trail encouraged the cattle industry to spread.

John Iliff and Plains ranching

Iliff saw opportunities to sell meat to booming mining towns in Colorado. As it was difficult to get supplies there, he decided to raise cattle on the Plains, and began ranching near Denver in 1866. He became a millionaire by selling beef to miners, Indian reservations and railroad worker gangs.

Changing roles for cowboys

Cowboys went from working on cow trails to ranches. Fewer cowboys were needed, but work was now full-time and all year round. Drinking and gambling were banned. It became less dangerous.

6

Ranchers vs Homesteaders

Rivalry between ranchers and homesteaders increased. Ranchers needed a lot of land for their cattle, and homesteaders wanted to claim this land for themselves.

Ranchers fenced off land to block the homesteaders, or took them to court (as they knew they were too poor to pay).



Before homesteading



After homesteading

Year 11 French Knowledge Organiser Learning Cycle 1

1 Know your question words!

To answer any question, it's essential you know your key question words well. These are all on Memrise as well for you to practise.

qu'est-ce que = what

quel = which

où = where

d'où = where from

quand = when

qui = who

avec qui = with whom

pourquoi = why

combien = how much

combien de = how many

comment = how

comment est = what like

2 Non-negotiable verbs

These are the most important verbs in the French. If you know these well you can talk about most things!

Je suis allé(e) = I went

J'ai vu = I saw

C'était = it was

Je l'aime = I like it

Je me suis amusé(e) =

I had fun

J'ai visité = I visited

J'ai mangé = I ate

Il y avait = there was/were

J'irai = I will go

Ce sera = it will be

Il y aura = there will be

je vais = I'm going to

Il / elle va = he/she's going

to

Je voudrais = I would like

4 Wow phrases

Including this type of vocab will always impress an examiner!

instead of *en mi opinión* use:

a mi juicio/ desde mi punto de vista or a mi modo de ver

instead of *en un mundo ideal* use:

si fuera posible (if it were possible)

si pudiera (if I could)

Use less common connectives- see the Wow phrases sheet for the full list.

5 High frequency vocab

This vocab is commonly used all the time in France, the more of this you know, the better you will be able to communicate in any situation:

en premier = first

puis = then

après = after that

plus tard = later

le premier jour = on the first day

le dernier jour = on the last day

la dernière fois = the last time

3 Vocab learning

1. Your Knowledge Organiser includes all the topic specific vocabulary for this term, this is also accessible on Memrise.
2. We have created vocab lists of common high-frequency words that you need to know for the various exams- use the resource sheets provided, or practise from the lists on Memrise.
3. Use your Target Books! Last year you were all given Target Reading and Writing books, these are written by the exam board and are an invaluable resource when preparing for the GCSEs

6 Further reading, websites

Revision of Theme 1- Identity and Culture:

<https://www.bbc.co.uk/bitesize/topics/zk9bmfr>

<https://www.bbc.co.uk/bitesize/topics/zd8r6v4>

<https://www.bbc.co.uk/bitesize/topics/zjw4hbk>

Revision of Theme 2- Local area, holidays and travel:

<https://www.bbc.co.uk/bitesize/topics/z7qknrd>

<https://www.bbc.co.uk/bitesize/topics/zm2df4j>

Revision of Theme 3- School:

<https://www.bbc.co.uk/bitesize/topics/z6xjvk7>

Revision of Theme 4- Future aspirations, work and study:

<https://www.bbc.co.uk/bitesize/topics/zht7bdm>

Revision of Theme 5- International and global dimension:

<https://www.bbc.co.uk/bitesize/topics/znpmrj6>



Year 11 Spanish Knowledge Organiser Learning Cycle 1

1 Know your question words!

To answer any question, it's essential you know your key question words well. These are all on Memrise as well for you to practise.

qué = what	cuánto = how much
cuál = which	cuántos = how many
dónde = where	cómo = how
adónde = where to	cómo es = what like
de dónde = where from	
cuándo = when	
quién = who	
con quién = with whom	
por qué = why	

2 Non-negotiable verbs

These are the most important verbs in the Spanish. If you know these well you can talk about most things!

fui = I went	iré = I will go
vi = I saw	será = it will be
fue/era = it was	habrá = there will be
me gustó = I like it	voy a = I'm going to
me divertí = I had fun	va a = he/she's going to
visité = I visited	me gustaría = I would like
comí = I ate	
había = there was/were	

3 Vocab learning

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2. We have created vocab lists of common high-frequency words that you need to know for the various exams- use the resource sheets provided, or practise from the lists on Memrise.
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4 Wow phrases

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instead of *en mi opinión* use:
a mi juicio/ desde mi punto de vista or *a mi modo de ver*

instead of *en un mundo ideal* use:
si fuera posible (if it were possible)
si pudiera (if I could)

Use less common connectives- see the Wow phrases sheet for the full list.

5 High frequency vocab

This vocab is commonly used all the time in Spain, the more of this you know, the better you will be able to communicate in any situation:

primero= first
luego = then
después = after that
más tarde = later
el primer día = on the first day
el último día = on the last day
la última vez = the last time

6 Further reading, websites

Revision of Theme 1- Identity and Culture:

<https://www.bbc.co.uk/bitesize/topics/zdyvqp3>

<https://www.bbc.co.uk/bitesize/topics/zj3b2sg>

<https://www.bbc.co.uk/bitesize/topics/z7grxc>

Revision of Theme 2- Local area, holidays and travel:

<https://www.bbc.co.uk/bitesize/topics/zmc4t39>

<https://www.bbc.co.uk/bitesize/topics/z69kpg8>

Revision of Theme 3- School:

<https://www.bbc.co.uk/bitesize/topics/zh8dscw>

Revision of Theme 4- Future aspirations, work and study:

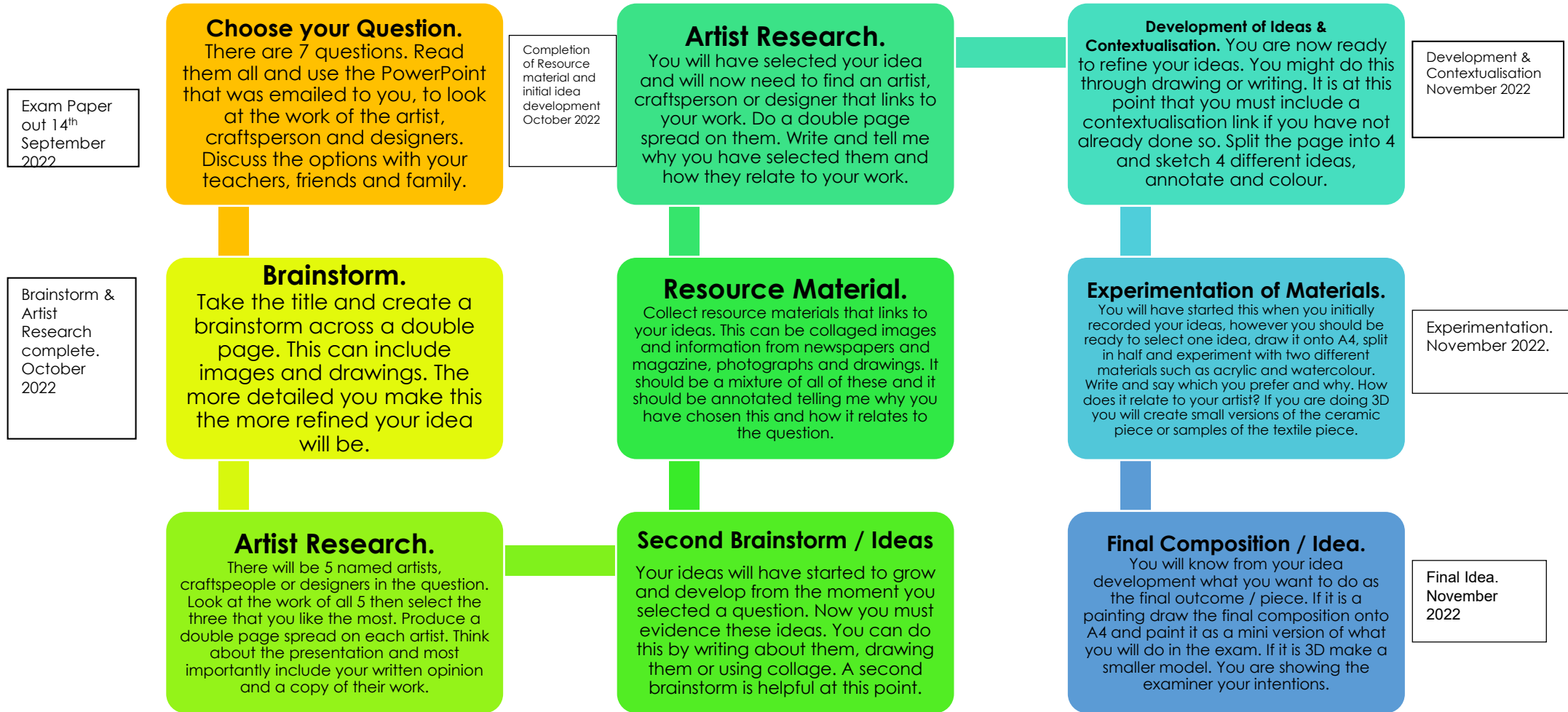
<https://www.bbc.co.uk/bitesize/topics/znwjy9q>

Revision of Theme 5- International and global dimension:

<https://www.bbc.co.uk/bitesize/topics/zfa7382>

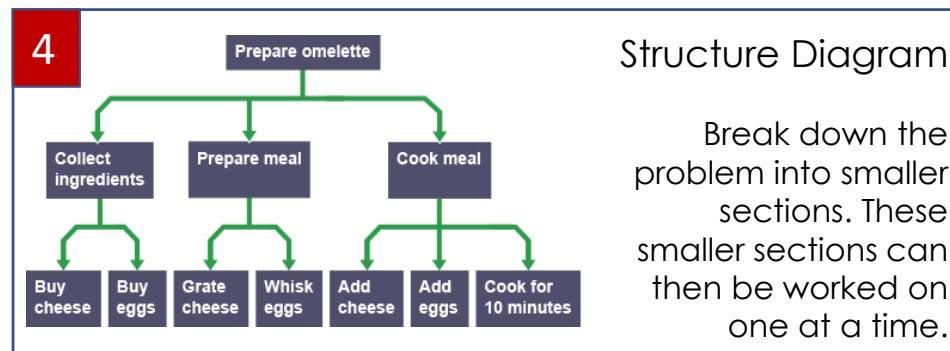


Year 11 Art Knowledge Organiser Learning Cycle 1

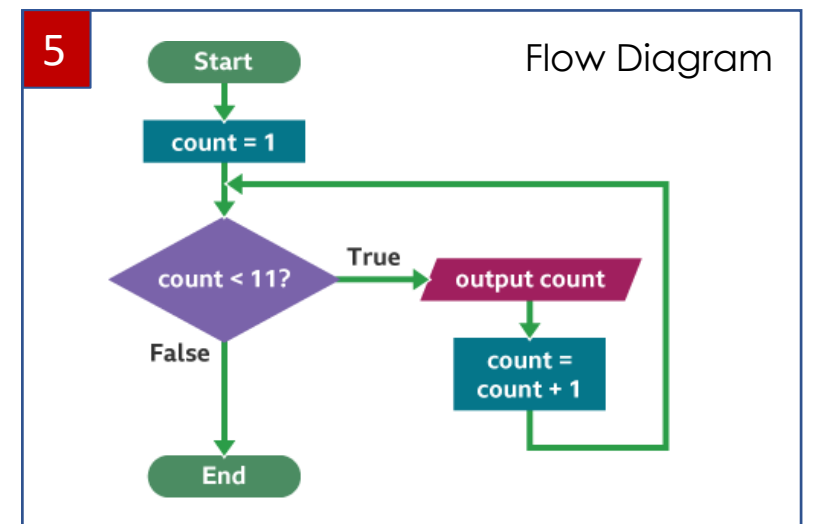


1 Computational Thinking	
Abstraction	Converting a real world problem into the inputs, processes and outputs needed to solve it. Simplifying and removing unnecessary detail.
Decomposition	Breaking a problem into sub-problems to make the task more manageable or to share tasks.
Algorithmic thinking	identifying the steps to solve a problem in the right sequence
Pseudocode	not an actual programming language. Instead, it is a simple way of describing a set of instructions in a manner that resembles a programming language.

2 Sorting Algorithms	
Bubble Sort	Compare the first value in the list with the next one up. If the first value is bigger, swap the positions of the two values.
Merge sort	The list is repeatedly divided into two until all the elements are separated individually. Pairs of elements are then compared, placed into order and combined. The process is then repeated until the list is recompiled as a whole
Insertion Sort	An insertion sort compares values in turn, starting with the second value in the list. If this value is greater than the value to the left of it, no changes are made. Otherwise this value is repeatedly moved left until it meets a value that is less than it. The sort process then starts again with the next value.



3 Searching Algorithms	
Linear Search	Starting at the beginning of the data set, each item of data is examined until a match is made. Once the item is found, the search ends. Can be quite inefficient
Binary Search	More efficient algorithm than a linear search. Works on an ordered list, breaking it into 2 parts until the number is found. Divide and Conquer.



Year 11 Computer Science Knowledge Organiser Learning Cycle 1 Topic 2: Programming Fundamentals & Data Types

1 Data Types and casting	
Integer	Whole number 13 myAge = int(age)
Real	Decimal places 105.7 myHeight = float(height)
String	More than one character A546TH myName = str(name)
Character	One letter or number (but cannot do maths with a char) Eg A or 6
Boolean	TRUE or FALSE
Array	<p>One Dimensional Array Names = ["John","Paul","George"] Index Names[0] = "John"</p> <p>Two Dimensional Array TicTacToe = [[1,2,3],[4,5,6],[7,8,9]] TicTacToe[1][1] = 5 TicTacToe[0][2] = 3 TicTacToe[2][2] = 9</p>

2 Programming	
Sequence	Instructions executed in order
Selection	IF... THEN... ELSE...
Iteration	FOR... NEXT WHILE... END WHILE DO/REPEAT... UNTIL
Subroutines	<p>Functions return one or more values function triple(number) return number*3 endfunction</p> <p>Procedures perform a task but do not return anything to the main program</p>
File Handling	<p>open, read, write, close</p> <p>file open modes: Read, Write, Append</p>

Order of Operations: **BIDMAS**

3 Operators 1	
Comparison operator	Meaning
= or ==	Is equal to
>	Is greater than
<	Is less than
<> or !=	Is not equal to
>=	Greater than or equal to
<=	Less than or equal to

4 Operators 2		
Comparison operator	Symbol	Example
ADD	+	age + 10
SUBTRACT	-	year - 55
DIVIDE	/	days / weeks
MULTIPLY	*	months = age * 12
MOD (remainder)	MOD	days MOD weeks
DIV (whole number)	DIV	13 DIV 2
Indicies (x ⁿ)	^	2^4

Year 11 Engineering Knowledge Organiser Learning Cycle 1

1 Marking and measuring tools:

Design Process- Analyse existing products

It is always a good idea to look at products and systems that are already in existence. It gives you a chance to see what works well and how the product has been put assembled or manufactured.

It can also be useful to be look at smaller parts of products or systems. For example parts for a circuit or mechanisms that perform specific tasks.

If you look at how products are assembled you can use similar or improved methods.



Existing products- possible concepts

Existing Products

Aesthetics
Cost
Customer
Environment
Size
Safety
Function
Material

Design process- writing a specification.

When we have investigated the requirements of the design brief and we have identified the intended user and their needs, it is time to describe clearly what the product is and how it will work.

There are lots of different things that can be 'specified' It will depend on each project. A really good starting point is to use the ACCESS FM method to remind you of key points.

By being 'specific' when describing the features and functions design thinking can be guided and degrees of success measured by evaluations and notes.

- A:** Aesthetics, what does the product look like.
- C:** Cost, how much does the product cost to buy?
- C:** Customer, who would buy or use the product?
- E:** Environment, where would the product be used or stored?
- S:** Size, how big or small is the product?
- S:** Safety, how safe during normal use?
- F:** Function, how does the product work?
- M:** Material, what is the product made of?

Examples of bad specification points.
It will be quite big so that it fits.
It will be suitable for everyone so you can sell more.

Examples of good specification points.
Size will be maximum 200 x 300 x 25 so that it fits in a standard kitchen drawer.
It will be appealing for users under five and must include room for them to customise the product.

2

Design Process- Computer Aided Design (CAD)

Computer Aided Design has a number of advantages over hand drawing techniques. It is a very precise method of working out design details.

CAD Modelling allows us to build components and make changes once we have tested if they fit properly.

It is possible to adapt designs easily and then produce realistic visuals to show the product materials and finishes.

CAD can also be used to control machines which print, cut or shape materials to create actual products.

This is called CAM . Computer Aided Manufacturing.



5

Marking and measuring tools:

Internal Callipers:

Measure internal sizes and diameters

External Callipers:

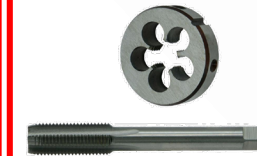
Measure external sizes and diameters

Odd Leg Callipers:

Mark a line parallel to an edge.

Engineers Square:

Marking out and checking 90 degrees.



Tap and Die:

Cutting internal and External Threads



Centre punch:

Creates an Indentation to locate drill point



4 Polymer manufacturing processes:

Extrusion

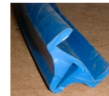
Continuous process used to produce both solid and hollow products that have a constant cross-section. E.g. window frames, hose pipe, curtain track, garden trellis.

Thermoplastic granules are fed from a **hopper** by a **rotating screw** through a **heated cylinder**.

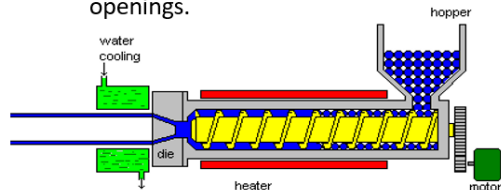
The **tapered screw** compacts the plastic as it becomes elasticised. The **die** which is fitted to the end of the **extruder barrel** determines the cross-section of the extrusion.

As the extrusion leaves the die it is cooled by passing through a cooling trough (below) containing cold water.

This extrusion in blue is part of a window seal made from thermoplastic elastomer (TPE)



The extrusion die creates the profile as the material is pushed through the openings.

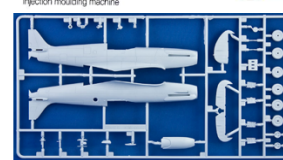
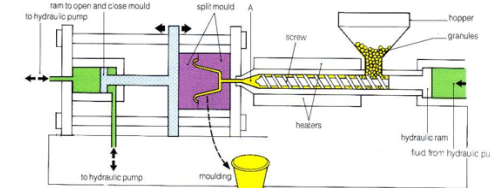
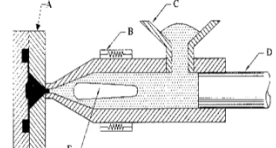


Injection Moulding

- A measured amount of molten thermoplastic is driven by a ram past a heating system into the mould. (The mould is also known as a 'tool'.)
- The mould is split to allow finished object to be removed after cooling.



- A – split mould
- B – heater
- C – hopper
- D – hydraulic ram
- E – torpedo (spreader)



Injection moulding is a very fast and accurate method of creating components. It is expensive to set up but because it is so fast parts can be made cheaply. It is used as part of a 'mass production' scale of manufacturing.

Key terms:

CAD: Computer Aided Design

CAM: Computer aided Manufacturing

Analyse: Weigh up positive and negative points- focusing on the product, material or manufacturing process

Year 11 Hospitality and Catering Learning Cycle 1

1

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.

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.

It is recommended that men have around 2,500 calories a day (10,500 kilojoules).
Women should have around 2,000 calories a day (8,400 kilojoules).

2

Needs of Specific Groups

Specific groups- Children



- Energy requirements increase because they grow quickly and become active.
- Good supply of protein, calcium, iron, vitamin A and D, as part of a healthy, balanced diet
- Calcium and vit D for healthy tooth development, and strong bones.
- Limit sugary carbohydrates such as sweets -tooth decay.
- Fat: small amounts for energy and insulation.
- Young children small stomachs, small and frequent meals. No room for junk food
- Children cannot cut food and chew as easily so need easy to eat foods
- Avoid nuts- choking and allergy risks,

Specific groups- teenagers



- Adolescence is a period of rapid growth and development and is when puberty occurs
- Boys need more protein and energy than girls due to their later growth spurt
- After menstruation begins, girls need more iron than boys to replace losses.
- Boys need extra iron initially for growth and muscles but this need decreases after age 19
- Increase in need for calcium for bone development with growth
- Must maintain good vitamin and mineral intake despite junk food

Specific groups- Adults



- Requirements do not change much between the ages of 19 to 50, except during pregnancy and lactation.
- On average, UK adults are having too much saturated fat and salt from food, and not enough fruit and vegetables.
- A balanced diet should ensure that the correct amounts of Protein fat and carbohydrate are consumed
- All the vitamins and minerals required should be present in a balanced diet without the need for supplements

Specific groups- Older adults

- Older adults need protein to repair worn out body cells. They need a good supply of calcium and Vitamin D in order to maintain healthy bones and teeth and iron to keep bloody healthy.
- In winter time, they may need a little more fat in their diet to provide body warmth. Fresh fruit and Vegetables are important for a good supply of vitamins and minerals.
- Old people may have digestive problems or may have difficulty cutting food (because of arthritis) or chewing food (because of false teeth).
- Examples of food suitable for the elderly = Soft foods – boiled potatoes, stew, soup, casseroles, one pot meals.
- A good supply of fibre is needed to prevent constipation in the elderly who may be less active

3

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.

Boiling

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

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.

Poaching

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

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.

Year 11 Hospitality and Catering Learning Cycle 1

4

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**.

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?

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).

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.

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?

5

Basic cooking skills and techniques

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

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.

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 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).

Complex cooking skills and techniques

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