YEAR 10 KNOWLEDGE ORGANISER

TRINITY TERM

Name:

Family Group:

LEARNING - LOVING - LIVING

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LEARNING - LOVING - LIVING

KNOWLEDGE ORGANISER GUIDANCE

The knowledge organiser is a book that sets out the **important**, **useful** and **powerful knowledge** of a single topic on one page.

When used effectively, Knowledge Organisers are useful in:

- Helping build a foundation of **factual knowledge.**
- Embedding **revision techniques** for now and future studies (A-Level, College, University)
- Allowing knowledge to become stored in **long term memory** which frees up working memory for more complex ideas. It also allows you to connect concepts together, even across subjects

HOMEWORK EXPECTATIONS

EACH NIGHT you should spend *at least* **1 hour** per night on homework. 3 subjects per night x 20 minutes per subject= 1 hour. Use the homework timetable as a guide to what subjects to complete each night.

Complete all work in your exercise book and make sure you bring your knowledge organiser to school EVERYDAY (in your coloured folder).

Every FRIDAY morning the week's worth of KNOWLEDGE ORGANISER homework will be checked in Family Group time and detentions issued for work not complete, or not up to standard.

SUBJECT HOMEWORK

In addition to knowledge organiser homework, subjects will be setting **additional homework task**s for completion. This is to further augment the knowledge organiser material and develop the skills and understanding in the subject areas.

Students will also be assigned **ENGLISH** reading activities on www.CommonLit.org and **MATHS** activities with short explanatory videos on the online platform of https://mathswatch.co.uk.

It is also recommended to take advantage of FREE online revision tools such as www.senecalearning.com or the recently updated BBC BITESIZE.

It is also recommended that students regularly **READ** a variety of **fiction and non fiction books** of their choosing.

HOMEWORK TIMETABLE

Year 10	Subject 1	Subject 2	Subject 3
Monday	Maths	Option A	Option C
Tuesday	English	Option B	Option C
Wednesday	Maths	RE	Option D
Thursday	English	Science	Option A
Friday	Maths	Science	Option B

EQUIPMENT CHECKLIST

Pencil case	Knowledge Organiser	2 Black or Blue pens
2 pencils and Eraser	Green Pen	Pencil Sharpener
Mini whiteboard and pen	Calculator	Ruler
Maths geometry set	Class book	

HOMEWORK CHECKLIST

Week 1	Week 2	Week 3	Week 4	Week 5

Half term

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6

Here are some activities that you can try at home with your knowledge organiser to help revise. There are even more strategies on page 3.

4 Methods of Retrieval Practice

@ImpactWales

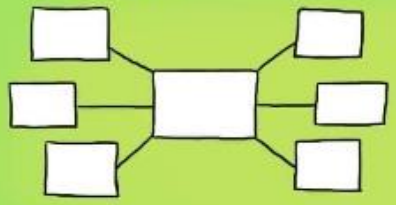
Before you start put away all your books & classroom materials.

Retrieval Practice Examples

- Exit Tickets
- Starter quizzes
- Multiple choice quizzes
- Short answer tests
- Free write
- Think, pair, share
- Ranking & sorting
- Challenge grids

BRAIN DUMP

Write, draw a picture, create a mind-map on everything you know about a topic.



Give yourself a time limit, say 3 minutes, then have a look at your books & add a few things you forgot.

QUIZZING

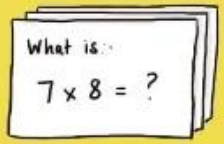
Create practice questions on a topic. Swap your questions with a partner & answer.

Question - What is a metaphor?

- ☐ A comparison using 'like, as, than'.
- ☐ A comparison where one thing is another.
- ☐ A comparison with a human attribute.

FLASHCARDS

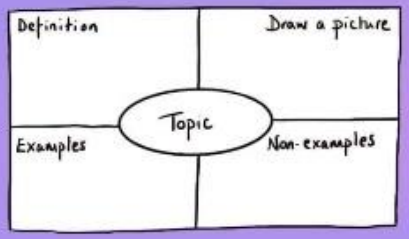
Create your own flashcards, question on one side answer on the other. Can you make links between the cards?



You need to repeat the Q & A process for flashcards you fail on more frequently & less frequently for those you answer correctly

KNOWLEDGE ORGANISERS

Complete a knowledge organiser template for key information about a topic.



You can use knowledge organisers to learn new vocab & make links in between subjects or ideas.

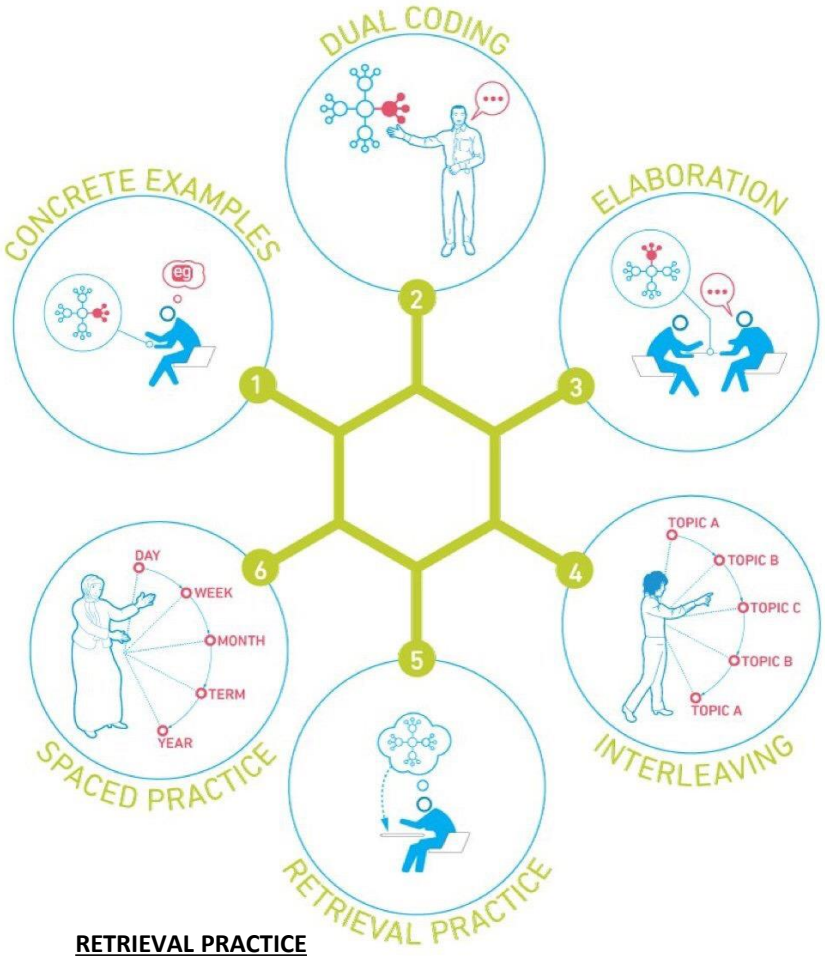
After you have retrieved as much as you can go back to your books & check what you've missed. Next time focus on that missing information

DUAL CODING

Dual coding is the process of combining visual and written materials. You can visually represent materials using methods such as info graphics, timelines, cartoon/comic strips, diagrams and graphic organisers. Combing images with words or explaining an image makes it more likely to 'stick'.

CONCRETE EXAMPLES

When you're studying, try to think about how you can turn ideas you're learning into concrete examples. Making a link between the idea you're studying and a real life example, concrete example, can help students understand abstract ideas and make it 'stick'.



ELABORATION

When talking about studying, elaboration involves explaining and describing ideas with many details. Elaboration also involves making connections among ideas you are trying to learn. Ask yourself questions about a topic to delve deeper. The more information you have about a specific topic the stronger your grasp and ability to recall.

SPACED PRACTISE

Divide up your revision into short manageable chunks of time . When revising aim for 20 - 30 minutes per session. Five hours spread out over two weeks is better than the same five hours all at once. This is **spaced practice** and it is regarded as one of the most effective revision strategies.

INTERVEAVING

Interleaving is a process where you combine multiple subjects and topics while you study in order to improve learning. Switch between ideas and make links between them during a study session. Interleaving has been shown to lead to better long-term retention

RETRIEVAL PRACTICE

Through the act of retrieval, or calling information to mind, our memory for that information is strengthened and forgetting is less likely to occur. Retrieval practice ideas include: Read, cover, write, check, flashcards and brain dumps.

Chapter 1:Story of the door:

Who	What	Notes
1) Utterson	Never lighted by a smile	U is 'austere', serious, strict, avoids frivolity
	Austere	U represses his desire for pleasure. Strives to conform to restrictive social mores
	I let my brother go to the devil in his own way.	Avoids gossip, doesn't judge: is he tolerant or selfish here?
	When the wine was to his taste something eminently human beaconed from his eye	U's 'austere' demeanour could be an act/veneer-drink removes his inhibitions.
2) Setting	The buildings are so packed together	Setting is claustrophobic and restrictive, mirroring the social mores. Gothic fiction involves entrapment!
	Neither bell nor knocker	House is private, mirroring the theme of secrecy.
3) Utterson	Though he enjoyed the theatre, had not crossed the doors of one for twenty years	U is Paranoid: extreme obsession with reputation results in bizarre/absurd behavior. U avoids frivolity
4) U and E	Looked singularly dull BUT chief jewel of each week	U and E walk in public to enhance reputation. Contrived.
5) Enfield	You start a question its like starting a stone The more it looks like Queer Street, the less I ask	E avoids gossip: is he being tolerant or selfish here? E is a hypocrite: he is fascinated by Hyde's story!
6) Hyde	Tramples 'calmly' on a child 'like some damned juggernaut'	H attacks the vulnerable. H is cold, callous. gratuitous violence, like an automaton.
7) Enfield	Make his name stink	E threatens to ruin H's reputation and cause a scandal. H pays money to avoid trouble. E and H are immoral!
8) Enfield on Hyde	Gave me one look so ugly that it brought out the sweat on me like running	H is repulsive, abhorrent, causes psychosomatic reaction in E. Links to U.Class stereotypes of lower class (a group seen as deviant, criminal, immoral).
	There is something wrong with his appearance; something displeasing, something downright detestable A strong feeling of deformity, although I couldn't specify the point	Link to Uncanny: ambiguous/vague. Victorians thought certain physiologies caused criminality (Physiognomy): ugly=criminal.

Chapter 2: The Search for Mr Hyde:

Who	What	Notes
9) Lanyon	Boisterous and decided manner	Stevenson commenting on arrogance of science (challenged traditional/religious beliefs).
10) L on J	Jekyll became too fanciful for me, he began to go wrong, wrong in mind Such unscientific balderdash	J=transcendental medicine. L=empirical science. J=Victorians associated science with supernatural because incomprehensible. L=Victorians associated science with arrogance/immorality (challenged the church)
11) U meets H	Fronted about with an air of defiance	H defies social mores/is immoral/doesn't conform. H represents U.Class repressed desires.
	Snarled aloud into a savage laugh	H is sinister, feral, atavistic (represents Victorian fears of evolution)
	Pale and dwarfish	H is depraved/disease to society. J is 'tall fine build of a man'. Hierarchy of status: J is superior (like class system)
	Murderous mixture of timidity and boldness	H is antithetical. Contradictory nonsensical description (like U.Class prejudice=incoherent/irrational)
12) H	Troglodytic	Link to Victorian fears of evolution. Caveman=uncivilized/feral. U.Class repress all savage/uncivilized impulses.
13) U on J	The ghost of some old sin, the cancer of some concealed disgrace	U suspects J has past vices. U suspects blackmail. 'cancer'=moral depravity and sin are a societal disease to be avoided.
14) U	Humbled to the dust by the many ill things he had done	U is archetypal Victorian Gent-he is perfect! (here U is paranoid and insecure)

Chapter 3: Dr Jekyll was quite at Ease

Who	What	Notes
15) J on L	Hide bound pedant, Lanyon	J (transcendental) vs L (Empirical). Victorian fears and disdain for science
16) J on H	It isn't what you fancy; it is not so bad as that	J implicitly referring to blackmail/illicit homosexuality
17) Jekyll	Asks U to help Hyde if J disappears	Close bonds of support and secrecy between U.Class men

Chapter 4: Carew Murder Case

Who	What	Notes
18) Hyde	Ape like fury	Feral, brutal, savage, malevolent, uncivilized, relentless,
19) The Attack	1) Unprovoked attack: SDC was bowing to greet H. SDC was genteel and polite (paragon of propriety and decorum). SDC is antithesis of H. 2) Victim: old, frail, vulnerable. MP=symbolizes society and civilization-H attacks the establishment 3) Nature of attack: No valuables taken. Makes H hard to understand-he is motivated by sadism. H is volatile 4) Weapon left=H doesn't care about ramifications or being caught 5) 'bones audibly shattered'= visceral, barbaric attack 6) Maid faints: accentuates brutality of attack.	

Chapter 5: Incident of the Letter:

Who	What	Notes
20) Utterson	Suspects J is covering for H (blackmail/homosexual subtext)	
	Handwriting of J and H are similar	Graphology (Victorian pseudo-science) claimed that personality/morality could be judged by handwriting

Chapter 6: Remarkable Incident of Dr Lanyon

Who	What	Notes
21) Lanyon	his flesh had fallen away Deep seated terror of the mind A doomed man	Shock of seeing H transform to J (explained in CH9) kills L. Links to idea that science is a threat/Victorian fears of science. H symbolizes human capacity for evil: L is shocked by this-like all U.Class men, L aims for perfection/represses desires for sin. When confronted with the thing he tries to ignore (evil/transgression) he is shocked and dies

Chapter 7: Incident at the Window:

Who	What	Notes
22) Jekyll	Slams the window to avoid E and U seeing transformation	J cannot control the transformations now
23) E and	E and U see J through the window	Symbolizes lack of privacy for U.Class men

Chapter 8: The Last Night:

Who	What	Notes
24) Poole on J	My master is a tall fine build of a man	Compare to H 'pale and dwarfish' hierarchy between them: J is supposed to be on top but H ends up more powerful
25) Poole on H	That masked thing like a monkey	Atavism/fears of evolution/feral/primitive/bestial
26)Hyde	H has been asking Poole to get a drug for him	Theme of addiction: to drug/sin/freedom/

Chapter 9: Dr Lanyon's Narrative

Who	What	Notes
27) Lanyon	My life is shaken to its roots	Link to idea that science is a threat/Victorian fears of science
28) Lanyon	After J's party in CH6, L receives letter from J asking L to get a drawer from J's house (containing notebook and vial)	Notebook explains that slowly the potion has stopped working: J has built up tolerance/become immune. Symbolises the normalization of transgression: the more you do, the more acceptable it becomes?
29) Hyde	Transformation in front of Jekyll	Gothic/supernatural/fears of science. L witnesses (like maid witnessing H battering SDC): reader encouraged to share their shock

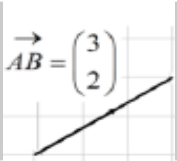
Chapter 10: Henry Jekyll's Full Statement of the Case

Who	What	Notes
30) Jekyll	That man is not truly one, but truly two	Duality of man. Evil+Good
	Extraneous evil	J claims H is separate (contradicts himself: compare to 'not truly one, but truly two' Is 'extraneous evil' the social mores?
	A solution to the bonds of obligation	H is a 'solution' to problem of restrictive social mores. 'bonds'=Victorian society is imprisoning/an entrapment (Gothic theme)
	Like a school boy, strip off these lendings and spring headlong into the sea of liberty	H excites J: 'like a school boy'=exhilarating. 'sea of liberty'=ignore social mores/indulge in transgressions and immorality.
	Commingled out of good and evil	Human psyche is a mixture not two separate things. evil and good are intertwined
	Like a thick cloak	Similar to 'extraneous evil'. J claims H is separate (contradicts himself) but WHY? 1) human psychology is too complex to comprehend 2) J is deliberately being evasive to avoid culpability 3) J is deluded and is lying to himself to avoid guilt and shame
	I was slowly losing hold of my original and better self, and becoming slowly incorporated with my second and worse	H eventually overpowers J. Evil side begins to take control
	If I am the chief of sinners, I am the chief of sufferers also	'sufferers'=J suffers under societal expectations. Repressing his desire to sin=suffering. Guilt of actions as H=suffering. Evil side taking control=suffering. Denying innate capacity for transgression=suffering.
	The animal within me	Atavism/fears of evolution-humans are similar to animals
	this brief condescension to evil finally destroyed the balance of my soul'	Temptation leads to further damage. repressing sin 'brief condescension' avoids moral depravity.
	Men have before hired bravos to transact their crimes, while their own person and reputation sat under shelter	Secrecy/reputation. Public behavior is a veneer/act. H is a 'bravos' and a 'thick cloak' to 'shelter' J from judgment and criticism
	Secret pleasures	Perhaps he only initially wanted to indulge in transgressions like drinking/prostitution not murder

Important Ideas

A **vector** has both **direction** and **magnitude**.

$\overrightarrow{AB} = -\overrightarrow{BA}$



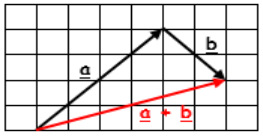
If two vectors have the **same magnitude and direction**, they are **equal**.

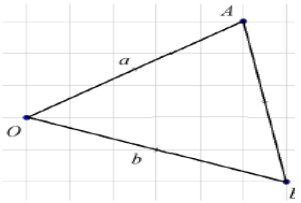
The **resultant** vector is the vector that results from **adding** two or more vectors together.

This can be represented graphically or with **column vector** notation

if **a** = $\begin{pmatrix} 4 \\ 4 \end{pmatrix}$ and **b** = $\begin{pmatrix} 2 \\ -2 \end{pmatrix}$

then **a** + **b** = $\begin{pmatrix} 4 \\ 4 \end{pmatrix} + \begin{pmatrix} 2 \\ -2 \end{pmatrix} = \begin{pmatrix} 6 \\ 2 \end{pmatrix}$





$\overrightarrow{OA} = a \quad \overrightarrow{AO} = -a$

$\overrightarrow{OB} = b \quad \overrightarrow{BO} = -b$

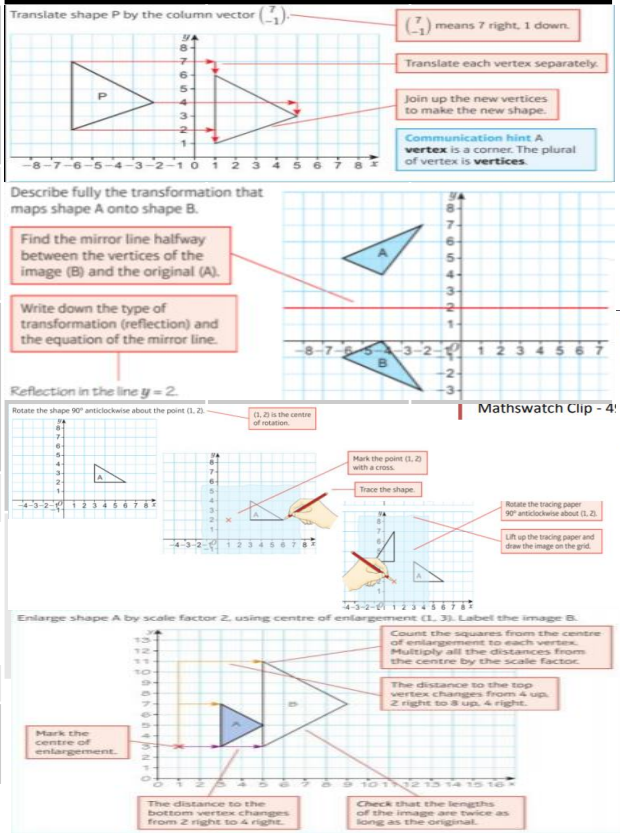
$\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB} = -a + b = b - a$

$\overrightarrow{BA} = \overrightarrow{BO} + \overrightarrow{OA} = -b + a = a - b$

Vocabulary

Object	Starting shape
Image	Created by a transformation
Congruent	Two shapes are exactly the same
Similar	Two shapes with the same angles but different length sides

Q& A



MathsWatch References

48	Reflections
49	Rotations
50	Translations
148	Enlargements
174	Introductions to Vectors
219	Vectors

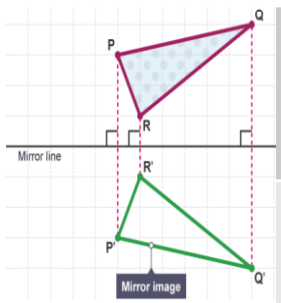
Key Facts & Formula

Reflection

Every point in the image is the same distance from the mirror line as the original shape.

The line joining a point on the original shape to the same point on the image is perpendicular to the mirror line.

A reflection creates a congruent image



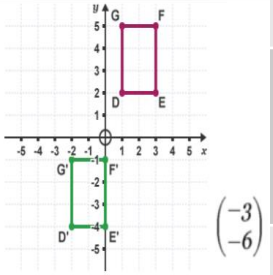
Translation

A **translation** moves a shape up, down or from side to side and creates a congruent image.

Column vectors are used to describe translations

$\begin{pmatrix} 4 \\ -3 \end{pmatrix}$ means translate the shape 4 squares to the right and 3 squares down.

$\begin{pmatrix} -2 \\ 1 \end{pmatrix}$ means translate the shape 2 squares to the left and 1 square up.



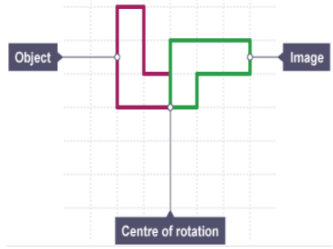
Rotation

Rotation turns a shape around a fixed point called the **centre of rotation**.

3 parts of a rotation

- the centre of rotation
- the angle of rotation
- the direction of rotation

A Rotation creates a congruent image



Enlargement

Enlarging a shape changes its size

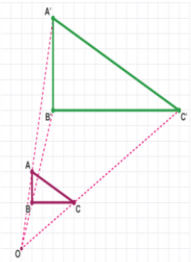
2 parts of an enlargement

- the scale factor
- the centre of enlargement

Fractional SF reduces the shape

Negative SF inverts the shape

An enlargement creates a similar shape



ABC has been enlarged by sf 3 about O.

SHAPES AND GRAPHS

Important Ideas

Factorising Quadratics

Factorise $x^2 + 5x + 6$

$x^2 + 5x + 6$

$(x \quad)(x \quad)$

$1 \times 6 \qquad 2 \times 3$

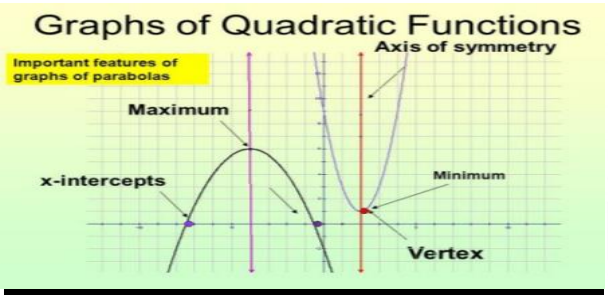
$1 + 6 = 7 \qquad 2 + 3 = 5$

$(x + 2)(x + 3)$

Check: $(x + 2)(x + 3) = x^2 + 5x + 6$

- Write a pair of brackets with x in each one. This gives the x^2 term when multiplied.
- Work out all the factor pairs of 6, the number term.
- Work out which factor pair will **add** to give 5, the number in the x term.
- Then write each number in each of the brackets with x.
- The expression is now factorised. Expand the brackets to check it is correct.

Graphs of Quadratic Functions



Vocabulary

Linear Sequence	A number pattern with a common difference.
Fibonacci Sequence	A sequence where the next number is found by summing the previous two terms
Quadratic Sequence	A sequence of numbers where the second difference is constant.
Term-to-term rule	A rule which allows you to find the next term in a sequence if you know the previous term.
n^{th} term rule	A rule which allows you to calculate the term that is in the nth position of the sequence.

Q& A

a Work out the nth term of the sequence 3, 7, 11, 15, … b Is 45 a term of the sequence?

a $4n$: 4, 8, 12, 16, … (−1)

3, 7, 11, 15, … (+4 +4)

The nth term is $4n - 1$.

- The common difference is 4. Write out the first five terms of the sequence for 4n, the multiples of 4. Work out how to get from each term in 4n to the term in the sequence.

b $45 = 4n - 1$

$46 = 4n$

$11.5 = n$

45 cannot be in the sequence because 11.5 is not an integer.

- Write an equation using the nth term and solve it.

Find a formula for the nth term of the sequence 8, 23, 48, 83, 128, …

sequence	8	23	48	83	128
1st differences		+15	+25	+35	+45
2nd differences			+10	+10	+10

- Work out the second differences.

So $a = 10 \div 2 = 5$

The formula has a $5n^2$ term in it.

- Halve the second difference to find the coefficient of n^2.

$5n^2$	5	20	45	80	125
Sequence	8	23	48	83	128

- Compare the given sequence with $5n^2$.

The nth term is $5n^2 + 3$

- The numbers in the second row are 3 more than those in the first row.

Solve $2x^2 + 11x - 5 = 0$. Give your answer to 2 decimal places.

$a = 2, b = 11, c = -5$

Substitute these into the quadratic formula, use brackets for negative numbers.

$$x = \frac{-11 \pm \sqrt{11^2 - 4 \times 2 \times (-5)}}{2 \times 2}$$

Put this into the calculator, first with a + and then with a − to find your two solutions.

$x = -5.92$ or $x = 0.42$

MathsWatch References

37	Generating sequences – term to term
102	Generating a sequence from nth term
103	Finding the nth term
104	Special sequences
141	Fibonacci Sequences

Key Facts & Formula

Finding the nth Term of a Linear Sequence

This method works for linear sequences – ones with a common difference (where the terms increase or decrease by the same amount each time). Linear sequences are also known as arithmetic sequences.

EXAMPLE: Find an expression for the nth term of the sequence that starts 5, 8, 11, 14, …

n:	1	2	3	4
term:	5	8	11	14
		+3	+3	+3

The common difference is 3, so '3n' is in the formula.

3n:	3	6	9	12
		+2	+2	+2
term:	5	8	11	14

You have to + 2 to get to the term.

So the expression for the nth term is $3n + 2$

1) Find the common difference – this tells you what to multiply n by. So here, 3 gives '3n'.
2) Work out what to add or subtract. So for n = 1, '3n' is 3 so add 2 to get to the term (5).
3) Put both bits together. So you get 3n + 2.

Always check your expression by putting the first few values of n back in, e.g. putting n = 1 into 3n + 2 gives 5, n = 2 gives 8, etc. which is the original sequence you were given – hooray!

Finding the nth Term of a Quadratic Sequence

A quadratic sequence has an n^2 term – the difference between the terms changes as you go through the sequence, but the difference between the differences is the same each time.

EXAMPLE: Find an expression for the nth term of the sequence that starts 10, 14, 20, 28…

n:	1	2	3	4
term:	10	14	20	28
		+4	+6	+8
			+2	+2

So the expression will contain an n^2 term.

term:	10	14	20	28
n^2:	1	4	9	16
term – n^2:	9	10	11	12

The expression for this linear sequence is n + 8

So the expression for the nth term is $n^2 + n + 8$

1) Find the difference between each pair of terms.
2) The difference is changing, so work out the difference between the differences.
3) Divide this value by 2 – this gives the coefficient of the n^2 term (here it's 2 ÷ 2 = 1).
4) Subtract the n^2 term from each term in the sequence. This will give you a linear sequence.
5) Find the rule for the nth term of the linear sequence (see above) and add this on to the n^2 term.

Quadratic Equation → $ax^2 + bx + c = 0$

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

Important Ideas

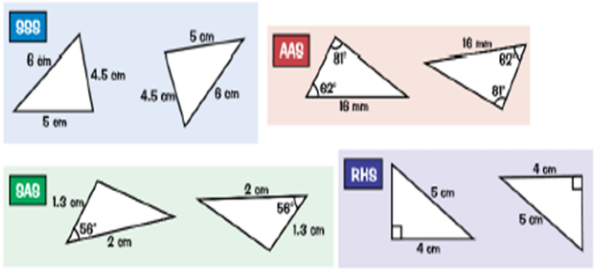
Congruent Shapes

Proving Triangles are Congruent

CONGRUENT – same size, same shape

To prove that two triangles are congruent, you have to show that one of the conditions below holds true:

1) SSS three sides are the same
2) AAS two angles and a corresponding side match up
3) SAS two sides and the angle between them match up
4) RHS a right angle, the hypotenuse and one other side all match up



Similar Shapes

SIMILAR – same shape, different size

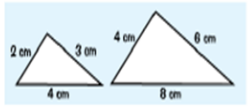
Similar Shapes Have the Same Angles

Generally, for two shapes to be similar, all the angles must match and the sides must be proportional. But for triangles, there are three special conditions – if any one of these is true, you know they're similar.

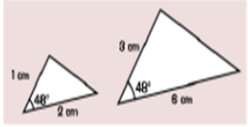
Two triangles are similar if:

1) All the angles match up i.e. the angles in one triangle are the same as the other.

2) All three sides are proportional i.e. if one side is twice as long as the corresponding side in the other triangle, all the sides are twice as long as the corresponding sides.

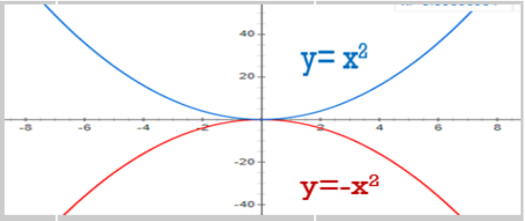


3) Any two sides are proportional and the angle between them is the same.

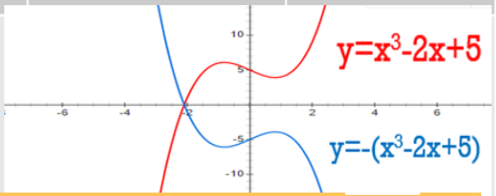


Q&A

Sketch the graphs of $y = x^2$ and $y = -x^2$



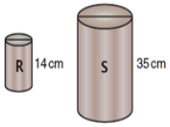
Sketch the graph of $y = x^3 - 2x + 5$ and $y = -(x^3 - 2x + 5)$



when lengths are multiplied by k, area is multiplied by k^2, volume by k^3

Example 7

Cylinders **R** and **S** are similar.
The surface area of cylinder **R** is 40 cm².
Calculate the surface area of cylinder **S**.



Solution 7

$\frac{35}{14} = 2.5$ — Work out $\frac{\text{height of cylinder S}}{\text{height of cylinder R}}$ to find the number by which lengths have been multiplied, that is, find the scale factor.

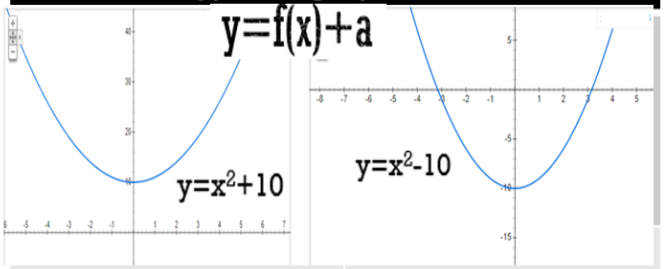
$2.5^2 = 6.25$ — Square the scale factor to find the number by which the area has to be multiplied.

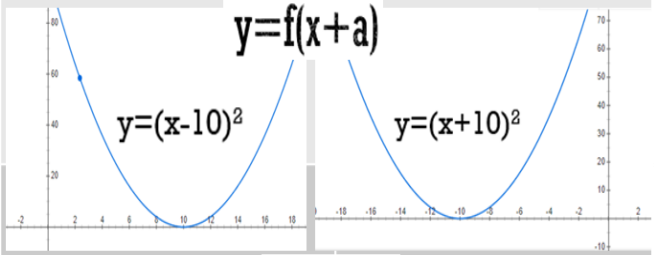
$40\text{ cm}^2 \times 6.25 = 250\text{ cm}^2$ — Multiply the surface area of cylinder **R** by 6.25 to find the surface area of cylinder **S**.

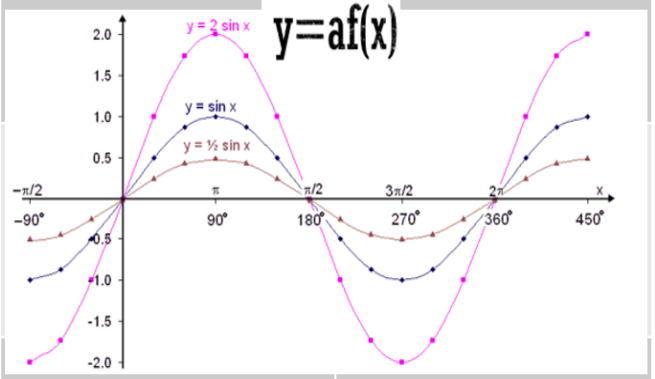
MathsWatch clip References

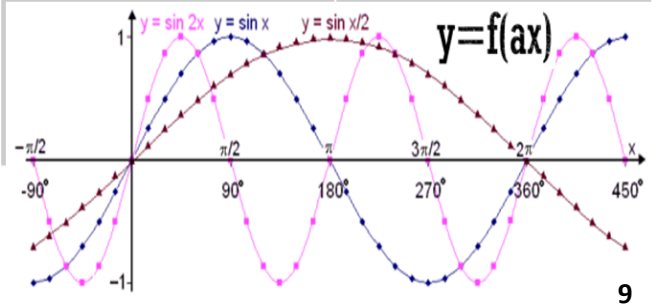
144	Similar Shapes
200	Similarity - Area and Volume
12b	Congruent Shapes
166	Congruent triangles
98	Drawing Quadratic Graphs
161	Cubic and Reciprocal Graphs
196a 196b	Transformation of Polynomial Functions Transformation of trigonometric Functions

Four main types of graph transformation



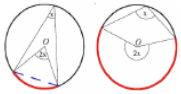
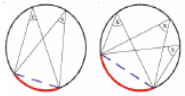
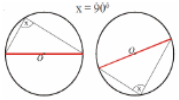
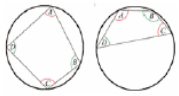
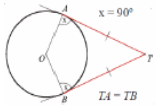
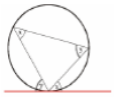






YEAR 10 – TRINITY TERM 2- MATHEMATICS- HIGHER – CIRCLE THEOREMS: EQUATIONS OF CIRCLES AND TANGENTS: GRADIENTS AND AREA UNDER A GRAPH: FUNCTIONS

LEARNING - LOVING - LIVING

Angles at the centre	The angles at the centre is twice the angle at the circumference	
Angles in the same segment	Angles at the circumference in the same segment are equal	
Angle in a semicircle	Angles in a semicircle are 90°	
Cyclic quadrilaterals	Opposite angles of a cyclic quadrilateral add to 180° $A + C = 180°$ $B + D = 180°$	
Tangents to a circle	The angle between a tangent and radius is 90° Two tangents from the same point to a circle are equal lengths	
Alternate segment	Alternate segment	

Equation of a circle, gradient of a radius

Equation of a circle	Circle with a centre of (0, 0) and radius r $x^2 + y^2 = r^2$	$x^2 + y^2 = 16$ ($r = \sqrt{16} = 4$) 
Gradient between 2 points	If A = (x_1, y_1) and B = (x_2, y_2) The gradient of line AB $m = \frac{y_2 - y_1}{x_2 - x_1}$	
Perpendicular lines	When lines are perpendicular the product of the gradients is – 1. If one graph has gradient m, the other has gradient $-\frac{1}{m}$	
Gradient of a radius to a circle	The gradient (m) of a radius to a point (x, y) on the circle $x^2 + y^2 = r^2$ is $\frac{y}{x}$	

Gradient and area under graphs

Distance-time graph

Represent a journey
The vertical axis represents the distance from a starting point
The horizontal axis represents time taken
Straight lines mean constant speed
Horizontal lines mean no movement
Gradient = speed

A = steady speed,
B = no movement,
C = steady speed back to start

$$Average\ speed = \frac{Total\ distance}{Total\ time}$$

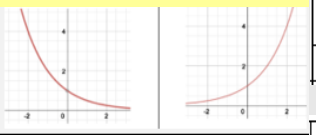
Velocity-time graph

Represent the speed at a given time
Straight lines mean constant acceleration/deceleration
Horizontal lines mean no change in velocity (speed)
Positive Gradient = acceleration
Negative Gradient = deceleration
The area under the graph = distance travelled

A = steady acceleration,
B = constant speed,
C = steady deceleration back to a stop

Exponential graph

The equation is of the form $y = a^x$, where a is a number called the **base**.
If $a > 1$ the graph **increases**.
If $0 < a < 1$, the graph **decreases**.
The graph has an **asymptote** which is the **x-axis**.

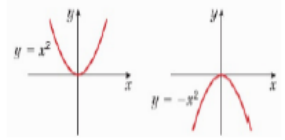
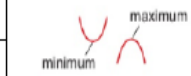


MathsWatch References

116, 183, 184, 208	Circles, tangents, circle theorems
143, 216 a, b	Distance-time, Velocity-time graph
161	Cubic, reciprocal graph
195 a, b	Trigonometric graphs
140	Solving simultaneous equations graphically

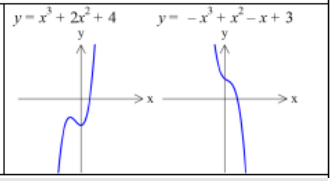
Graphs of functions

Quadratic graph

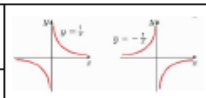
The quadratic graph a curved shape called a parabola $y = ax^2 + bx + c$	
A positive x^2 term will give a ∪ shape	
A negative ($-x^2$) term will give a ∩ shape	
Turning points	The point where a curve turns in the opposite direction Either a maximum or a minimum point 
Line of symmetry	A quadratic graph will have a line of symmetry passing through its maximum or minimum point

Cubic graph

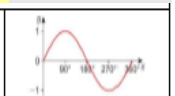
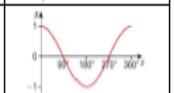
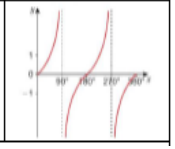
$y = ax^3 + bx^2 + cx + d$
Will have 1, 2, or 3 roots



Reciprocal graph

Reciprocal graphs have the form $y = \frac{k}{x}$ where k is a number	
It will have 2 asymptotes	

Trigonometric graphs

Sine function	The sine graph repeats every 360° in both directions.	
Cosine function	The cosine graph repeats every 360° in both directions.	
Tangent function	The tangent graph repeats every 180° in both directions. The tangent graph is not defined for angles of the form (90° ± 180n°)	

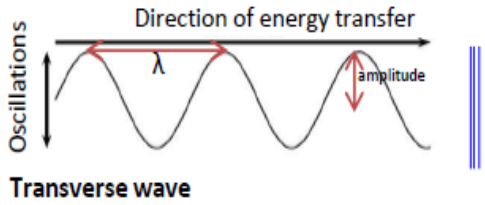
Types Of Wave

You can see waves easily in the sea, or if a tap is dripping into a sink of water. However, waves are far more common than just that. Waves can be **mechanical**, which means they involve particles moving, or **oscillating**, such as waves in the sea or sound waves in the air. Or, they can be **electromagnetic**, which don't involve any particles oscillating – instead, EM waves involve vibrations or oscillations of the electromagnetic field. All waves involve the transfer of energy.

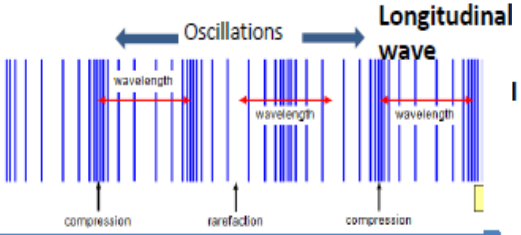
The other way of defining types of wave is whether they are **longitudinal** or **transverse**. Which one they are depends on the direction of the oscillations compared to the direction of energy transfer by the wave.

- In **transverse waves**, the oscillations are **perpendicular** to the direction of energy transfer.
- In **longitudinal waves**, the oscillations are **parallel** to the direction of energy transfer. They show areas of compression and rarefaction – see diagram.

Examples: ALL electromagnetic waves are transverse. Mechanical waves can be either longitudinal or transverse. For instance: sound waves are mechanical and are longitudinal. Ripples in water are mechanical waves, and are transverse.



Transverse wave

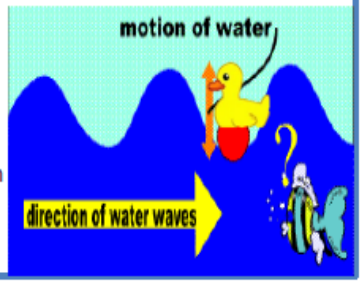


Longitudinal wave

Particles Don't Travel, But The Wave Does. Particles Just Oscillate.

An easy way to see that the particles aren't travelling but the wave is (so energy is being transferred): put a rubber duck in a tank of water where waves are moving across. The duck goes up and down, just like the water particles (oscillations perpendicular to direction of energy transfer, remember), while the waves move across.

With longitudinal waves, you can tell the particles aren't flowing either – just oscillate. When you speak, you don't breathe into someone else's ear! Also, when a tuning fork is vibrating to produce a sound wave, it doesn't create a vacuum around it due to air particles travelling away.



Key Terms	Definitions
wave	A wave transfers **energy** from one place to another, and can also carry information. All waves involve movements or **oscillations**, allowing energy to be transferred **without** particles having to flow or travel from one place to another.
oscillations	Rhythmic back and forth movements from a rest position (e.g. vibrations). These movements are of particles in **mechanical** waves, or of the electromagnetic field when it comes to **electromagnetic** waves.
perpendicular	At right angles to.
amplitude	The amplitude of a wave is the maximum displacement of a point on the wave from the undisturbed position. *Translated*: the distance from a peak or trough to the 'midline' of the wave.
wavelength	The distance from a point on one wave to the equivalent point on the next wave along. This is easiest to measure at the distance from the centre of one area of compression to the next (longitudinal waves) or the distance from peak to peak (transverse waves). Symbol: λ
frequency	The frequency of a wave is the number of complete waves that pass a point per second. Symbol: f
period	The period, or time period, of a wave is the time it takes to complete a full wave. Symbol: T

Equation	Meanings of terms in equation
$T = \frac{1}{f}$	*T = time period (seconds, s)* *f = frequency (hertz, Hz)*
$v = f\lambda$ *	*v = wave speed (m/s)* *f = frequency (Hz)* *λ = wavelength (metres, m)*

The Wave Equation

The equation is directly above. You could measure the speed of sound in air, with a long distance between you and a friend. They make a loud noise (you start your clock when you see them do it) and you time how long it takes to get to you. Just use distance/time to calculate the speed.

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Electromagnetic Waves (EM Waves)

EM waves are always **transverse waves**. They transfer energy from the source of the waves to an **absorber** – object that absorbs the wave. EM waves occur all over the universe naturally, and we can produce them ourselves for all sorts of uses.

EM waves all travel at the **same velocity** through empty space (a vacuum) – at what we call the speed of light. However, the wavelength of EM waves varies from a few kilometres to wavelengths even smaller than an atom. The EM waves form a **continuous spectrum**, but for convenience we've grouped the infinite types of waves into seven groups of wavelengths, based on their properties. Learn the order of EM waves in the EM spectrum. Notice that a *longer* wavelength equates to a *lower* frequency and vice versa – this is clear from the wave equation.

Long wavelength → Short wavelength

Radio waves	Microwaves	Infrared	Visible light	Ultraviolet	X-rays	Gamma rays

Low frequency → High frequency

Visible light is the only kind of EM wave we can detect with our eyes (hence the name). Thus, we can only detect a limited range of EM waves without special equipment. However, it is easy to understand examples of how EM waves transfer energy. If you are standing in front of a fire, you feel the warmth thanks to infrared. Getting sunburn is due to the transfer of energy by ultraviolet waves from the Sun. Using Wi-Fi means a transfer of energy by microwaves.

Properties Of EM Waves

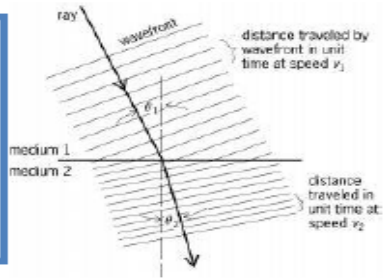
All EM waves can be **reflected**, **refracted**, **absorbed** or **transmitted** *depending* on the wavelength of the EM wave and the **medium** they are travelling through, or surface they are reaching.

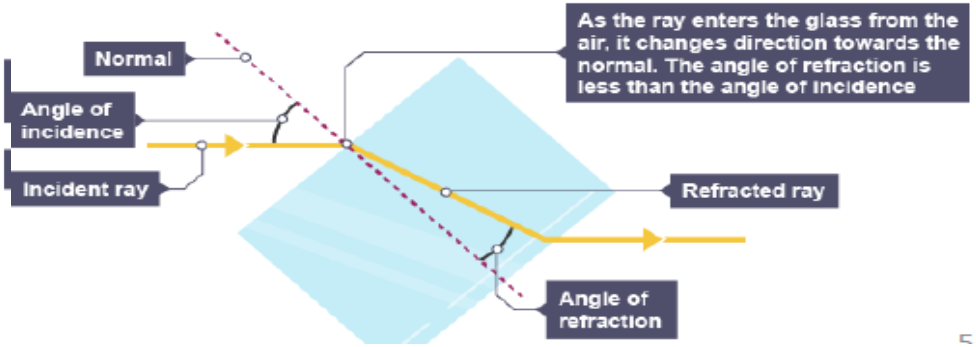
Refraction occurs when a wave changes the medium it is travelling through. Refraction is a change in direction of the wave, and it happens at the boundary, or junction, between the media – for instance, the surface of a sheet of glass would be the boundary between the glass and the air. You need to be able to draw diagrams to show refraction, like the example opposite. Notice that the light ray refracts *towards* the normal as it enters the glass (this is because it slows down), and refracts *away* from the normal as it leaves the glass (it speeds back up), ending up parallel to the original ray in air.

Key Terms	Definitions
reflection	Rebounding of a wave from a surface. The angle between the **incident** (in-going) wave and the **normal** is the same as the angle between the reflected wave and the normal.
refraction	Changing direction of a wave due to a change in the **medium** it is travelling through.
absorption	'Taking in' energy from a wave and transferring it to another form, usually heat. For instance, you warming up if you lie in the sunshine (revising science, of course).
transmission	A wave travelling through a material. Right now, visible light waves are being transmitted through the air to your eyes.
media	*Singular 'medium'*. The medium is the material through which a wave travels.
normal	A 'construction line' (made up line to help with diagram drawing) at right angles to a surface at the point where the wave hits the surface.

HT: More On Refraction

Refraction is due to differences in the velocity of the waves in different media. The diagram shown here represents the **wave fronts**. The wave slows down as it enters medium 2, but the near edge slows first. The other end is faster, as it is still in medium 1. This is what causes the 'bending' of the wave towards the normal.





Electromagnetic Waves (EM Waves): Producing Them

EM waves can be generated by changes in atoms or the nuclei of atoms. For instance, gamma rays are produced due to changes in the nucleus of an atom (nuclear decay – more on this in a later topic).

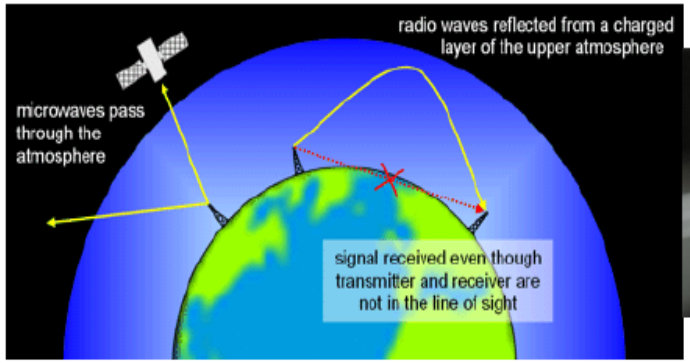
HT: radio waves can be produced by oscillations in electrical circuits. This is how a TV/radio broadcast is produced. It is received (e.g. by your TV aerial) by another electrical circuit; the radio waves create an alternating current with the same frequency as the radio wave itself. More on alternating current in the electricity topic – but it is enough to say for now that it involves oscillations.

Dangers Of EM Waves

Ultraviolet waves, X-rays and gamma rays are potentially dangerous types of EM waves, since they can have hazardous effects on human tissues. How severe the effects are depends on the type of radiation and the size of the **dose** received.

Doses of radiation are measured according to how great the risk of harm to the body is. The radiation dose, or danger due to **exposure** to radiation, is measured in **sieverts** (Sv).

A specific risk due to exposure to ultraviolet waves: they cause skin to prematurely age and increase the risk of skin cancer.
X-rays and gamma rays are **ionising** types of radiation. This means they can damage DNA, causing mutations and therefore increasing the risk of cancer.



Key Terms	Definitions
radiation dose	The risk of harm due to exposure to radiation.
exposure	Receiving and absorbing radiation (by the body).
sievert	The measure of radiation dose. As with the usual prefix: 1000 millisieverts (mSv) = 1 sievert (Sv)
ionising	Describes radiation that forms ions by 'knocking' electrons off atoms to make ions.
cancer	Type of disease caused by specific mutations to DNA, resulting in cells dividing out of control (making a tumour).

Applications Using EM Waves

It is not exaggerating to say that EM waves dominate our technology and our lives. Here are some examples to learn of the practical applications of EM waves:

- **Radio waves**: used for *television*, *radio* and Bluetooth. A signal carried by radio waves can get from a transmitting mast to a receiver by being reflected off a layer in the atmosphere.
- **Microwaves**: obviously, cooking food, but also communication with *satellites* and *mobile phones*; Wi-Fi internet. Unlike radio waves, microwaves can pass through the atmosphere (see diagram bottom left). In microwave ovens, the microwaves cause the water particles in the food to vibrate, heating it up.
- **Infrared**: electrical heaters, cooking food, infrared cameras. All objects emit infrared, but hotter objects emit more. An infrared camera detects infrared instead of visible light, so it can see hotter objects in the dark – night vision.
- **Visible light**: *fibre optic communication* (like the best broadband). Optical fibres reflect pulses of light all the way along their length. The pulses of light transmit the information.
- **Ultraviolet**: *sun tanning* beds… however, look at the dangers of UV in the other box.
- **X-rays**: both medical imaging for *diagnosis* (like broken bones) and medical *treatments*. X-rays can pass through soft tissue (like muscle), but not bone. That's why an X-ray image works to show up bones, and any breaks.
- **Gamma rays**: used in medical treatments such as radiotherapy.

Rate of Reaction

The rate of reaction is the speed at which a chemical reaction is happening. This can vary hugely from reaction to reaction.

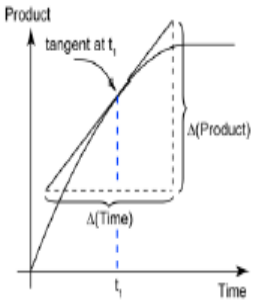
The rate of reaction can be calculated either by measuring the quantity of **reactant used or the quantity of product made in a certain length of time**. The quantity can either be a volume measured in cm^3, a mass measured in grams (g), or even a concentration (g/dm^3).

Key Terms	Definitions
rate of reaction	The rate at which reactants are being turned into products
reactant	What is used in a chemical reaction
product	What is made in a chemical reaction
catalyst	A substance which speeds up a chemical reaction without being used up
tangent	A straight line that touches a curve at a point

Higher Tier: Measuring Rate of Reaction at a point in time

The gradient of a volume or mass/time graph will give you the rate of reaction at a given point. However when the line is a curve you need to draw **a tangent** to measure the gradient. To draw a tangent follow the following steps

1. Line you ruler up across your graph, so that it touches the line on the point that you want to find out the gradient
2. Adjust the ruler until the space between the ruler and the curve is equal on both sides
3. Draw the line and pick two easy points that will allow you to calculate the gradient of the line.

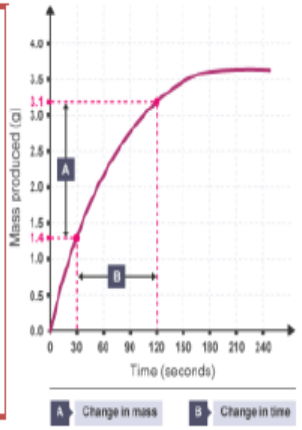


Equation	Meanings of terms in equation
Rate of Reaction= $\frac{Reactant\ used}{time}$	*Reactant used can either be measured in grams or cm^3*
Rate of Reaction= $\frac{Product\ Made}{time}$	*Reactant used can either be measured in grams or cm^3*

Higher Tier: Calculating the Mean Rate of Reaction

To calculate the mean rate of reaction between specific times from a graph you need to:

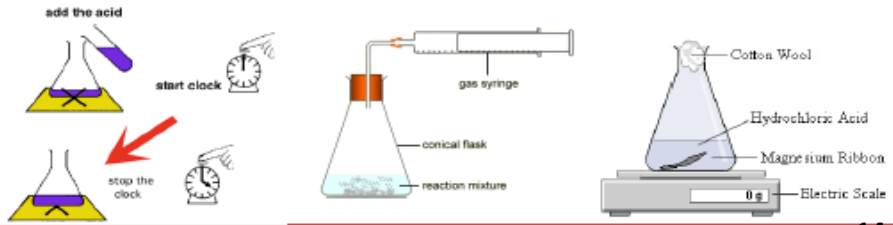
- choose the two times on the x-axis,
- use the line to complete the y part of the coordinate,
- Find the change in y and the change in x
- and then divide the change in y by the change in x



Measuring the Rate of Reaction

There are several experiments that can be used to measure the rate of a chemical reaction.

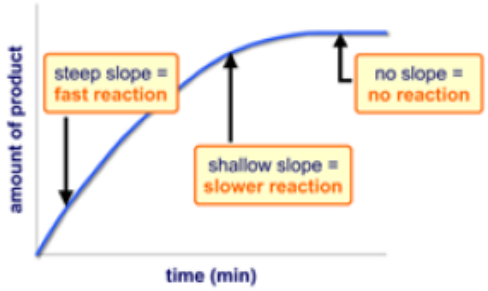
1. Measuring the mass lost in a chemical reaction (marble chips and acid is a good example)
2. Measuring the volume of gas produced (decomposition of hydrogen peroxide is a good example)
3. Time taken to make an X disappear (sodium thiosulphate and acid is a good example)

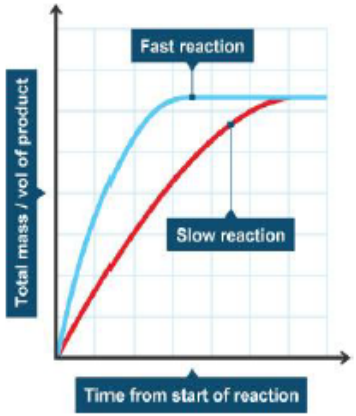


Interpreting Rate of Reaction Graphs

The results from rate of reaction experiments can be plotted on a line graph. For example how the mass changes against time or how much gas is made against time. Different lines can be plotted for different conditions, the **steeper the gradient, the faster the reaction.**

It is important to remember that the graphs flatten off (plateau) at the same point as the same amount of reactant is being used.





Key Terms	Definitions
activation energy	The minimum energy required for a chemical reaction to take place
collision theory	The theory that states for a chemical reaction to happen, particles must collide with sufficient energy
gradient	The measurement of how steep a line is on a graph
frequency	The amount of times something happens in one second
concentration	The number of particles in a given volume

Factors which affect Rate of Reaction

Being able to slow down and speed up chemical reactions is important in everyday life and in industry. We can change the rate of a reaction by:

· Changing temperature
· Changing pressure
· Changing the concentration of a solution
· Changing the surface area
· Adding a catalyst

Collision Theory

Collision Theory: reactions occur when particles of reactants **collide** with a certain amount of **energy**.

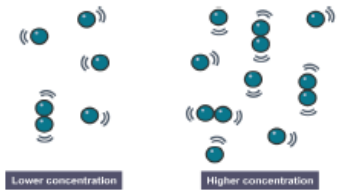
The minimum amount of energy needed for the particles to collide successfully and react is called the **activation energy**, which is different for each reaction.

The rate of a reaction depends on two things:

· the **frequency** of collisions between particles. The more often particles collide, the more likely they are to react.
· the **energy** with which particles collide. If particles collide with less energy than the activation energy, they will not react.

The effect of concentration is explained with collision theory

If the concentration of a solution is increased then there are more particles in a given volume, therefore collisions are **more frequent** and the chemical reaction is faster. Concentration **is directly proportional** to rate of reaction (if you double the concentration you double the rate).

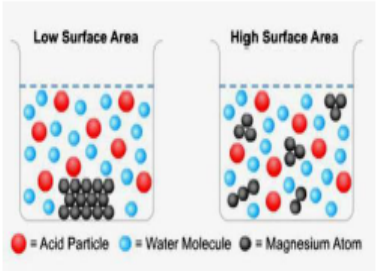


The effect of temperature is explained by collision theory

When you increase the temperature of something the particles will move around faster (greater kinetic energy). This increases the **frequency of the collisions.** As well as that, as the particles are moving faster the particles collide with more energy making it more likely that collisions exceed the **activation energy.**

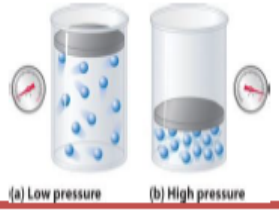
The effect of surface area is explained by collision theory

When you increase the surface area of a solid (you cannot increase the surface area of a liquid or gas). You increase the number of particles that are available for collision, therefore increasing the frequency of collisions therefore increase the rate of reaction.



The effect of pressure in gases is explained by collision theory

If the reaction is carried out in the gaseous state, then increasing the pressure will increase the rate of reaction. If there are more particles in a given volume of gas, then collisions will be more frequent and therefore the reaction will be faster.

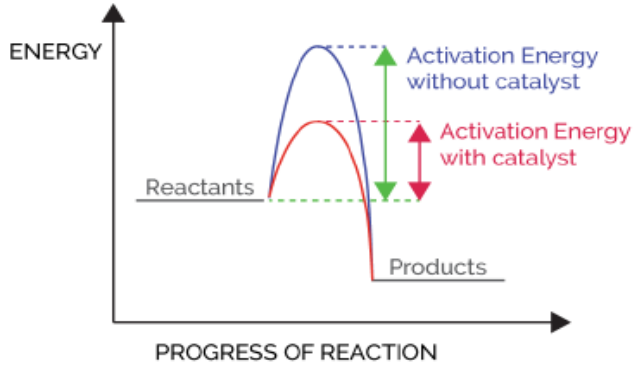


Key Terms	Definitions
enzymes	A biological catalyst
reaction profile	A graph which show the energies of the reactants and products at different stages of the chemical reaction

The effect of catalysts is explained by collision theory

A catalyst is a substance which speeds up a chemical reaction without being used up. It speeds up a reaction because it lowers the activation energy by providing an alternative pathway for the reaction and this means that there are more **successful collisions and a faster reaction.**

The effect of a catalyst is shown on the reaction profile below:



Catalysts are not included in a chemical equation as they are not used up in a chemical reaction.

Enzymes **are biological catalysts**, they speed up chemical reactions in biological systems for example in digestion in animals. Unlike non-biological catalysts, enzymes have an optimum temperature where they work best. This is usually around 37°C.

Experiment: Rates of Reaction and Concentration

Equipment List

- 40g/dm³ sodium thiosulfate solution.
- 2.0M dilute hydrochloric acid
- 10cm³ and 100cm³ measuring cylinders
- 100cm³ conical flask
- printed black paper cross
- stopclock

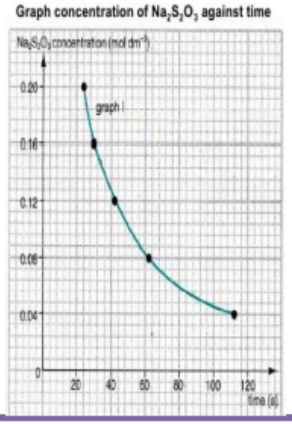
Method- When the reaction produces a precipitate

1. Use a measuring cylinder to place 10cm³ sodium thiosulfate solution into the conical flask. Again using a measuring cylinder, dilute this by adding 40cm³ water. This will make a solution of thiosulfate with a concentration of 8g/dm³. Put the conical flask on the black cross.
2. Put 10cm³ of dilute hydrochloric acid into the small measuring cylinder.
3. As you tip this acid into the flask, swirl it gently and at the same time start the stopclock.
4. Looking down through the top of the flask, stop the clock when you can no longer see the cross
5. Write the time taken **in seconds** in the first blank column of the table on the back of this sheet. You will need to multiply any minutes by 60 and then add the extra seconds.
6. Repeat **steps 1 - 4** four times, but **in step 1** use:
7. 20cm³ sodium thiosulfate + 30cm³ water (concentration 16g/dm³)
8. 30cm³ sodium thiosulfate + 20cm³ water (concentration 24g/dm³)
9. 40cm³ sodium thiosulfate + 10cm³ water (concentration 32g/dm³)
10. 50cm³ sodium thiosulfate + no water (concentration 40g/dm³)
11. Repeat the **whole investigation** (steps 1 – 5) twice more and record the results in the second and third blank columns of the table.

Expected Results

When plotting time taken for the cross to disappear against time. There should be an inversely proportional relationship between the two variables. As the concertation increases, the time taken for the cross to disappear decreases.

Using this method we cannot calculate rate Of reaction as we have only taken one time per concertation.

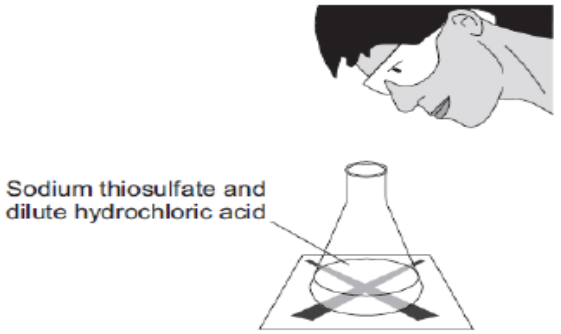


Key Terms	Definitions
Precipitate	When a solid is formed from the reaction of two solutions.

Variables

I.V- Concentration of sodium thiosulphate
D.V- Time taken for cross to disappear
C.V- Volume of sodium thiosulphate, volume of hydrochloric acid, person judging when the X has disappeared.

Diagram



Conclusions

As you increase the concertation the time taken for the cross disappear decreased. This is because there are more particles in a given volume. Therefore collisions are more frequent and the reaction is faster.

The equation for the reaction is:

HCl + sodium thiosulfate → sodium chloride + sulfur dioxide + sulfur + water.

$2HCl_{(aq)} + Na_2S_2O_{3(aq)} \rightarrow 2NaCl_{(aq)} + SO_{2(g)} + S_{(s)} + H_2O_{(l)}$

The reason it goes cloudy is because the solid sulphur forms as a precipitate.

Experiment: Rates of Reaction and Concentration

Equipment List

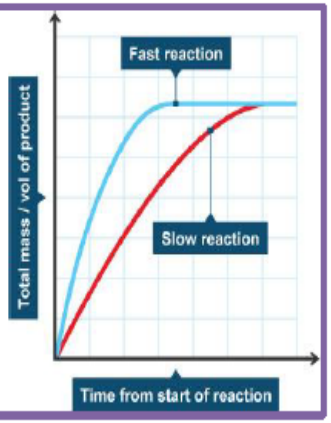
- 1.0M, 1.5M and 2.0M dilute hydrochloric acid
- 100 cm^3 measuring cylinders
- 250 cm^3 conical flask
- Stopclock
- Magnesium strips
- Ruler
- Scissors
- Gas Syringe or
- 250 cm^3 measuring cylinders
- Trough

Method- When producing a gas

1. Set up the apparatus as shown in the diagram. Note there are two possible ways of measuring the gas given off. Either using a gas syringe or using a filled, upturned measuring cylinder in a trough of water.
2. Measure 100 cm^3 of 1.0 M hydrochloric acid, using a measuring cylinder. Pour this into the conical flask.
3. Measure and cut a 3 cm strip magnesium. Place the magnesium in the conical flask with acid and immediately fit the bung.
4. Record the volume of gas every 10 seconds, until no more gas is given off.
5. Repeat this experiment with different concentrations of acid for example 1.5 M and 2M

Expected Results

The graph should look like those to the right.
The graph will start off with a steep gradient which will gradually reduce until it plateaus,
This is where the reaction has stopped.
The higher the concertation the steeper the gradient and the sooner it will plateau. The rate of reaction
Can be calculated by calculating the gradient
The mean rate can be calculated between 2 points.
It can also be calculated at a point using a tangent

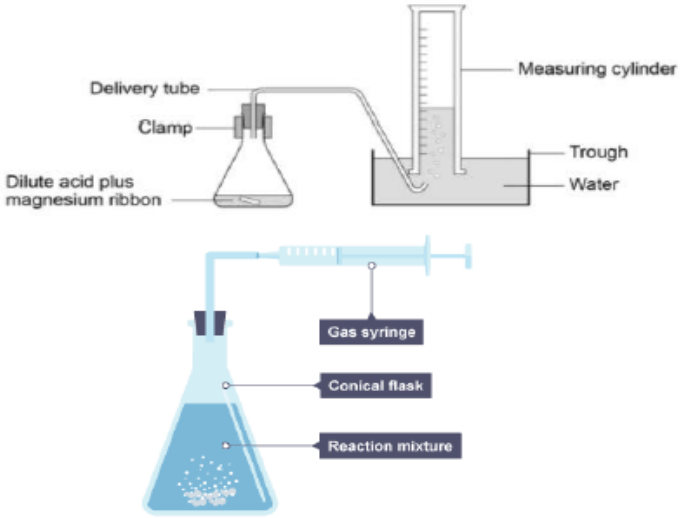


Key Terms	Definitions
Gas syringe	A piece of equipment that can be used to measure a volume of gas

Variables

I.V- Concentration of hydrochloric acid
D.V- Rate of reaction
C.V- Volume of acid, length of magnesium, temperature of acid,

Diagram



Conclusions

The higher the concentration the faster the rate of reaction. As there are more particles in a given volume, the frequency of collisions increases and therefore the rate of reaction increases.

The graph is steeper initially as there is a higher concentration of reactant particles as the reaction goes on, the amount of reactant particles decreases the collision become less frequent and therefore the rate of reaction decreases.

Anomalies can be caused in this experiment by gas being lost through some of apparatus.

Recap: Extraction of Metals

A metal ore is a compound found in rock, dug out of the ground, that contains enough metal that it is **economical** to extract it.

Other methods of extraction

The amount of some metals is running out, this means people are finding new ways to extract metals like copper.

Phytomining uses plants to absorb copper from the soil, the plants are then burnt and the copper extracted.

Bioleaching involves using bacteria to make a **leachate** that contains metal compounds. Scrap iron can also be used to **displace copper** from a solution.

Crude Oil

Crude oil is a mixture of chemicals called hydrocarbons. These are chemicals that contain **hydrogen and carbon only.** It made from **ancient biomass,** mainly plankton. Crude oil straight out of the ground is not much use, as there are too many substances in it, all with **different boiling points**.

Before we can use crude oil we have to separate it into its different substances. We do this by fractional distillation.

How does fractional distillation work?

· Crude oil is heated and vaporises/boils.
· Vapours rise up the column, gradually cooling and condensing.
· Hydrocarbons with different size molecules condense at different levels/temperatures
· The crude oil is separated into a series of fractions with similar numbers of carbon atoms and boiling points.

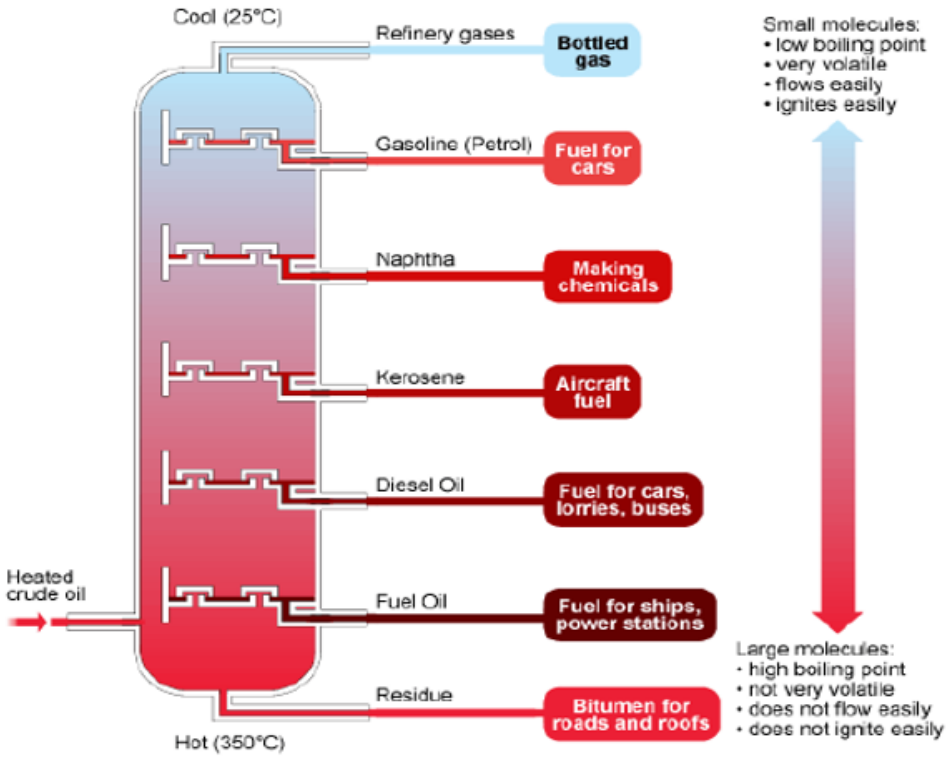
As the number of carbon atoms increases:

· Molecules become larger and heavier
· Boiling point increases
· Flammability decreases (catches fire less easily)
· Viscosity increases (liquid becomes thicker)

Key Terms	Definitions
hydrocarbon	A compound which contains only hydrogen and carbon (covalently bonded)
fractional distillation	The process where crude oil is separated into different compounds through evaporation
viscosity	The ability of a liquid to flow

Fractional Distillation Column

Below is a diagram of a fractionating column; you need to know the pattern in properties on the right, the uses but not the names of each fraction:

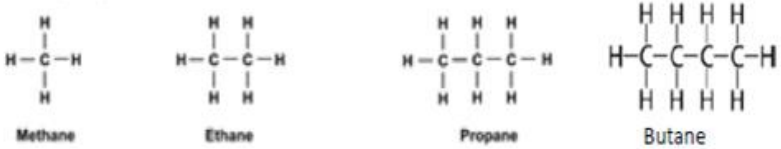


Alkanes

Crude oil is largely made up of a family of **hydrocarbons** called alkanes; these contain only a single (covalent) carbon to carbon bond.
You can either represent alkanes with a **molecular formula**, e.g.:

CH_4	C_2H_6	C_3H_8	C_4H_{10}
Methane	Ethane	Propane	Butane

Or a **displayed formula**:



[H = Hydrogen, C = Carbon, - indicates a chemical bond between atoms]

Cracking

Smaller hydrocarbons make better fuels as they are easier to ignite. However, crude oil contains a lot of longer chain hydrocarbons. To break a longer chain hydrocarbon down into a smaller one we use a process known as **cracking.**

Cracking

So large/long alkanes get CRACKED, which means they get broken in two.
· They are **heated**, turned into a vapour and passed over a hot catalyst
· Cracking produces two molecules:
1. One shorter (useful as a fuel) alkane
2. One alkene (used to make polymers).

Summary

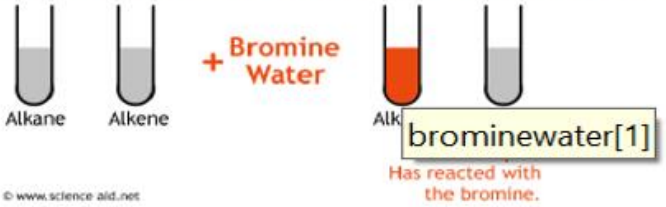
Long Chain Alkane → Short Chain Alkane + Alkene

$C_{10}H_{22}$ → C_8H_{18} + C_2H_4

Key Terms	Definitions
alkane	A hydrocarbon that contains only carbon to carbon single bonds
cracking	A process where longer chain hydrocarbons are broken down into smaller more useful ones.
alkene	A hydrocarbon that contains at least one carbon to carbon double bond.

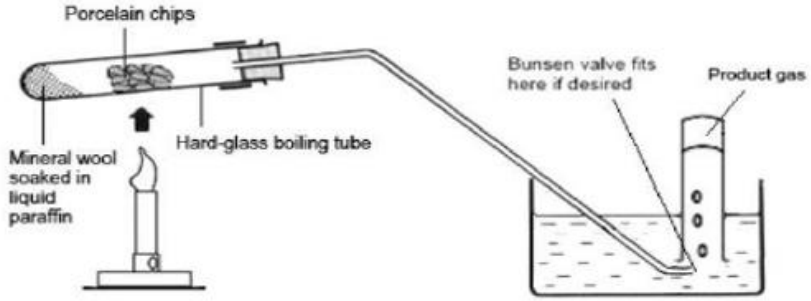
Alkenes

These hydrocarbons have at least one double bonds between the carbon atom. The general formula for alkenes is C_nH_{2n}
Alkenes are **more reactive** than alkanes. They react with bromine water and make it go from orange to colourless.
Alkanes do not have a double bond so the bromine water stays orange.



Cracking

Experimental set up for cracking in the lab:



1	Biosphere	The living layer of Earth and between the lithosphere and the atmosphere
2	Biomes	A large scale ecosystem such as tropical rainforests
3	Latitudes	How far north or south a location is from the equator.
4	Tropical Rainforest	Located in the tropics close to the equator. Receives 2000mm of precipitation a year and an average temperature of 28°C.
5	Hot desert	Located along the Tropic of Cancer and Capricorn at 30° N and S of the equator. Receives less than 250mm precipitation a year. They are diurnal, meaning it is very hot in the day 40°C and 0°C in the night.
6	Precipitation	Anything wet falling from the sky ie. Rain or snow.
7	Biotic	Living part of the biome (flora and fauna)
8	Abiotic	Non-living part of the biome and includes the atmosphere, rock and soil.
9	Altitutudinal Zonation	The change in ecosystems a different altitudes caused by alterations in temperature, precipitation and nutrient levels.
10	Biodiversity	The number of different plants and animals in one area.
11	Hydrological cycle	The water cycle.
12	Nutrient cycle	Nutrients move between the biomass, litter and soil.
13	Taiga	The world's biggest forest- Coniferous forest in extreme North – between 50 and 60°N.
14	Biomass	Sum of all living parts of an area.
15	Goods	Items that can be picked up, touched, seen and sold such as timber.
16	Ecosystem	A localized biome made up of living things and their non-living environment.
17	Net Primary Productivity (NPP)	A measure of how much new plant and animal growth is added to biome each year.
18	Carbon Sink	Natural stores for carbon containing chemical compounds, like carbon dioxide or methane.
19	Carbon Sequestration	Removing carbon dioxide from the atmosphere and locking it up in biotic material.
20	Photosynthesis.	The process by which green plants and some other organisms use sunlight to synthesize nutrients from carbon dioxide and water.
21	Pessimistic View of population growth.	Population will eventually grow so large that the plant will run out of food, water, energy and other resources.
22	Optimistic view of population growth.	As population grows, humans invent new technologies to allow more food to be grown and more resources to be supplied.
23	Positive Checks	Malthus believed that war, starvation and famine would reduce population growth and secure supplies of resources.
24	Preventative Checks.	Malthus believed that people marrying later and having less children would also secure resources.
25	Indigenous Populations.	The original people of a region.
23	Ranching	Rearing cattle.
24	Timber	Deforested trees that will be used for furniture. Paper etc.
25	Ecosystem services	A collective term for all the ways human benefit from ecosystems.

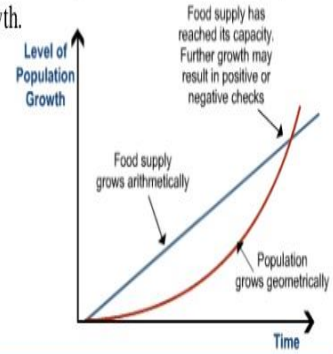
Biomes= A life-support system	
Provisioning services (goods) *Products obtained from the ecosystem*	**Supporting Services** *These keep the ecosystem healthy so it can provide the other services*
Food, nuts, berries, fish, game, crops. Fuelwood. Timber for building and other uses. Genetic and chemical material.	Nutrient cycle Photosynthesis and food webs. Soil
Regulating Services *These services link to other physical systems and keep areas and the whole planet healthy*.	**Cultural Services** *These are the benefits people get from visiting or living in a healthy ecosystem.*
Storing carbon and emitting oxygen, which keep the atmosphere in balance. Purifying water and regulating the flow of water within the hydrological cycle.	Recreation and tourism Education and tourism Education and science Spiritual well being and happiness

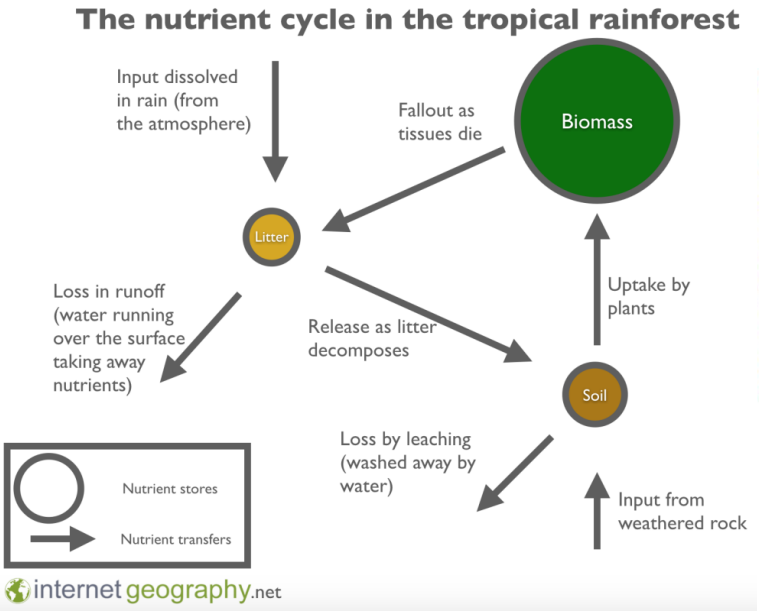
The Malthusian theory

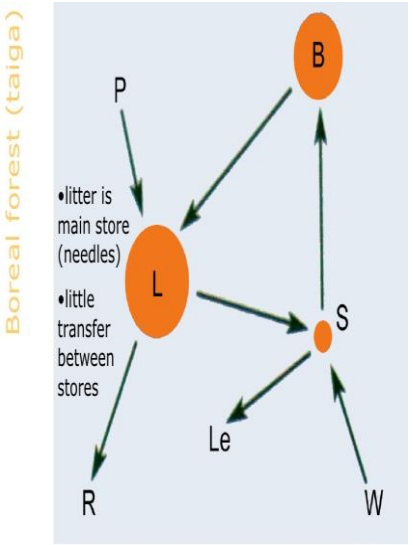
- In his 1798 work, An Essay on "the Principle of Population", Malthus examined the relationship between population growth and resources and developed the Malthusian theory of population growth.

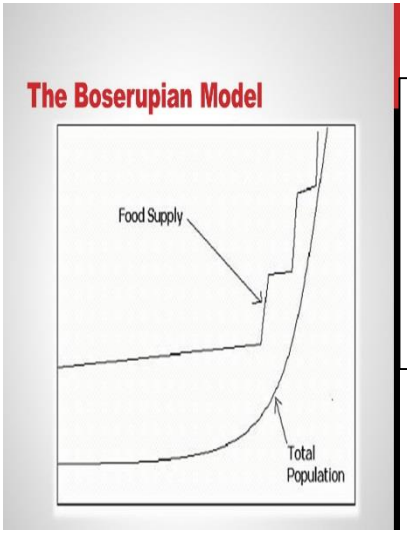
Observation:

- While resources tended to grow arithmetically, populations exhibit exponential growth.









Boserup- An optimistic approach

"Necessity is the mother of invention"- 1965

Challenges to Elizabeth at Home and Abroad 1569-88	
1	Elizabeth faced many serious threats both within England and from aboard. Many still wanted Mary Queen of Scots on the throne. Philip II of Spain also wanted to remove Elizabeth from the throne. Spain and England were religious and political rivals. There was particular tension when Drake tried to challenge Spanish dominance in the New World.
Key events	
2	**1492** Discovery of the New World
3	**1567** Spanish travel to Netherlands to crush Protestant revolt.
4	**1568** Mary Queen of Scots arrives in England
5	**1569** Revolt of the Northern Earls
6	**1570** Elizabeth excommunicated
7	**1571** The Ridolfi Plot
8	**1572** Elizabeth hired Drake as a privateer
9	**1576** Spanish Fury and Pacification of Ghent
10	**1577-80** Drake circumnavigated the globe.
11	**1583** Throckmorton Plot
12	**1584** Treaty of Joinville
13	**1585** Act of Preservation of the Queen's Safety/Treaty of Nonsuch
14	**1586** Babington Plot
15	**1587** Mary Queen of Scots executed
16	**1587** Attack on Cadiz
17	**1588 Spanish Armada**

Key Words		
21	**New World**	North and South America.
22	**Revolt of the Northern Earls**	When northern earls encouraged Catholics to rebel.
23	**Ann Percy**	Wife of Thomas Percy.
24	**Jane Neville**	Wife of James Neville and Duke of Norfolk's sister.
25	**Mary Queen of Scots**	Supported the plan to marry the Duke of Norfolk.
26	**Thomas Howard, Duke of Norfolk**	One of England's most senior nobles and a Protestant.
27	**Charles Neville, Earl of Westmorland**	Duke of Norfolk's brother in law and from an important Catholic family.
28	**Thomas Percy, Earl of Northumberland**	Had been important under previous monarchs, but as a Catholic he had been side-lined.
29	**James Pilkington**	Appointed Archbishop of Durham.
30	**Civil War**	A war between people in the same country.
31	**Conspiracy**	A secret plan with the aim of doing something illegal.
32	**Papal Bull**	A written order by the Pope.
33	**Council of the North**	Used to implement Elizabeth's laws and authority in the North of England.
34	**Ridolfi Plot**	Plan to murder Elizabeth, launch a Spanish attack and put Mary Queen of Scots on the throne.
35	**Priest holes**	Secret hiding places for Catholic priests.
36	**Hanged, drawn and quartered**	A type of punishment used when the accused was found guilty of high treason. The accused would be hanged until near dead, cut open, have their intestines removed and were finally chopped into four pieces.
37	**Throckmorton Plot**	Plan for the French Duke of Guise to invade England, free Mary , overthrow Elizabeth and restore Catholicism in England.
38	**Sir Francis Walsingham**	Elizabeth's Secretary of State.
39	**Babington Plot**	The Duke of Guise would invade England and put Mary on the throne.
40	**Act of Preservation of the Queen's Safety**	In the event of Elizabeth's assassination, Mary would be banned from the succession.
41	**Agent provocateurs**	Agents who become part of groups suspected of wrongdoing and encourage other members to break the law so that potential threats can be identified and arrested.
42	**Foreign Policy**	The aims or objectives that guide a nation's relations with other states.
43	**Privateer**	Individuals with their own armed ships that capture other ships for their cargo, often with the support and authorisation of the government.
44	**Francis Drake**	Elizabeth hired him as a privateer.
45	**Circumnavigate**	To travel all the way around the world.
46	**Autonomy**	The right to self government, so people of one country can manage its own affairs.
47	**Spanish Fury**	The Spanish rampaged through Dutch provinces as they left.
48	**Pacification of Ghent**	Spanish troops expelled from Netherlands, political autonomy to be returned and end of religious persecution.
49	**Mercenary**	A soldier who fights for money rather than a nation or a cause.
50	**Treaty of Joinville**	The King of France and the King of Spain became allies against Protestantism.
51	**Treaty of Nonsuch**	Effectively put England and Spain at war.
52	**Singeing of the King of Spain's beard**	Drake sailed into Cadiz harbour, Spain's most important Atlantic port, and over 3 days destroyed 30 ships.
53	**Tilbury Speech**	Elizabeth's famous speech to her troops before the Armada.

Elizabethan Society in the Age of Exploration 1558-88	
1	Elizabeth's I's reign was a time of expansion with growth in many different areas of society and life.
Key events	
2	**1563** Statute of Artificers
3	**1570** Norwich Survey
4	**1572** Vagabonds Act
5	**1576** Poor Relief Act
6	**1580** Drake returns from circumnavigating the globe with spices, treasure and tales of Nova Albion.
7	**1584** Raleigh begins planning new colonisation attempt by sending a fact finding mission to Virginia.
8	**1585** Colonists set sail for North America and begin the English colonisation of Virginia.
9	**1586** Surviving colonists abandon Virginia and return to England
10	**1587** New group of colonists arrive in Virginia and establish colony at Roanoke
11	**1590** English sailors arrive at Roanoke only to find it abandoned
Key Concepts	
12	**Education –** Expanded during Elizabeth's reign but it was expensive and mostly for boys. The large majority of people were illiterate.
13	**Pastimes –** Theatre thrived. Elizabethan leisure was similar to modern day but sport was much more violent.
14	**Population Growth –** During the reign of Elizabeth, population grew by as much as 35%. Food prices rose, wages fell and enclosure brought problems. The urban poor grew and poverty was a real problem.
15	**Exploration** by Drake led to conflict with Spain over the New World.
16	**Attitudes** – Unemployment was recognised as a genuine issue.
17	**Poverty** was an issue that Elizabeth wanted to address.

Key Words		
18	**Social mobility**	Being able to change your position in society.
19	**Humanists**	Believed that learning was important in its own right and not for just practical reasons.
20	**Grammar schools**	Private schools set up for boys considered bright who largely came from well off families in towns.
22	**Apprentice**	Someone learning a trade or a skill.
23	**Petty schools**	Set up in a teacher's home. For boys.
24	**Dame schools**	Set up in a teacher's home. For girls.
25	**Pastimes**	Activities for leisure.
26	**Mystery plays**	Plays base on the Bible and saints' stories.
27	**Globe**	Shakespeare's theatre.
28	**Alms**	Charity
29	**Poor relief**	Financial help.
30	**Itinerants**	People who had moved from their home parishes looking for work.
31	**Enclosure**	The process of replacing large, open fields that were farmed by villages with individual fields belonging to one person.
32	**Rural depopulation**	When the population of the countryside falls as people move away in search of a better life.
33	**Subsistence farming**	Growing just enough to feed the family but not to sell.
34	**Vagabonds**	Homeless people without jobs who roamed the countryside begging for money or perhaps committing crimes in order to survive.
35	**Economic recession**	When a fall in demand leads to falling prices and businesses losing money.
36	**Deserving poor**	People unable to work because of illness or old age.
37	**Idle poor**	People who were fit to work but didn't.
38	**Triangular trade**	Route from Europe to Africa to the Americas.
39	**Quadrant/ Astrolobe**	Used by sailors to help with navigation at sea.
40	**Cartographer**	Map maker.
41	**Galleons**	Ships that were much larger than traditional trading ships.
42	**Colonies**	Land under the control or influence of another country.
43	**Monopoly**	When one person or company controls the supply of something.
44	**Nova Albion**	Region named by Drake, probably north of modern day San Francisco.
45	**Walter Raleigh**	Explorer who encouraged colonists to Virginia.
46	**Barter**	To exchange goods for other goods.
47	**Manteo and Wanchese**	Two native American Indians who came back to England.
48	**Native Americans**	People who lived in the New World before the colonists.

The Weimar Republic	
1	This was the name given to Germany after the Kaiser had abdicated in November 1918. This was a time of despair and hope for Germany. At first, the country faced lots of chaos but under Gustav Stresemann, there was some stability.
Key events	
2	**1918** World War One ended. The Kaiser abdicated and Germany became a country without a monarch (a Republic).
3	**1919 January** Spartacist Uprising
4	**1919 June** Signing of the Treaty of Versailles
5	**1919 August** Weimar Constitution finalised
6	**1920** Kapp Putsch
7	**1923** French occupation of the Ruhr and hyperinflation
8	**1924** Dawes Plan
9	**1925** Locarno Pact
10	**1926** Germany joins League of Nations
11	**1928** Kellogg Briand Pact
12	**1929** Young Plan
Key Concepts	
13	**The Weimar Republic** faced much opposition. It was disliked by the left wing who wanted Germany to be like Communist Russia and it was disliked by the right wing who wanted the monarchy back.
14	**The Treaty of Versailles** caused many problems for Germany. The German people disliked the politicians for signing it and it caused political problems and economic problems.
15	**Gustav Stresemann** helped to bring about recovery in Germany after 1924. He solved economic problems by making friends with other countries. However, historians have very different views about the extent of this recovery**.**
16	**The Golden Age** was the period from 1924-29 and it saw significant changes in culture, the standard of living and the position of women.

Key Words		
17	**Abdication**	When a monarch leaves the throne
18	**Republic**	A country without a King or a Queen
19	**Ebert**	The first President of the Republic
20	**Stresemann**	The Chancellor of Germany from the Summer of 1923
21	**Article 48**	The President could use this to ignore the Reichstag and rule as he saw fit
22	**Kaiser**	King
23	**Armistice**	An agreement to end war
24	**Weimar**	The new government could not meet in Berlin as it was so dangerous, so they met here instead
25	**Constitution**	This is an agreement about how the country would be ruled
26	**Reichstag**	German parliament
27	**Gewaltfrieden**	An enforced peace
28	**Freikorps**	Ex military soldiers who wanted to overthrow the Republic
29	**Rentenmark**	The currency of Germany after November 1923
30	**Hyperinflation**	When money loses its value
31	**Dawes Plan**	An agreement where the USA would lend Germany money
32	**Young Plan**	This lowered the reparations payment and gave Germany longer to pay
33	**Treaty of Versailles**	This decided how Germany was going to be treated after WW1
34	**Locarno Pact**	An agreement on borders signed by Britain, France, Italy and Belgium
35	**Kellogg Briand Pact**	65 counties including Germany agreed to resolve conflict peacefully
36	**Coalition**	A government of two or more political parties

Key Ideas		
Religious Views on Sexuality 	**Sexual Orientation** - The Roman Catholic church teaches that sex between people of the same gender is 'disordered' - They argue that **homosexual** relationships are banned by the Bible - Liberal Christians teach that Jesus wanted people to love each other and show **mercy** and that we should be accepting of homosexuals - **Gay marriage** is banned in the Catholic Church and Church of England *"Do not have sexual relations with a man as one does with a woman"* – Leviticus 18:22	**Adultery and Sex Outside Marriage** - Roman Catholics argue that all **sex before marriage** and after a divorce is unacceptable. Sex should only take place inside a marriage which is a lifelong, loving relationship. - **Adultery** means the act of having sex with someone who is not your husband or wife. - It is prohibited by the Bible and Christians argue it is wrong as it undermines marriage involves lies and secrecy. *"You shall not commit adultery"* - Exodus 20:14
Artificial Contraception 	- **Artificial contraception** means using something to stop yourself from getting pregnant. This could be a condom, the pill or a device like the coil. - **Family planning** means using the natural cycle of fertility which women go through to predict when a woman would be least fertile. It is much less effective than artificial contraception. - God tells Adam and Eve (the first couple) to *"be fruitful and multiply"* (Genesis 1:2) which encourages them to have children. ☒ The ***Catholic Church*** argues that all sexual acts inside marriage must be open to **procreation** (having babies) and that a baby is a gift from God. They may use family planning as it is a natural method. ☑ The ***Church of England*** argues that contraception should be allowed so that couples can take time and consider if they want to have children.	
Marriage and Divorce 	- **Marriage** is a religious and legal ceremony in which two people make **vows** (promises) in front of their friends and family and (if in a church) in front of God - During the ceremony you agree to be **together for life** saying *"til death do us part"* (Marriage Ceremony) - **Divorce** is the legal break-up of a marriage. It is **legal** in the UK and many marriages currently end in divorce. - Many Christians do not like it as it is seen to **break the promises** made in a marriage. ☒ The ***Catholic Church*** do not support divorce. They believe that sex after divorce is a form of adultery and you cannot get remarried in a Catholic Church once you have been divorced. Jesus says *"if a man divorces his wife [...] he involves her in adultery"* (Matthew 5:32) ☑ The ***Church of England*** accepts divorce, especially if it is for reasons of abuse but you have to receive special permission to get remarried in a church. They might see it as a merciful option.	
Family 	**Types of Family** - **Nuclear Family** is a family with a mother, father and children – some Christians argue this is the ideal - **Extended Family** is a family where grandparents and other relatives are involved - **Single Parent Family** this is a family where one parent brings up the child	**Purpose of the Family** - **Procreation** – the family should be for the purpose of having and bringing up children - **Stability** – the family should be for providing a secure, stable environment for children - **Faith** – the family should be a way of bringing children up as good Christians
Gender 	- **Gender equality** means that men and women should be equal and given the same rights and opportunities as each other -In the UK women can face gender **prejudice and discrimination** where they are not treated equality - The **Catholic Church** argues that women have a special role as mothers and they do not allow women to be priests - The **Church of England** has allowed women priests since 1994	

Key Words	
Adultery	Having sex with someone who is not your husband or wife, outside of marriage
Artificial Contraception	Methods of preventing pregnancy e.g. condoms, the pill, the coil
Cohabitation	Living and starting a family with someone who you are not married to
Divorce	The legal ending of a marriage
Family Planning	Using a woman's natural cycle of fertility to try and avoid pregnancy
Gender Discrimination	Acting against people based on their gender
Gender Prejudice	Holding biased opinions about people based on their gender
Heterosexual	Sexual attraction to the opposite gender
Homosexual	Sexual attraction to the same gender
Marriage	A legal and religious ceremony joining two people together in love
Procreation	Bringing babies into the world
Remarriage	Marrying someone else after divorce

Key Ideas

Ideas about Creation

Christian Ideas

- Christians believe the universe was designed and made by God
- The creation story in **Genesis 1** says that God made the world in six days
- **Literalist Christians** believe this is true and that God created Adam + Eve from whom all humans come
- **Liberal Christians** say the creation story in the Bible is just a story and may agree with scientific ideas about creation

"In the beginning God created the heavens and the earth" – Genesis 1:1

Scientific Ideas

- The **Big Bang Theory** argues that the universe started as a dense collection of mass which massively expanded creating stars, galaxies and planets
- The **Theory of Evolution** comes from Charles Darwin who observed that animals change over time and argued that humans were not designed by God but evolved from apes
- These theories do not fit with a **literalist Christian's** view but could fit with a **liberal** view

Stewardship + Dominion

Stewardship

- **Stewardship** means Christians have a **duty** to look after the environment on behalf of God and for future generations
- This can be seen where Christians campaign for environmental charities or choose to reduce waste and recycle

"Rule over [..] every living creature" - Genesis 1:28

Dominion

- **Dominion** is the idea that God gave humans power and authority over the world
- Some Christians believes this allows them to use **natural resources** (e.g. oil and coal) and animals to make their lives better
- In **Genesis** God gives Adam and Eve the power to name the animals and rule over them

Abortion

- **Abortion** is the removal of a foetus from the womb in order to end a pregnancy.
- In the UK (except Northern Ireland) it is **legal** during the first 24 weeks of pregnancy unless the mother's life is in danger or the foetus is severely deformed.

☒ The ***Catholic Church*** is strongly against abortion. They believe in **sanctity of life**, the idea that life is a sacred gift from God which only God can take away. They see the foetus as a living thing.

☑ The ***Church of England*** think abortion is sometimes acceptable as a pregnancy as a result of rape or where the child would be very ill would lead to a very poor **quality of life**

Euthanasia

- **Euthanasia** is the painless killing of a patient with a terminal illness.
- **Voluntary** euthanasia is where the patient asks for their life to be ended.
- **Non-voluntary** euthanasia is where the patient is not capable of asking to die, perhaps in a coma.
- All forms of euthanasia are currently **illegal** in the UK.

☒ The ***Catholic Church*** is strongly against euthanasia. They believe that only God can give and take life and that life is sacred (**sanctity of life**)

☑ Some ***liberal Christians*** think euthanasia can be an act of mercy which Jesus tells them is a good thing to do, this is especially the case when someone's **quality of life** is very poor.

The Afterlife

- Christians believe that when you die you will be judged and that those who are found to be good will go to **heaven** but those who have sinned and gone against God's wishes will go to **hell**.

Roman Catholics believe that there is a middle stage called **purgatory** where souls go to be purified of sin before they go to heaven

Some Christians believe that Jesus will return on a future **Day of Judgement** when all souls will be judged

Key Words

Abortion	The ending of a pregnancy
Big Bang Theory	Scientific theory of the creation of the universe through a large explosion
Dominion	The power humans have over God's creation
Euthanasia	The painless killing of a terminally ill patient
Evolution	Scientific theory of the development of humans from apes
Heaven	Paradise where those judged good go after death to be forever with God
Hell	Damnation where those judged bad go after death to be forever without God
Judgement	After death Christians believe you are judged by God
Liberal	A type of Christian who reads the Bible as stories, myths and metaphors
Literalist	A type of Christian who believes the Bible is literally true + the word of God
Natural Resources	Materials found in nature (e.g. coal, oil) which are exploited by humans
Purgatory	Where Catholics believe souls are purified after death + before heaven
Quality of Life	How easy or difficult someone's life is – e.g. cancer causes a low quality of life
Sanctity of Life	The belief that all life is sacred as man is made in God's image
Stewardship	The responsibility God gave humans to look after the world
Vegetarian	The choice not to eat animals

Semaine 1

Les matières	School subjects		
le commerce	*business studies*	l'anglais	*English*
le dessin/les arts plastiques	*art/fine art*	l'art dramatique	*drama*
le français	*French*	l'économie	*economics*
le latin	*Latin*	l'éducation physique et sportive/l'EPS	*PE*
la biologie/les Sciences de la Vie et de la Terre	*biology*	l'espagnol	*Spanish*
		l'étude des médias	*media studies*
la chimie	*chemistry*	l'histoire	*history*
la géographie	*geography*	l'histoire-géo	*history and geography (studied together in France)*
la musique	*music*		
la physique/les sciences physiques	*physics*	l'informatique	*ICT*
la religion	*religious studies*	l'instruction civique	*citizenship*
la sociologie	*sociology*	l'italien	*Italian*
la technologie	*design and technology*	les arts ménagers	*home technology*
l'allemand	*German*	les maths	*maths*

Semaine 2

Mon collège	My school		
Mercredi, à 11h15, j'ai histoire-géo.	*I have history and geography at 11.15 a.m. on Wednesday.*	Je trouve …	*I find …*
		Je pense que … est/sont …	*I think that … is …*
J'ai (deux) heures de (musique) par semaine.	*I have (two) hours of (music) per week.*	intéressant(e)(s)	*interesting*
		passionnant(e)(s)	*exciting*
Il n'y a pas de cours de … dans mon emploi du temps.	*There are no … lessons in my timetable.*	ennuyeux/-euse(s)	*boring*
		… parce que …	*… because …*
J'apprends (deux) langues vivantes.	*I learn (two) foreign languages.*	c'est facile/fascinant/ difficile/utile/inutile	*it's easy/fascinating/ difficult/useful/useless*
Mes cours finissent à (16h00) tous les jours.	*My lessons finish at (4.00 p.m.) every day.*	Je suis fort(e)/faible/doué(e) en …	*I am strong/weak/gifted in …*
Je n'ai pas cours (le mercredi après-midi).	*I don't have lessons (on Wednesday afternoon).*	Le/La prof est bon(ne)/sympa/marrant(e)/ sévère/gentil(le)/impatient(e).	*The teacher is good/nice/funny/ strict/kind/impatient.*
Ma matière préférée est …	*My favourite subject is …*	On a trop de devoirs.	*We have too much homework.*
J'adore/j'aime/je n'aime pas/je déteste …	*I love/like/don't like/hate …*		

Semaine 3

Mon bahut	My school		
Comment s'appelle ton collège?	*What's your school called?*	Le mercredi après-midi, il n'y a pas cours.	*There are no lessons on Wednesday afternoon.*
Mon collège s'appelle …	*My school is called …*		
C'est quelle sorte d'école?	*What sort of school is it?*	Quelles matières étudies-tu?	*What subjects do you study?*
C'est un collège mixte pour les élèves de onze à seize ans.	*It's a mixed school for pupils from 11 to 16.*	J'étudie douze matières dont …	*I study 12 subjects, including …*
		Toutes mes matières sont obligatoires.	*All my subjects are compulsory.*
Il y a combien d'élèves?	*How many pupils are there?*	Quelle est ta matière préférée?	*What is your favourite subject?*
Il y a 750 élèves et quarante-cinq professeurs.	*There are 750 pupils and 45 teachers.*	Ma matière préférée, c'est (les arts ménagers) car …	*My favourite subject is (home technology) because …*
Quels sont les horaires du collège?	*What are the school hours?*	J'adore (cuisiner) car …	*I love (cooking) because …*
Les cours commencent à 8h30.	*Lessons start at 8.30 a.m.*	je suis doué(e) pour ça	*I'm talented at that*
La récré est à 10h15 et dure quinze minutes.	*Break is at 10.15 a.m. and lasts 15 minutes.*	Comment sont les professeurs?	*What are your teachers like?*
		Les profs sont sympa/sévères.	*The teachers are nice/strict.*
On a une heure et demie pour le déjeuner.	*We have an hour and a half for lunch.*	Qu'est-ce que tu penses de ton collège?	*What do you think of your school?*
Les cours finissent à 16 heures.	*Lessons finish at 4.00 p.m.*	Je trouve que/qu' …	*I find that …*
Il y a combien de cours par jour?	*How many lessons are there per day?*	les journées sont trop longues	*the days are too long*
Il y a sept cours de cinquante-cinq minutes par jour.	*There are seven lessons of 55 minutes per day.*	on a trop de contrôles	*we have too many tests*
		les profs sont excellents	*the teachers are excellent*

Semaine 4

'école chez nous, l'école hez vous	School here and with you		
n Angleterre/Écosse/Irlande du Nord, …	*In England/Scotland/ Northern Ireland …*	l'école commence …	*school starts …*
		ils portent …	*they wear …*
u pays de Galles, …	*In Wales …*	ils achètent …	*they buy …*
on va à l'école de … ans à … ans	*we go to school from … to … years old*	ils (ne) redoublent (pas)	*they (don't) repeat the year*
		ils étudient …	*they study …*
l'école commence à … heures et finit à … heures	*school starts at … and finishes at …*	Je préfère le système (anglais/français) parce que …	*I prefer the (English/French) system because …*
on porte un uniforme scolaire/ ses propres vêtements	*we wear a school uniform/our own clothes*	les horaires sont plus raisonnables	*the hours are more sensible*
		l'uniforme scolaire est pratique/inutile	*school uniform is practical/useless*
on achète ses propres stylos et règles	*we buy our own pens and rulers*	l'école fournit l'équipement	*the school provides the equipment*
on ne redouble pas	*we don't repeat the year*	le redoublement (n')est (pas) une bonne idée	*repeating the year is (not) a good idea*
on étudie …	*we study …*		
lais en France/au Canada/au Mali, … ils vont …	*But in France/Canada/Mali … they go …*	on (n')étudie (pas) …	*we/they (don't) study …*

Semaine 5

Le règlement scolaire	School rules		
Dans cette école, il faut …	*In this school, you must …*	ridicule/frustrant	*ridiculous/frustrating*
être à l'heure	*be on time*	… parce que/car …	*… because …*
faire ses devoirs	*do your homework*	c'est/ce n'est pas dangereux	*it's (not) dangerous*
porter l'uniforme scolaire	*wear a school uniform*	il faut protéger les jeunes	*you must protect young people*
Il ne faut pas …	*You must not …*	on n'est pas des bébés	*we're not babies*
manquer les cours	*miss lessons*	il faut respecter les autres	*you must respect others*
tricher pendant un contrôle	*cheat in a test*	la mode n'a pas de place à l'école	*fashion has no place at school*
Il est interdit de/d' …	*It is forbidden to …*	c'est/ce n'est pas important	*it's (not) important*
mâcher du chewing-gum	*chew gum*	l'école, c'est pour apprendre	*school is for learning*
utiliser son portable en classe	*use your mobile in class*	J'ai eu une heure de retenue/de colle.	*I had an hour of detention.*
porter des bijoux/des piercings/ trop de maquillage	*wear jewellery/piercings/too much make-up*	J'ai dû copier des lignes.	*I had to write lines.*
harceler d'autres élèves	*bully other pupils*	Quelle perte de temps!	*What a waste of time!*
sortir de l'école pendant l'heure du déjeuner	*leave school during the lunch hour*	Je pense que tu as raison.	*I think you're right.*
Je trouve ça …	*I find that …*	Ah non, tu as tort.	*Oh no, you're wrong.*
raisonnable/logique	*reasonable, sensible/logical*	Moi aussi, je trouve que …	*Me too, I find that …*
juste/injuste	*fair/unfair*	Je (ne) suis (pas) d'accord avec toi.	*I (don't) agree with you.*
		Tu rigoles!	*You're joking!*

Semaine 6

Profiter de l'école	Making the most of school		
Présentez-vous pour être délégué(e) de classe.	*Put yourself forward to be class representative.*	Je joue dans l'équipe de rugby.	*I play in the rugby team.*
Levez la main autant que possible en classe.	*Raise your hand as often as possible in class.*	Je représente les opinions de mes camarades de classe.	*I put forward my classmates' opinions.*
Participez à la chorale.	*Join the choir.*	Je n'oublierai jamais cette expérience.	*I will never forget this experience.*
Soyez «écolo».	*Be 'green'.*	Je fais partie du club de théâtre.	*I am in the drama club.*
N'ayez pas peur de remettre en cause les attitudes sexistes, racistes ou homophobes.	*Don't be afraid to challenge sexist, racist or homophobic attitudes.*	C'est une bonne préparation pour la vie d'adulte.	*It's good preparation for adult life.*
Faites une activité sportive.	*Do a sporting activity.*	Je suis fier/fière car je n'ai pas beaucoup confiance en moi.	*I am proud because I don't have much self-confidence.*
N'oubliez pas de remercier vos profs.	*Don't forget to thank your teachers.*	Ce succès est mérité car je travaille très dur.	*I deserve my success because I work hard.*
Soyez gentils avec les plus jeunes.	*Be kind to the youngest ones.*	J'ai donné un concert.	*I gave a concert.*
Profitez des sorties scolaires.	*Make the most of your school trips.*	J'ai toujours de bons commentaires sur mon bulletin scolaire.	*I always get good comments in my school report.*
Amusez-vous bien!	*Have lots of fun!*	C'est un honneur de représenter son école.	*It's an honour to represent your school.*
C'est quoi, ton plus grand accomplissement au collège?	*What is your greatest achievement at school?*		

Semaine 6

En échange	On an exchange		
Pourquoi faire un échange scolaire?	*Why go on a school exchange?*	Les élèves et leurs profs sont arrivés (en car).	*The pupils and their teachers arrived (by coach).*
On se fait de nouveaux amis.	*You make new friends.*	J'ai été content(e) de rencontrer X.	*I was pleased to meet X.*
On améliore ses compétences en langue.	*You improve your language skills.*	On a passé le premier week-end en famille.	*We spent the first weekend with the family.*
On habite chez une famille d'une culture différente.	*You live with a family from another culture.*	Nous sommes allés au collège ensemble.	*We went to school together.*
On visite un nouveau pays ou une nouvelle région.	*You visit a new country or region.*	Nous avons visité …	*We visited …*
On apprécie non seulement les différences mais aussi les similarités entre nos vies.	*You appreciate not only the differences, but also the similarities between our lives.*	On a participé à …	*We took part in …*
Mon/Ma correspondant(e) anglais(e) est arrivé(e) il y a (cinq) jours.	*My English exchange partner arrived (five) days ago.*	Il y aura une sortie à …	*There will be an outing to …*

Semaine 6 - Traduction spéciale en français : tout le vocabulaire plus …

Les mots essentiels	High-frequency words		
dont	*of which*	bientôt	*soon*
en ce moment	*at the moment, currently*	à cause de ça	*because of that*
parmi	*among*	y compris	*including*
au lieu de	*instead of*		

Semana 1

Las comidas	Meals
el desayuno	*breakfast*
la comida / el almuerzo	*lunch*
la merienda	*tea (meal)*
la cena	*dinner / evening meal*
desayunar	*to have breakfast / to have … for breakfast*
comer / almorzar	*to have lunch / to have … for lunch*
merendar	*to have tea / to have … for tea*
cenar	*to have dinner / to have … for dinner*
tomar	*to have (food / drink)*
beber	*to drink*
entre semana…	*during the week…*
los fines de semana…	*at weekends…*
Desayuno a las ocho.	*I have breakfast at eight o'clock.*
(el) Cola Cao	*Cola Cao (Spanish chocolate drink)*
(el) marisco	*seafood*
(el) pescado	*fish*
(el) pollo	*chicken*
(el) zumo de naranja	*orange juice*
(la) carne	*meat*
(la) ensalada	*salad*
(la) fruta	*fruit*
(la) leche	*milk*
(la) sopa	*soup*
(la) tortilla	*omelette*
(los) cereales	*cereals*
(los) churros	*fried doughnut sticks*
(las) galletas	*biscuits*

Semana 2

Desayuno / Como / Meriendo / Ceno…	*For breakfast / lunch / tea / dinner I have…*
un huevo	*an egg*
un yogur	*a yogurt*
un pastel	*a cake*
un bocadillo	*a sandwich*
una hamburguesa	*a hamburger*
(el) café / (el) té	*coffee / tea*
(las) patatas fritas	*chips*
(las) tostadas	*toast*
(las) verduras	*vegetables*
algo dulce / ligero / rápido	*something sweet / light / quick*
ser goloso/a	*to have a sweet tooth*
tener hambre	*to be hungry*
tener prisa	*to be in a hurry*
tomar un desayuno fuerte	*to have a big (lit. strong) breakfast*

Las expresiones de cantidad	Expressions of quantity		
cien / quinientos gramos de…	*100 / 500 grammes of…*	una barra de…	*a loaf of…*
un bote de…	*a jar of…*	una botella de…	*a bottle of…*
un kilo de…	*a kilo of…*	una caja de…	*a box of…*
un litro de…	*a litre of…*	una docena de…	*a dozen…*
un paquete de…	*a packet of…*	una lata de…	*a tin / can of…*

Los alimentos	Food products		
el aceite de oliva	*olive oil*	los pimientos	*peppers*
el agua	*water*	los plátanos	*bananas*
el ajo	*garlic*	los pomelos	*grapefruits*
		los refrescos	*fizzy drinks*

Semana 3

el arroz	*rice*	las cebollas	*onions*
el atún	*tuna*	las fresas	*strawberries*
el azúcar	*sugar*	las judías (verdes)	*(green) beans*
el chorizo	*spicy sausage*	las legumbres	*pulses*
el maíz	*corn*	las lentejas	*lentils*
el pan	*bread*	las manzanas	*apples*
el queso	*cheese*	las naranjas	*oranges*
la cerveza	*beer*	las peras	*pears*
la carne de cerdo / cordero / ternera	*pork / lamb / beef*	las piñas	*pineapples*
la coliflor	*cauliflower*	las uvas	*grapes*
la harina	*flour*	las zanahorias	*carrots*
la mantequilla	*butter*	¿Has probado…?	*Have you tried…?*
la mermelada	*jam*	el gazpacho	*gazpacho (chilled soup)*
los albaricoques	*apricots*	la ensaladilla rusa	*Russian salad*
los guisantes	*peas*	la fabada	*stew of beans and pork*
los lácteos	*dairy products*	Es un tipo de bebida / postre.	*It's a type of drink / dessert.*
los melocotones	*peaches*	Es un plato caliente / frío.	*It's a hot / cold dish.*
los melones	*melons*	Contiene(n)…	*It contains / They contain…*
los pepinos	*cucumbers*	Fue inventado/a / introducido/a…	*It was invented / introduced…*

Mi rutina diaria	My daily routine		
me despierto	*I wake up*	me acuesto	*I go to bed*
me levanto	*I get up*	salgo de casa	*I leave home*
me ducho	*I have a shower*	vuelvo a casa	*I return home*
me peino	*I brush my hair*	temprano / tarde	*early / late*
me afeito	*I have a shave*	enseguida	*straight away*
me visto	*I get dressed*	odio levantarme	*I hate getting up*
me lavo los dientes	*I clean my teeth*		

Semana 4

¿Qué le pasa?	What's the matter?		
No me encuentro bien.	*I don't feel well.*	Tengo dolor de cabeza.	*I have a headache.*
Me siento fatal.	*I feel awful.*	Tengo fiebre.	*I have a fever / temperature.*
Estoy enfermo/a / cansado/a.	*I am ill / tired.*	Tengo gripe.	*I have flu.*
Tengo calor / frío.	*I am hot / cold.*	Tengo mucho sueño.	*I am very sleepy.*
Tengo catarro.	*I have a cold.*	Tengo náuseas.	*I feel sick.*
Tengo diarrea.	*I have diarrhoea.*	Tengo quemaduras de sol.	*I have sunburn.*
Tengo tos.	*I have a cough.*	los ojos	*eyes*
Tengo una insolación.	*I have sunstroke.*	¿Desde hace cuánto tiempo?	*How long for?*

Semana 4 Parte B

Tengo tos.	*I have a cough.*	los ojos	*eyes*
Tengo una insolación.	*I have sunstroke.*	¿Desde hace cuánto tiempo?	*How long for?*
Tengo una picadura.	*I've been stung.*	desde hace…	*for…*
Me duele(n)…	*My … hurt(s)*	un día / un mes	*a day / a month*
Me he cortado el/la…	*I've cut my…*	una hora / una semana	*an hour / a week*
Me he hecho daño en…	*I've hurt my…*	¿Desde cuándo?	*Since when?*
Me he quemado…	*I've burnt my…*	desde ayer	*since yesterday*
Me he roto…	*I've broken my…*	desde anteayer	*since the day before yesterday*
Me he torcido…	*I've twisted my…*	no se preocupe	*don't worry*
el brazo / el estómago	*arm / stomach*	¡Qué mala suerte!	*What bad luck!*
el pie / el tobillo	*foot / ankle*	Tiene(s) que / Hay que…	*You have to…*

Semana 5

la boca / la cabeza	*mouth / head*	beber mucha agua	*drink lots of water*
la espalda / la garganta	*back / throat*	descansar	*rest*
la mano / la nariz	*hand / nose*	ir al hospital / médico / dentista	*go to the hospital / doctor / dentist*
la pierna / la rodilla	*leg / knee*	tomar aspirinas	*take aspirins*
los dientes / las muelas	*teeth*	tomar este jarabe / estas pastillas	*take this syrup / these tablets*
los oídos / las orejas	*ears*	usar esta crema	*use this cream*

Las fiestas / *Festivals*

la fiesta de…	*the festival of…*	las calles se llenan de…	*the streets are filled with…*
esta tradición antigua…	*this old tradition…*	los niños / los jóvenes…	*children / young people…*
se caracteriza por…	*is characterised by…*	los familiares / las familias…	*relations / families…*
se celebra en…	*is celebrated in…*	comen manzanas de caramelo	*eat toffee apples*
se repite…	*is repeated…*	decoran las casas / las tumbas con flores / velas	*decorate houses / graves with flowers / candles*
se queman figuras de madera	*wooden figures are burnt*	preparan linternas / altares	*prepare lanterns / altars*
se construyen hogueras	*bonfires are built*	se disfrazan de brujas / fantasmas	*dress up as witches / ghosts*
se disparan fuegos artificiales	*fireworks are set off*	ven desfiles	*(they) watch processions*
se lanzan huevos	*eggs are thrown*		

Un día especial / *A special day*

Abrimos los regalos.	*We open presents.*	Vamos a la mezquita / iglesia.	*We go to the mosque / church.*
Buscamos huevos de chocolate.	*We look for chocolate eggs.*	Ayer fue…	*Yesterday was…*

Semana 6

Cantamos villancicos.	*We sing Christmas carols.*	el baile de fin de curso	*the school prom*
Cenamos bacalao.	*We have cod for dinner.*	el Día de Navidad	*Christmas Day*
Comemos dulces navideños / doce uvas / pavo.	*We eat Christmas sweets / twelve grapes / turkey.*	(el) Domingo de Pascua	*Easter Sunday*
Nos acostamos muy tarde.	*We go to bed very late.*	(la) Nochebuena	*Christmas Eve*
Nos levantamos muy temprano.	*We get up very early.*	(la) Nochevieja	*New Year's Eve*
Rezamos.	*We pray.*	Me bañé y luego me maquillé.	*I had a bath and then did my make up.*

¿Qué va a tomar? / *What are you going to have?*

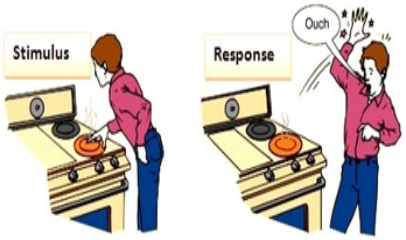
de primer / segundo plato…	*for starter / main course…*	el menú del día	*the set menu*
de postre…	*for dessert…*	la especialidad de la casa	*the house speciality*
Voy a tomar…	*I'm going to have…*	está buenísimo/a / riquísimo/a	*it's extremely good / tasty*
(el) bistec	*steak*	¡Que aproveche!	*Enjoy your meal!*
(el) filete de cerdo	*pork fillet*	¿Algo más?	*Anything else?*
(el) flan	*crème caramel*	Nada más, gracias.	*Nothing else, thank you.*
(el) jamón serrano	*Serrano ham*	¿Me trae la cuenta, por favor?	*Can you bring me the bill, please?*
(la) merluza en salsa verde	*hake in parsley and wine sauce*	No tengo cuchillo / tenedor / cuchara.	*I haven't got a knife / fork / spoon.*
(la) sopa de fideos	*noodle soup*	No hay aceite / sal / vinagre.	*There's no oil / salt / vinegar.*
(la) tortilla de espinacas	*spinach omelette*	El plato / vaso / mantel está sucio.	*The plate / glass / table cloth is dirty.*
(la) trucha a la plancha	*grilled trout*	El vino está malo.	*The wine is bad / off.*
(los) calamares	*squid*	La carne está fría.	*The meat is cold.*

Semana7

(las) albóndigas	*meatballs*	dejar una propina	*to leave a tip*
(las) chuletas de cordero asadas	*roast lamb chops*	equivocarse	*to make a mistake*
(las) croquetas caseras	*homemade croquettes*	pedir	*to order / ask for*
(las) gambas	*prawns*	ser alérgico/a…	*to be allergic to…*
(las) natillas	*custard*	ser vegetariano/a	*to be a vegetarian*
¿Qué me recomienda?	*What do you recommend?*		

Un festival de música / *A music festival*

Me fascina(n)…	*…fascinate(s) me.*	atrevido/a(s)	*daring*
Admiro…	*I admire…*	imaginativo/a(s)	*imaginative*
No aguanto / soporto…	*I can't stand…*	precioso/a(s)	*beautiful*
su actitud / talento	*his/her attitude / talent*	repetitivo/a(s)	*repetitive*
su comportamiento	*his/her behaviour*	original(es)	*original*
su determinación / estilo	*his/her determination / style*	triste(s)	*sad*
su forma de vestir	*his/her way of dressing*	Me/Te hace(n) falta…	*I/You need…*
su música / voz	*his/her music / voice*	crema solar	*sun cream*
sus canciones / coreografías	*his/her songs / choreography*	el pasaporte / DNI	*your passport / national ID card*
sus ideas / letras	*his/her ideas / lyrics*	un sombrero / una gorra	*a hat / cap*

Section 1: Response to Stimulus	Section 2: Development and Collaboration	Section 3: Analysis and Evaluation
In your devising log, you will be asked to write about the stimuli that your teacher presented to you and the stimulus you chose. You will need to explain the following: ▪ Your first response to the stimuli. ▪ The different ideas, themes and settings you considered and how and why you reached your final decision. ▪ What you discovered from your research ▪ What your own dramatic aims and intentions are (for example, if you are a performer what you want to achieve in your portrayal of your character). ▪ What the dramatic aims and intentions of the piece were (for example what theme might your piece explore or what message would you deliver?).  	Working with others and developing ideas are a part of the pleasure of drama, but these can also be difficult. Make sure that throughout the process you are contributing and meeting your responsibilities. For your devising log, you need to explain: ▪ How you developed and refined your ideas and those of others with whom you worked. ▪ How you developed the piece in rehearsals. ▪ How you developed AND refined your own theatrical skills (performance or design) during the devising process. ▪ How you responded to feedback. ▪ How you used your refined theatrical skills in the final piece.  	Section 3 of your devising log provides you with the opportunity to show your skills at analysing and evaluating your devised work. **Key Words** To **'analyse'** is to identify and investigate. To **'evaluate'** is to assess the different approaches used and formulate judgments. For example "This was successful because... or this could be improved by" ▪ You need to include: ▪ How far you developed your theatrical skills. ▪ The benefits you brought to the pair/group and the way in which you helped to shape the final piece. ▪ The overall impact you personally had on the devising, rehearsal and performance. You could also, if appropriate, consider the areas of the devising that didn't go as well as you had hoped or could have been further developed. In order to write concisely about how well you succeeded, you need to be very clear about what you hoped to achieve. 
Assessment Criteria – Response to Stimulus ▪ The explanations given in the Devising log evidence excellent skills in creating and developing ideas to communicate meaning. ▪ There is evidence of a highly developed and highly creative response to the stimulus. ▪ The explanation is very clear and points are comprehensively explored. ▪ Precise details are provided throughout.	**Assessment Criteria – Development and Collaboration** ▪ The explanations given in the Devising log evidence excellent skills in creating and developing ideas to communicate meaning. ▪ There is evidence of extensive and highly effective development and refinement of skills and the piece. ▪ The explanation is very clear and points are comprehensively explored. ▪ Precise details are provided throughout.	**Assessment Criteria – Evaluation** ▪ Response demonstrates highly developed skills in identifying and investigating how far they developed their theatrical skills and how successfully they contributed to the devising process and to the final devised piece (analysis). ▪ Response demonstrates highly developed skills in assessing the merit of different approaches and formulating judgements about the overall impact they had as an individual (evaluation). ▪ Response is critical and insightful. Points are comprehensively explored and supported in depth with thorough exemplification.

Starter Sentences

Sometimes it can be tricky deciding how best to start your sentences. Use these starter sentences below to help you.

To Introduce

- My devised play focused on...
- The key aspect of my devised play was...
- The central theme to my devised performance was...
- In my devised performance I wanted to emphasise...
- The issue that we focused on in our devised piece was...
- My intentions for my character was...
- The overall intensions for our piece is...

To conclude

- In summary, my play...
- To conclude, I am pleased that my play...
- In conclusion, we successfully...
- In short, my play...
- It has been shown that my play...
- Hence...
- To sum up...
- To review my ideas...

Connectives

Connectives can be used to link ideas within sentences, between sentences and between paragraphs. Improve the sentence structure of your Devising Log. Why not develop your ideas more effectively by using connectives to show how your ideas are linked.

Adding
And...
Also...
As well as...
Moreover...
Too...

Cause and Effect
Because...
So...
Therefore...
Thus...
Consequently...

Emphasising
Above all...
In particular...
Especially...
Significantly...
Indeed...
Notably...

Comparing
Equally...
In the same way...
Similarly...
Likewise...
As with...
Alike...

Qualifying
However...
Although...
Unless...
Except...
If...
As long as...
Apart from...
Yet...

Illustrating
For example...
Such as...
For instance...
As revealed by...
In the case of...

Contrasting
Whereas...
Instead of...
Alternatively...
Otherwise...
Unlike...
On the other hand...
Despite...

Speculative
It would seem...
One could say...
One wonders...
It could appear that...

Theatrical Terminology

Have you been using the key words? Check as this will increase your grades.

General

Antagonist
Anti-climax
Aside
Blackout
Character
Character Interaction
Charter Motivation
Chorus
Climax
Communal Voice
Costume
Mood and Atmosphere
Cross Cutting
Flashbacks
Forth Wall
Forum Theatre
Freeze Frame
Genre
Improvisation
Narration
Props
Protagonist
Split Screen
Structure
Sub-Text

Genre

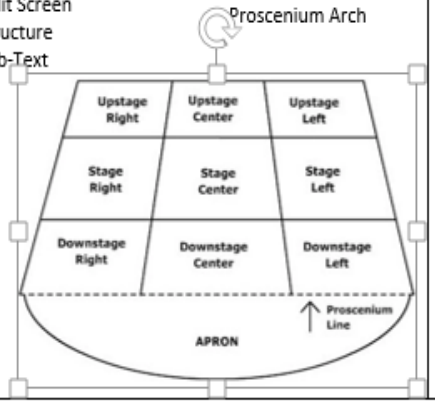
Documentary Theatre
Naturalism (Stanislavski)
Non Naturalism (Brecht)
Physical Theatre
Theatre in Education

Rehearsal Techniques

Bigger Bigger Bigger
Conscience Corridor
Hot-Seating
Inner Thoughts
Role on the Wall

Stage Types

End on
In the round
Arena
Thrust
Traverse
Promenade
Proscenium Arch



Devising Log Checklist

As you are preparing your devising log, keep checking it against the following checklist:

- ☐ Have I written three sections with appropriate headings?
- ☐ Are the sections roughly the same length?
- ☐ Have I stayed within the final word count?
- ☐ Have I provided evidence of research?
- ☐ Have I stated my dramatic aims AND intentions?
- ☐ Have I shown how I developed and refined my ideas?
- ☐ Have I explained how I helped the group?
- ☐ Have I shown how I responded to feedback?
- ☐ Have I demonstrated that I have developed my theatrical skills?
- ☐ Have I explained how I positively shaped the final piece?
- ☐ Have I used correct theatrical terms to explain my thoughts?
- ☐ Have I given specific examples to back up my points?
- ☐ Have I analysed and evaluated my work?

Act One- Reverend Parris' house
- In Salem, 1692, some girls have been caught dancing in the forest.
- The younger girls are frightened and pretend to be ill.
- The town's minister, Parris, is worried that word will get out that his daughter Betty and his niece Abigail were among the girls. He is worried about his reputation.
- The Putnam's arrive at Parris's house and are please to find that the minister's daughter is ill.
- They jump to witchcraft as an explanation. This suits them as they want revenge on the neighbours for appointing Parris for the position that they wanted a relation to get.
- Abigail threatens to hurt the girls if they tell anyone that she drank a potion to kill John Proctor's wife, Elizabeth.
- John Proctor comes in. He had an affair with Abigail when she was his servant. Abigail confesses it is not witchcraft to blame for Betty's illness and tries to rekindle the affair but Proctor refuses her advances. Abigail loses her temper, mentioning that she blames his wife.
- Betty wakes up and starts screaming, bringing the others back into the room.
- Reverend Hales, a famous witchcraft 'expert' arrives and begins to look for signs of witchcraft.
- When questioned about the dancing Abigail accuses the black slave Tituba of summoning the devil. Tituba confesses and starts accusing others. Abigail and Betty join the confession.

Act Two- The Proctors' house, a week later
- The witchcraft trials have started. Mary Warren the Proctors' servant has been at the court all day.
- Elizabeth wants her husband to go to court and denounce Abigail. Proctor is reluctant.
- Mary Warren returns from court and brings Elizabeth a 'poppet' (a doll). Thirty- nine women are in jail for witchcraft. Elizabeth's name has been mentioned in court.
- Reverend Hale arrives to question Elizabeth. Giles Corey and Francis Nurse burst in- their wives have been arrested.
- Two court officials come to arrest Elizabeth, and they have been instructed to search the House for 'poppets'
-They find such a doll with a needle stuck in its stomach. Abigail claims Elizabeth's spirit stuck a needle in her that same evening.
- John tells Mary she must tell the court that Abigail is lying. Elizabeth is arrested.

Act Three- The Courtroom
- Giles Corey goes to court to try to save his own wife.
- Proctor arrives to present evidence that Abigail and the girls have been lying all along. He has persuaded Mary Warren to tell the truth about the girls but she is very nervous.
- Lots of villagers have signed a testimony to say Elizabeth, Martha Corey and Rebecca Nurse aren't witches. Danforth orders everyone who signed it to be arrested.
- Abigail pretends that Mary is sending her spirit out to attack her.
- Proctor confesses to his affair with Abigail to ruin her reputation. Elizabeth's brought in and asked if it's true. She denies it to protect him which destroys John's case again her.
- Abigail screams that she is being attacked by a bird sent by Mary Warren. The girls join in.
- This frightens Mary so much that she sides with Abigail and says that Proctor is the Devil's man. John is arrested.

Act Four- Salem Jail, Autumn 1692
- Tituba and Sarah Good are to be hanged. Hale tries to persuade the accused to confess rather than hang.
- We learn that Abigail has run off with Parris's money.
- There are rumours of rebellion against trials. Parris is frightened for his life
- John Proctor is given a last chance to confess to witchcraft and so save his life.
- Elizabeth is asked to persuade John to confess. John decides that he will confess.
- Over a hundred people have confessed. Giles Corey wouldn't plead guilty or not guilty, so he was tortured to death.
- Proctor refuses to allow his signed confession to be posted on the door of the church.
- Proctor chooses to die rather than give up his good name.
- Parris and Hale ask Elizabeth to persuade John to confess again, but she refuses

Key characters	Key themes	Historical context	Stylistic features and symbols
John Proctor-local farmer. **Elizabeth Proctor**- John's wife **Reverend Parris**- Minister of Salem **Abigail Williams**- Parris's niece. She had an affair with Proctor. Leader of the girls. **Reverend Hale**- Witchcraft 'expert' **Marry Warren**- shy girl who works for Proctor **Rebecca Nurse**- local **farmer's wife.** She's known for her goodness and courage **Deputy- Governor Danforth**- judge in charge of trials **The Putnams**- Local couple **Giles Corey**- local farmer **Tituba**- Black Slave girl from Barbados	Loyalty Fear Identity & Reputation Envy & Revenge Conflict Religion Courage & Integrity Tyranny Lies and Betrayal Greed	▪ English settlers came to America in 1626 and founded a settlement in Massachusetts. They were Christians who followed the teachings of the Bible extremely strictly; they were *Puritans.* ▪ Salem society was a *Theocracy*- a society ruled by people who are considered to be guided by God. Community was extremely important. ▪ Puritan Women were seen as socially inferior and had less power than men. Children were seen as young adults with no time to play and punished if they misbehaved. ▪ Puritans believed in the Devil and witchcraft. They blamed Smallpox, attacks from Indians and crops not growing on the devil. The Crucible is based on the real Salem Witch Trials that happen in 1692 where trials led to mass hysteria and over 150 people accused of witchcraft. ▪ McCarthyism was a real- life 'Witch Hunt'. Joe McCarthy organised a twentieth-century version of witch hunting. It ruined 100s of reputation and careers. It was used as a way for revenge and those accused were encouraged to accuse friends and colleagues to clear their own name. ▪ Miller wrote The Crucible after being accused of communism. Miller refused to name any of his colleagues as communist similar to John Proctor.	**Allegory**- *The Crucible* can be read as an allegory of the anti-communist investigations in the USA in 1950s. **Colloquial**- Miller uses colloquial language within the characters dialogue to make it sound more realistic and remind the audience that the play's based on real events. Less educated characters have more rural sounding patterns. **Latin** -More educated use Latin such as Hale and Danforth **Tragic Hero**- character who makes an error of judgment or has a fatal flaw. **Natural Light** throughout the play contrasts with the unnatural accusations. **Stage Directions** reveal a lot about the characters including background information shows Millar wanted the play to be read as well as performed. **Bird Imagery** represent people's Spirit **The Title**- A crucible is a container that can be heated to high temperature and separate the pure bits of metal from the not pure.

.. **Stage 1: Analysis**

The purpose of the analysis stage is to identify the requirements of the problem and what
the proposed solution will do to meet the requirements.
The analysis tasks are to:

- analyse the given problem and identify the requirements of the program that will be
designed, implemented and tested
- decompose the problem into manageable sub-problems, with an explanation of each.

An introduction to the problem, in prose, will demonstrate an understanding of abstraction.
The decomposed list of requirements can be presented in prose or as a bulleted list, with
each requirement clearly identified.
Decomposition requires choices to be made, in this case by breaking the given problem down
into sub-problems that will be designed and implemented later. A description of what each
sub-problem will do is required, it can be presented in prose or as a bulleted list. An explanation, in prose, of the reasons why the decomposition submitted is the most appropriate to meet requirements must also be included

Report content for analysis

For this stage, the report should include:

- a short introduction to the problem
- a list of the requirements of the problem that will be programmed
- decomposition of the problem into sub-problems, including
  - a short description of what each of the sub-problems will do
  - a short explanation of the reasoning behind the decomposition submitted.

Stage 2: Design

The purpose of the design stage is to describe what has to be done when implementing the
solution and to suggest an appropriate strategy to test the solution.
2.1 Solution design
An algorithm or algorithms should be designed that meet/s the requirements of the problem
using appropriate conventions (flowchart, pseudo-code, written description). Program code
using the chosen language must not be included in the design solution.
The algorithm(s) should:

- show detailed decomposition into sub-problems and how they link together
(if appropriate)
- demonstrate clear abstraction (for example by including parameterisation,
links between components)
- include inputs, processes and outputs
- use all three basic programming constructs: sequence, selection and iteration.

Report content for solution design

- the algorithm(s) any refinements to the design identified during implementation, with reasons for the refinements.

The test strategy should be presented in prose. An example of a table that could be used for the initial test plan is shown below. When constructing test data for the initial test plan, normal data is data that the program will accept. Erroneous data is inaccurate data that the program will not accept. Boundary data is typically on the 'edge' of a range of possible values that may or may not be accepted. Not all tests may require data entry.

the test strategy

- the initial test plan, using the headings shown, with all four columns completed. It should be labelled 'Initial Test Plan'

Test no	Purpose of the test	Test data	Expected result

Report content for implementation
For this stage, the report should include:
- a copy of the program code; any refinements should be noted as comments in the final program.
- screenshots demonstrating effective use of debugging skills to correct errors

Report content for testing, refining and evaluation
For this stage, the report should include:
- the updated and complete Test Plan (labelled 'Final Test Plan')
- the evaluation

Test no	Purpose of the test	Test data	Expected result	Actual result	Action needed/comments

1.11.3. Multiple Function Definitions

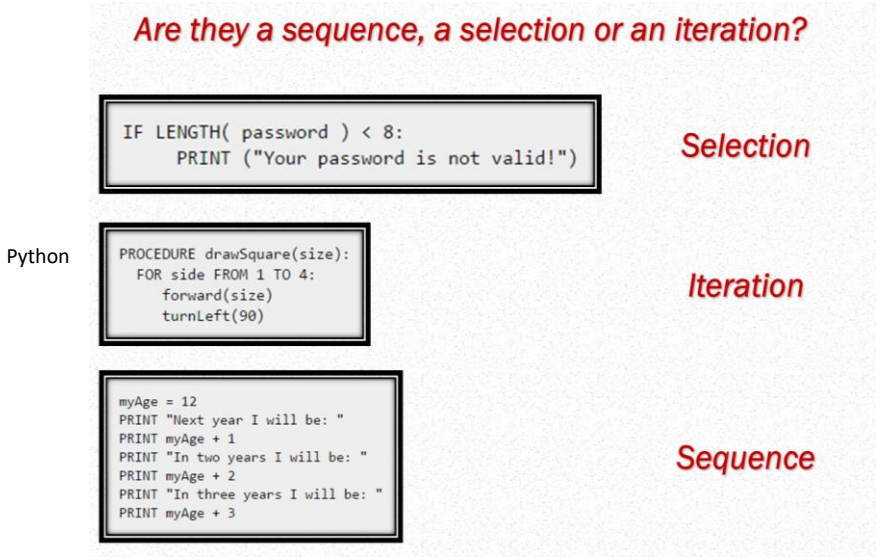
Here is example program `birthday4.py` where we add a function `happyBirthdayAndre`, and call them both. Guess what happens, and then try it:

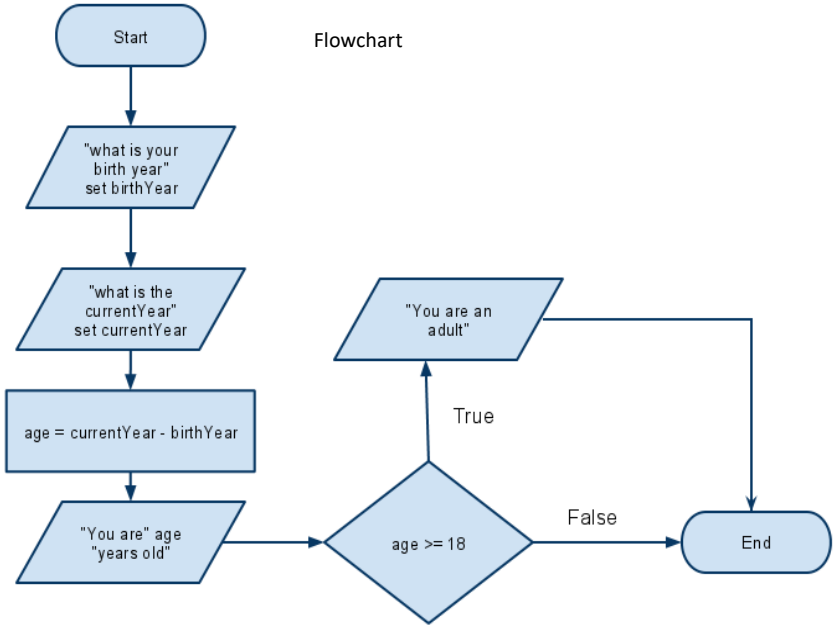
```
'''Function definitions and invocation.'''

def happyBirthdayEmily():
    print("Happy Birthday to you!")
    print("Happy Birthday to you!")
    print("Happy Birthday, dear Emily.")
    print("Happy Birthday to you!")

def happyBirthdayAndre():
    print("Happy Birthday to you!")
    print("Happy Birthday to you!")
    print("Happy Birthday, dear Andre.")
    print("Happy Birthday to you!")

happyBirthdayEmily()
happyBirthdayAndre()
```





Variables and arrays

Syntax	Explanation of syntax	Example
SET Variable TO <value>	Assigns a value to a variable.	SET Counter TO 0 SET MyString TO 'Hello world'
SET Variable TO <expression>	Computes the value of an expression and assigns to a variable.	SET Sum TO Score + 10 SET Size to LENGTH(Word)
SET Array[index] TO <value>	Assigns a value to an element of a one-dimensional array.	SET ArrayClass[1] TO 'Ann' SET ArrayMarks[3]TO 56
SET Array TO [<value>, ...]	Initialises a one-dimensional array with a set of values.	SET ArrayValues TO [1, 2, 3, 4, 5]
SET Array [RowIndex, ColumnIndex] TO <value>	Assigns a value to an element of a two dimensional array.	SET ArrayClassMarks[2,4] TO 92

Repetition

Syntax	Explanation of syntax	Example

WHILE <condition> DO
<command>
END WHILE
	Pre-conditioned loop. Executes <command> whilst <condition> is true.	WHILE Flag = 0 DO
		SEND 'All well' TO DISPLAY
		END WHILE

REPEAT <command> UNTIL <expression>	Post-conditioned loop. Executes <command> until <condition> is true. The loop must execute at least once.	REPEAT SET Go TO Go + 1 UNTIL Go = 10
REPEAT <expression> TIMES <command> END REPEAT	Count controlled loop. The number of times <command> is executed is determined by the expression.	REPEAT 100-Number TIMES SEND '*' TO DISPLAY END REPEAT

FOR <id> FROM <expression> TO <expression> DO
<command>
END FOR
	Count controlled loop. Executes <command> a fixed number of times.	FOR Index FROM 1 TO 10 DO
		SEND ArrayNumbers[Index] TO DISPLAY
		END FOR

FOR <id> FROM <expression> TO <expression> STEP <expression> DO
<command>
END FOR
	Count controlled loop using a step.	FOR Index FROM 1 TO 500 STEP 25 DO
		SEND Index TO DISPLAY
		END FOR

FOR EACH <id> FROM <expression> DO <command> END FOREACH	Count controlled loop. Executes for each element of an array.	SET WordsArray TO ['The', 'Sky', 'is', 'grey'] SET Sentence to '' FOR EACH Word FROM WordsUArray DO SET Sentence TO Sentence & Word & ' ' END FOREACH

Selection

Syntax	Explanation of syntax	Example

IF <expression> THEN
<command>
END IF
	If <expression> is true then command is executed.	IF Answer = 10 THEN
		SET Score TO Score + 1
		END IF

IF <expression> THEN
<command>
ELSE
<command>
END IF
	If <expression> is true then first <command> is executed, otherwise second <command> is executed.	IF Answer = 'correct' THEN
		SEND 'Well done' TO DISPLAY
		ELSE
		SEND 'Try again' TO DISPLAY
		END IF

Syntax	Explanation of syntax	Example
SEND <expression> TO DISPLAY	Sends output to the screen.	SEND 'Have a good day.' TO DISPLAY
RECEIVE <identifier> FROM (type) <device>	Reads input of specified type.	RECEIVE Name FROM (STRING) KEYBOARD RECEIVE LengthOfJourney FROM (INTEGER) CARD_READER RECEIVE YesNo FROM (CHARACTER) CARD_READER

Subprograms

Syntax	Explanation of syntax	Example
PROCEDURE <id> (<parameter>, ...) BEGIN PROCEDURE <command> END PROCEDURE	Defines a procedure.	PROCEDURE CalculateAverage (Mark1, Mark2, Mark3) BEGIN PROCEDURE SET Avg to (Mark1 + Mark2 + Mark3)/3 END PROCEDURE
FUNCTION <id> (<parameter>, ...) BEGIN FUNCTION <command> RETURN <expression> END FUNCTION	Defines a function.	FUNCTION AddMarks (Mark1, Mark2, Mark3) BEGIN FUNCTION SET Total to (Mark1 + Mark2 + Mark3)/3 RETURN Total END FUNCTION
<id> (<parameter>, ...)	Calls a procedure or a function.	Add (FirstMark, SecondMark)

Arithmetic operators

Symbol	Description
+	Add
-	Subtract
/	Divide
*	Multiply
^	Exponent
MOD	Modulo
DIV	Integer division

Relational operators

Symbol	Description
=	equal to
<>	not equal to
>	greater than
>=	greater than or equal to
<	less than
<=	less than or equal to

File handling

Syntax	Explanation of syntax	Example
READ <File> <record>	Reads in a record from a <file> and assigns to a <variable>. Each READ statement reads a record from the file.	READ MyFile.doc Record
WRITE <File> <record>	Writes a record to a file. Each WRITE statement writes a record to the file.	WRITE MyFile.doc Answer1, Answer2, 'xyz 01'

2.1 Human Resources

Stages of Recruitment

1. **Identifying a need** – Before the stages of recruitment can begin, the company must identify a need; why do they want to recruit a new staff member?

Perhaps the business has grown and so they need more staff, or maybe staff members have left the role/retired/gained promotion? Or, maybe the business has changed in some way and so a new skill set is required from new staff members.

2. **Job Description and Person Specification** - Job Description – the employer must set out the duties and responsibilities of the role, who the new staff member will be responsible for, who they will report to as well as the required hours and hourly pay or salary.

Person Specification – this is measured against in order to assess the individual's suitability for the role. It will set out various essential criteria along with desirable criteria. Examples include qualifications, experience and attributes.

3. **Advertise a Position**

Advertising a position is key in attracting the best candidates. The following should be included within an advert:

- Details about your business, what it does and what size is it
- Job title and description
- Details of hourly wages or salary
- Location of the job
- The days and times which the employer wants you to work
- A detailed description of the specifics of the role as well as the level of responsibility.

4. **Shortlisting Applicants -** Shortlisting is when candidates who have applied for the job vacancy are then reduced so that only the most suitable candidates are moved to the next stage of the recruitment process.

Shortlisting must be carried-out in an honest, fair and traceable manner. Many employers assess the number of essential criteria and desirable criteria met within each application. Points may be scored to determine whether each candidate has shown evidence of each competence.

5. Conducting an Interview - After the shortlisting process, candidates may be invited to attend an interview. Usually, all interviewees are asked the same series of questions and the interview panel assesses each answer with a written mark.

At the end of the interview, the points are added up and the candidate with the highest amount of points may be offered the role, subject to providing satisfactory evidence of references and qualifications.

Continue…

6. Obtaining References and Offering the Position - A potential employer may ask a candidate for two references, preferably previous employment if possible.

A reference may be used to check for honesty within the application, assess whether they are of good character and check for any previous safeguarding concerns if applicable.

When offering an individual the position, it may be done in writing in order to state the start date, the hourly pay and hours of work and where to arrive and who to report to on your first day.

2.1.3 Legal Considerations

Contract of Employment - When offered a job, you will be given a contract of employment which sets out the terms of the role offered and what is required from both yourself and your employer. This contract is legally binding.

A contract may be written (in writing) or verbally agreed. It may take many forms such as in an employee handbook or through a letter from the employer.

A contract of employment is required by law and may include the rate of pay, holiday allowance and health and safety regulations. There may be implied terms included which are not written down, e.g. being punctual, not stealing.

Types of Contract -There are different types of employment contract, e.g. permanent, temporary or fixed term.

- **Permanent** – your employment does not have an end date, providing good job security for you.
- **Temporary** – your employment will be for a temporary period, perhaps for seasonal work such as throughout Christmas. There will still be a notice period.
- **Fixed Term** – your employment will end on a fixed end date. An example may be covering maternity leave as the employer knows when the employee will be returning.

2.1.3 Legal Considerations Types of Contracts Continue ….

A contract of employment may be for either part time work or full time work. Therefore, you may be employed part time on a permanent contract, full time on a temporary contract, or any other combination.
Full time – a full time employee will usually work over 35 hours per week
Part time – hours may vary but could range between 1 hour through to 34 hours.
Alternatively, **a zero hour** contract may be used when the employer does not know how many hours work they can give an employee. This does not offer much job security.

Equality in Recruitment - The **Equality Act 2010** provides that it is illegal to discriminate against anyone in regards to their race, nationality, religion, sex, sexual orientation, age, disability, pregnancy or being married or in a civil partnership. The Act encompasses all previous discrimination laws.
In employment, employers must treat all employees fairly and equally, ensuring that there is no discrimination in recruitment either. All individuals must be treated equally and be provided equal opportunities.

Redundancies - An employee may lose their job and be made redundant. This may happen if the business suddenly closes, or downsizes due to falling profits or if the products/services which the business offers changes.
Certain redundancy procedures may be used, such as offering voluntary redundancy or using the 'last in first out' method.
Anyone made redundant will be entitled to compensation if they have worked there for over two years and will receive an amount depending upon the number of years they have worked for the company. They may receive one week's pay per year of employment with the company.

Disciplinary - Employees must abide by a set of rules which set the expected standards and code of conduct in the workplace. A disciplinary procedure ensures that an employee will not be unfairly dismissed if they are accused of breaching the code of conduct.
A verbal warning may be given for minor mistakes.
A written warning is a more formal stage for more serious incidents or if an incident has happened after a previous verbal warning.
Failure to improve or if the employee commits a much more serious offence, they could be given a final warning.
Instant dismissal may be used for very serious offences such as being violent or stealing in the workplace.

2.1.4 Staff Development

Induction - When starting a new job, you may be given an induction which introduces you to your new working environment, your colleagues and the job role itself.
You may be told the health and safety guidelines, the policies and procedures of the company and how to carry out your duties. You will also be made aware of general information such as where the canteen is and where the nearest toilets are.
Staff Appraisals - A staff appraisal may be carried out every year to review the performance of the employee. Targets may be set for the next working year and the employee may be offered motivation to improve and develop, discussing any Continuous Professional Development applicable. Any targets set should be SMART – specific, measurable, accurate, realistic and time-bound.
Training - There are many reasons why staff training is carried out.
In some sectors, new ways of carrying out and completing tasks are continuously evolving and so it is important for all employees to maintain up to date knowledge.
Qualifications may adapt or change and a company may require its employees to up date their skills.
There may be promotion opportunities available.
Training may be internal, carried out by other more senior employees within the company, or external, by consultants or trainers.

2.1.5 Pay and Remuneration

Wages and Salaries - A wage is a regular payment paid for the hours you have completed. You may get paid weekly, fortnightly or monthly. An employee working in a restaurant or a shop will probably be paid per hour.
A salary may be paid monthly and is a fixed amount, regardless of the hours worked. This may mean that a salaried employee may work many more hours than a standard 37 hour week but receive no extra pay. There is usually more responsibility and more is asked from the employee.

Types of Funding:
When starting-up your own business, you will usually need some money to buy any equipment, premises, vehicles, etc. The type of funding and the amount of money you will need depends upon the type of business and the size of the potential business. Your credit history may also be taken into consideration for some types of funding.

Personal savings – the best way to fund your potential business is through your own personal savings. This is your money and so you can access it immediately and you do not have to pay it back. You will be risking your own money, however.

It may be possible to apply for a **bank loan**, depending on your credit history. Amounts will vary but you will of course have to pay back the loan, with interest.

A **credit card** may be easier to apply for than a loan but you would only secure a small amount of money. Your credit limit may increase over time if you pay back what you have initially borrowed, however. Interest rates may be much higher than a bank loan and you will still have to sign a credit agreement.

It may be possible to borrow money from **friends or family**, who may allow you to repay it over a longer term and with no interest, depending on their own position.

It may be possible to apply for a **grant** from your local government, although there are strict criteria to meet before you can apply. Grants encourage local entrepreneurs to grow businesses and you would not have to pay back the grant.

The Princes Trust is a charity that supports and help disadvantaged young people, providing practical advice and financial grants. There is a criteria to meet but a grant does not have to be paid back.

https://www.princes-trust.org.uk/

Types of Funding continue ….

You could apply for an **overdraft** on your existing bank account. This may be quite easy to do although there will of course be charges applied such as interest on the money borrowed.

The term **Business Angel** refers to a wealthy investor who may wish to invest in your business. The investor may ask for a percentage of the business in return for their investment. You may be able to use the expertise of the investor.

Crowdfunding may be used for a variety of reasons, including starting up your own business.

Many businesses use **trade credit** as a source of finance, which enables the business to acquire goods on credit. This means that the business may be able to gain materials from a supplier, but the business may have a period of time before they have to pay for the materials.

Financial Concepts and Calculations:
Sales revenue is the money earned by a business over a set period of time, for example a year. You may find that sales revenue is sometimes called turnover. The calculation to find the sales revenue of a business is:
Revenue = Price x Quantity

The **gross profit** of a business is the amount of money left from the sales revenue after the cost of sales have been deducted. The cost of sales is the direct costs involved in making the product such as the direct materials and the direct labour.

The calculation to find the gross profit of the business is: **Gross Profit = Sales Revenue – Cost of Sales**

The **net profit** of a business is calculated by taking the gross profit and deducting all other expenses such as utilities and rent.
The amount of money left over is the net profit and this is the final profit of the business for that particular year. The calculation to find the net profit is:
Net Profit = Gross Profit – Expenses

Unit		Title
1	a	Types of data
	b	Population and sampling
	c	Sampling methods
	d	Planning and collecting data
2	a	Qualitative and discrete data
	b	Continuous data
	c	Tabulation
3	a	Measures of central tendency – mode, median and mean
	b	Measures of dispersion – range, quartiles, interquartile range and percentiles
	c	Box plots, skewness and representing outliers
4	a	Describing correlation by inspection, lines of best fit and Spearman's rank correlation coefficient
5	a	Calculating moving averages, seasonal and cyclic trends
6	a	Simple probability and theoretical probability
	b	Probability from two-way tables, sample space diagrams, tree diagrams and Venn diagrams
7	a	Interpreting index numbers in context and simple calculations

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	b	Measures of dispersion – range, quartiles, interquartile range, interpercentile range, interdecile range and standard deviation
	c	Box plots, skewness, calculating and representing outliers
4	a	Describing correlation by inspection, lines of best fit and Spearman's rank correlation coefficient, Pearson's product moment correlation coefficient
5	a	Calculating moving averages, seasonal and cyclic trends
6	a	Simple probability and theoretical probability
	b	Probability from two-way tables, sample space diagrams, tree diagrams and Venn diagrams
7	a	Interpreting index numbers in context and simple calculations
8	a	Binomial distribution
	b	Normal distribution and standardised scores
	c	Quality assurance

Box 1: Sport is a reflection of society and many of the issues that affect society are also prevalent in sport. For the same reasons, sport can also be a force for good at local, national and international level because of its ability to bring people together.

Box 2: Different **user groups** who may participate in sport:

- Ethnic minorities,
- Retired people / people over 50,
- Families with children / teenagers,
- Disabled people,
- Unemployed / socially disadvantaged.

Box 3: Some of the **barriers** that may affect participation in sport:

- Not much free time available due to work / school commitments,
- Family commitments (looking after children),
- Disposable income (unable to afford cost of participation),
- Accessibility to facilities / equipment,
- Awareness of what is available (activities not advertised),
- Portrayal of gender issues in sport / role models with perfect figures.

Box 4: Some **solutions** that may affect participation in sport (**provision**):

- Specific sessions for different demographic groups for example wheelchair sports,
- Planning times to suit different groups for example Mummy and baby activities in morning (not late at night).

Box 5: Some **solutions** that may affect participation in sport (**promotion**):

- Targeted promotion (promoting in places visible by that demographic),
- Using role models to encourage participation,
- Initiatives aimed at promoting participation (free swimming for over 60's, reduced rates at certain times).

Box 6: Some **solutions** that may affect participation in sport (**access**):

- Access to facilities (transport in rural areas, ramps for wheelchair access),
- Sensible pricing / concessions (unemployed / young children).

Box 7: What factors can **impact upon the popularity** of sport in the UK:

- Participation: football is a wide spread, mass participation sport as a result of strong infrastructure being in place, not just in the UK but in many other countries,
- Provision: tennis lacks easily accessible courts and as a result base level participation is low,
- Environment / climate: snow sports for example are impractical in many places particularly in the UK therefore following and participation in this is low.
- Spectatorship / media coverage: making it easy for people to view live sport.
- Role models / acceptability: are there any female footballers from minority ethnic groups? Is it acceptable to 'hurt the opponent' in boxing?

Box 8: Trends in the popularity of different sports in the UK are always changing for different reasons. Statistics and studies show that current growth sports in the UK in terms of numbers are recreational walking, fishing/angling, cycling and swimming. Growth of new emerging sports and activities in the UK include ultimate frisbee.

Questions:

1. State the different demographic user groups who may participate in sport.
2. Different demographic user groups experience differing barriers to participation. Can you explain some of the barriers to participation for different demographic user groups.

Box 1: What values can be promoted through sport?

- Team spirit (learning how to work together and support others by playing fairly as a team),
- Fair play (learning the importance of adhering to the rules and being fair to others),
- Citizenship (being involved in your local community through sport),
- National pride (supporters and performers unite over events),
- Excellence (striving to be the best possible, to make the team).

Box 2: Olympics and Paralympics:

The symbol of the five interlocking rings represents the union of five continents.

The Olympic and Paralympic values include Respect, Excellence, Friendship, Courage, Determination, Inspiration and Inequality.

Other initiatives and events promoting values through sport include: *Sport Relief, Sport England, FIFA's Football for Hope Campaign,* England Cricket '*Chance to Shine*' programme.

Box 3: Sporting behaviour is important for both performers and spectators including:

- Fairness, promoting values, safety of participants / spectators etc.
- Sportsmanship (giving the ball to the opposition when they have kicked it out when an injury occurs to the your team),
- Gamesmanship (also known as time wasting if your team are winning),
- Spectator etiquette (quiet during rallies at the tennis, quiet during play in snooker),
- Sports initiatives to break down barriers ('Kick racism out of football')

Box 4: There are many arguments for and against performance enhancing drugs in sport and many reasons why they are used including:

- Performers having pressure to succeed as an individual as well as pressure from team, supporters etc.
- One of the negatives of performance enhancing drugs is long term health effects, consequences when found to be guilty, knowing you have an unfair advantage over opponent.
- The impact of taking drugs will damage a performer's reputation.
- One of the arguments in sport with regard to drug taking is should there be a distinction between use of performance enhancing drugs vs recreational drugs – should performance enhancing drug takers compete in a separate league?

Questions:

1. State 3 reasons for and against drug taking in sport.
2. Explain some of the values that can be promoted through sport.
3. Research some of the initiatives promoting values in sport for example *Sport Relief*.

'The most important thing is not to win but to take part, just as the most important thing in life is not the triumph but the struggle. The essential thing is not to have conquered but to have fought well.' Pierre De Coubertin

Box 1: Hosting a major sporting event such as The Olympics / Paralympics, The World Cup or a Master Event will only happen once in any given city / country in a generation.

A regular event for example the UEFA Champions League Final is an annual event in the UK which a city would host more than once in a relatively short period of time but it is shared around as a rule.

Regular and recurring events would include hosting a Formula 1 Grand Prix annually. It would normally be contracted for a period of years to the host country / city.

If a country / city are going to host a large scale sporting event for example The London Olympics in 2012 a large amount of investment is required and also sponsorship deals with companies to aid the costs. However there is a legacy to be achieved as a result including increased profile of sport, a social legacy and an economic one such as new buildings and facilities.

Questions:

1. What are some of the barriers to cities hosting major sporting events?
2. What are some of the benefits to cities of hosting major sporting events?
3. Discuss some of the of National Governing Bodies in sport and these link to the benefits of hosting a major sporting event.

Box 2: **The potential barriers and benefits to cities hosting major sporting events:**

Barriers:

- Bidding to host can be an expensive exercise and you may not be awarded the event.
- Can cost host more than raised in revenue.
- Facilities can end up being left after the event.
- Can have a negative effect on the country if the event is not run properly/disorganized.
- May help to promote one sport but others may suffer as a consequence.

Benefits:

- Investment in developing/improving transport system.
- Increased direct / indirect tourism.
- Commercial benefits.
- Participation may increase in some sports.
- Improvements in sporting facilities which can be used by people in the local area.
- Raise the morale of the country.

Box 3: There are links between potential barriers and benefits of hosting a major sporting events. Many of the benefits and drawbacks are relevant to more than one legacy areas (sporting, social, economic) (e.g. sports facilities could have both sporting and social legacy).

Box 4: What are the roles of National Governing Bodies in sport:

- Promotion: promoting participation (equal opportunities), increasing popularity (particularly in schools), exposure in the media.
- Development: elite training and development, coaching awards and qualifications, training of officials.
- Infrastructure: competitions / tournaments, rule making and disciplinary procedure, providing a vision.
- Policies and initiatives: promoting etiquette and fair play, anti doping policy, community programmes.
- Funding: lobby for and receive funding from different streams and then distribute these funds fairly including grants, memberships, subscriptions, lottery funding, fundraising events.
- Support: providing technical advice and providing location and contact information for clubs, how to get started with the sport and introducing *grass routes* programmes.

Describe the contributing traits of two contrasting contemporary musical styles	Listen to a piece of music, recognizing and discussing the following musical elements
Rock 'n' Roll (1950s) **Reggae (1970s)** **Hip-Hop (1980s)**	**Tonality** – Learners will identify the Major/Minor, Tonal/Atonal characteristics of the track **Tonality** Major, Minor, Tonal, Atonal (essential for assessment) modulation, relative major/minor, tonic major/minor (good practice)
The factors that influenced its inception – Learners will consider the economic/political/social climate that led to the inception of the chosen style **Inception** How this was formed, this can relate to styles, substyles or revivals	**Tempo** – Learners will identify the tempo and relate this to the feel of the track **Tempo** The BPM (beats per minute) of the given piece of music (essential for assessment), simple and compound time (good practice)
Significant artists/bands/producers – Learners will select prominent artists/band/producers that accurately illustrate the chosen style **Significant** An artist/band/producer that is either prominent with the style or has in some way contributed to its evolution	**Instrumentation** – Learners will identify contemporary instrumentation present on the selected track and describe the effect this instrumentation has on the overall recording **Instrumentation** The instrumentation present within the given piece of music, e.g. The Beatles – Drums, Bass, 2 x Guitar, 4 x Vocals (essential for assessment)
Important recordings/performances/events – Learners will select seminal recordings/performances/events that accurately relate to, and illustrate the chosen style **Important** A recording that received commercial, cultural, or innovative recognition	**Lyrical content** – Learners will consider and analyse lyrical content (where appropriate) and analyse the tracks meaning **Lyrical Content** The lyrical message of the track or specific language used
Imagery and fashion associated with the style – Learners will provide examples of imagery and fashion describing how they were used and to what effect. **Imagery** Album covers, associated artwork, artist/band/producer stage appearance **Fashion** Clothing/accessories associated with the style. Worn or referenced by either artist/band/producer or fans	**Production techniques** – Learners will recognise the balance of the tracks mix, panning, effects, and EQ. **Production Techniques** The use of production during the recording process or applied afterwards. This can consist of, but is not limited to: **Panning** The way the track is presented in stereo sound (the balance between left and right). Are different instruments or vocals more prominent on one side of the recording **Mix Levels** How the track is mixed, i.e. the relative volumes of each instrument or vocal. **EQ** How the tone of instruments is sculpted to enhance or change them. **Effects** How processes are added to sounds to alter their characteristics.

Factors that influenced its inception	Significant artists/bands/producers	Important recordings/performances/events
• Rock 'n' roll has many roots - gospel, blues, country - dating back to the nineteenth century and before, but the emergence of rock 'n' roll really began with the social and economic changes stemming from the Second World War. • Through *rock* '*n*' *roll*, young people began searching for an identity. Before the 50s and Rock 'n' Roll, there was no such thing as a 'teenager' – young people listened to whatever their parents did. • Rock 'n' Roll gave them the opportunity to have their own music, clothing, style and identity – the rebellious age of the teenager had begun. • Amplified instruments were gradually becoming available, and this meant that electric guitar and bass soon became dominant, with the guitar become the solo instrument • Was heard in live dance halls, on juke boxes in coffee bars and on radio and was associated with dances such as the jive and the twist. Rock and Roll music was frequently associated with rebellion, and was popular with teenagers – a group who had only just developed their own identity.	**Chuck Berry:** Influenced by blues and country, played a major part in the fusion or rock 'n' roll from R 'n' B and hillbilly **Bill Haley & The Comets:** Uninhibited dancing style appealed to teenage audience as it represented rebellion. Took Rock 'n' Roll outside of America, by touring Europe and Australia **Elvis Presley:** Brought Rock 'n' Roll to both black and white audiences, achieving success in the R 'n' B and Country charts simultaneously **Sam Philips:** Producer and owner of Sun Records. Often referred to as 'The Father of Rock 'n' Roll, owing to his role in nurturing new talent and having 'discovered' many of the earliest Rock 'n' Roll Artists. **Jerry Lee Lewis:** Developed a distinctive style, influenced by R and B, Boogie Woogie and Gospel. Moved rock 'n' roll away from guitars to a piano-based sound **Eddie Cochran:** He experimented with multi-track recording and over dubbing in early 1960s **Gene Vincent:** Considered to be Rockabilly's greatest vocalist **Little Richard:** One of the first Rock and Roll singers in America. **Buddy Holly:** One of the pioneers of early rock and roll. Holly managed to bridge the racial divide that marked music in America along with Elvis and Chuck Berry. **Alan Freed:** DJ who started broadcasting *Moondog's Rock n Roll Party* in 1952	**'Rocket 88', (1951):**a precursor of rock 'n' roll, aimed solely at black audience **1953**: Alan Freed organized an R&B stage show at the Cleveland Arena. **1954**: '**That's alright', Elvis Presely:** Elvis' 1st release. '**Honey Don't', Carl Perkins**: One of the first original Rock 'n' Roll songs. **'Ain't that a shame', Fats Domino (1955):** 1st record to breakthrough to white audience/market in the pop charts, making him a Rock 'n' Roll star. **'Maybellene', Chuck Berry**: his first hit – a year before Elvis became famous, was popular across a wide spectrum of the population, both black and white, and particularly a teenage audience **'Rock around the Clock', Bill Haley & The Comets**: is considered the first rock 'n' roll hit, and was popularised by the 1955 film 'Blackboard Jungle', thus introducing rock 'n' roll to a wider audience through the medium of cinema. It was again used in the 1956 film 'Rock Around the Clock' **1956**: Elvis signs for RCA, recording '**Heartbreak Hotel'** – his 1st international hit – his sound became more commercialized. **1955-9**: Boom years for record industry where Rock'n' Roll becomes more internationally known.

Imagery & fashion associated with the style	Musical Features
Associated fashions included narrow lapels on jackets and drain-pipe trousers, white socks, string ties, cow-lick hair, full ballerina-length skirts, "waspy" belts, flat slip-onshoes, pony tails.	Usually uses 12-bar blues structure based on a repeated sequence using three chords, with Walking bass lines. Basic rock beat developed from jazz, and also featured strong back beat on 2 and 4, as in country. 'Shuffle rhythm' with slightly swung quavers was also common. Energetic delivery with screams and shouts, simple lyrics, scat singing (a type of jazz singing where nonsense syllables are used – e.g. doo wah) and the use of the blues scale. Backing vocals often in unison. Less improvisation than in rhythm and blues and country, and a developing verse – chorus structure, though this was still based on the 12 bar blues chord sequence. Call and response between vocal and guitar or piano.

Factors that influenced its inception	Significant artists/bands/producers	Important recordings/performances/events
• Reggae emerged in Jamaica from its predecessors Ska and Rocksteady and was performed at a slower tempo with a more laid-back feel. • After Jamaica's independence, people flocked from the countryside to Kingston, seeking work and settling into shanty towns. With high unemployment, Jamaican 'rude boys' (disaffected youths on the street) arose and became regular subject matter. • The roots Reggae style incorporated elements of the Rastafarian religion into the lyrics, with a political message concerning the plight of the underprivileged Jamaican. • Engineer-producers such as King Tubby and Lee 'Scratch' Perry worked with 'dub' recording techniques – creating dub versions of songs which were also later used to 'toast' over.	**Duke Reid & Coxsone Dodd**: producers who helped to slow the tempo of ska, to form rock steady. **Toots & the Maytals**: pioneered the Reggae sound **Bob Marley and The Wailers:** Became the defining sound of roots Reggae (Bob Marley, Bunny Wailer & Peter Tosh). Helped Reggae to reach a global audience. **Jimmy Cliff**: gained international fame as the star of the movie 'The Harder They Come '. **Chris Blackwell:** Founded Island Records in Jamaica but relocated to London. **Clement Dodd:** Studio One producer, recorded The Wailers 1st track 'Simmer Down'. **UB40**: British Reggae Band, gave Reggae a fresher sound.	**1962:** Jamaica became independent. **'My boy lollipop, Millie Small (1964)**: early reggae success in British charts **'Rudy a message to you', Dandy (1967)** – example of a 'rudeboy' song. **'Do the reggay', The Maytals (1968):** early use of the term 'reggae. **The Israelites, Desmond Dekker (1969)** **'Wonderful World, Beautiful People', Jimmy Cliff (1969)** **1972**: Blackwell signed Bob Marley & the Wailers. **1973**: The Harder they come (film) was released **'No Woman no Cry', Bob Marley (1974)** '**I shot the Sheriff', Eric Clapton (1974)**: Cover of Marley's song which was a big hit and inspired many listeners to look up Marley's music. **Freedom Fighters, Delroy Washington (1976)** **'One Love', Bob Marley (1977)** **1978**: Bob Marley brings 2 opposing leaders together at 'One Love' concert in a bid to encourage peace.

Imagery & fashion associated with the style	Musical Features
Associated fashions included the colours of the Jamaican flag: green, gold, red and black – each colour symbolizing a different thing, associated with the Rastafarian religion. Dreadlocks are also common features	Slow tempo with a laid-back feel. The bass guitar and percussion are brought to the foreground, and guitar and keyboards sent back in the mix, exchanging the traditional roles of these instruments. A Reggae bassline is very melodic and often the defining feature. It normally avoids the first beat of the bar. Drums also avoid beat 1, preferring to stress beat 3. The guitar mostly plays chords on the offbeat, beats 2 and 4. Piano & organ also play on the offbeat. Horns sometimes add countermelodies and would normally be made up of Sax, Trumpet and Trombone.

COMMON FEATURES OF ENGINEERING DRAWINGS

- Geometry – the shape of the object; represented as views; how the object will look when it is viewed from various angles, such as front, top, side, etc.
- Dimensions – the size of the object is captured in accepted units. The dimension is the numerical value expressed in appropriate units of measurement and indicated graphically on technical drawings with lines, symbols and notes.
- Tolerances – the allowable variations for each dimension. Tolerancing is the practice of specifying the upper and lower limit for any permissible variation in the finished manufactured size of a feature. The difference between these limits is known as the tolerance for that dimension.
- Material – represents what the item is made of.
- Finish – specifies the surface quality of the item, functional or cosmetic. For example, a mass-marketed product usually requires a much higher surface quality than, say, a component that goes inside industrial machinery.
- Scale – The scale to be chosen for a drawing shall depend upon the complexity of the object to be depicted and the purpose of the representation. In all cases, the selected scale shall be large enough to permit easy and clear interpretation of the information depicted. The scale and the size of the object, in turn, shall decide the size of the drawing.

TITLE BLOCK

The title block (T/B, TB) is an area of the drawing that conveys header-type information about the drawing, such as:

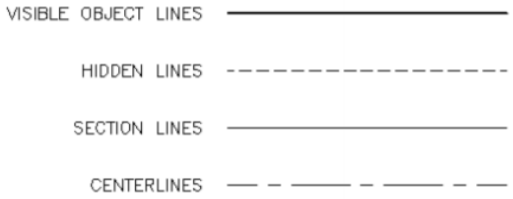
Author	Drawing Number	Date	Title
Materials	Scale	Sheet Number	Measurement

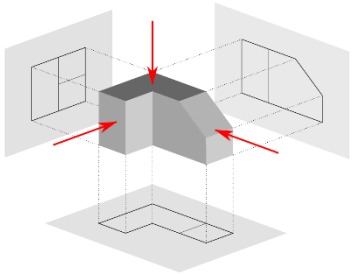
BRITISH STANDARD BBS8888

BS8888 is a set of standards relating to the layout of technical drawings, the various ways of indicating required dimensions, the way in which tolerances and surface finishes are identified, as well as the recognised systems for adding other annotations, symbols, and abbreviations.

It works to allow interpretation of a technical drawing by persons with minimal engineering experience and even with limited grasp of the language in which the drawing was first created.

LINE TYPES





MULTI VIEW PROJECTION

A multiview projection is a type of orthographic projection that shows the object as it looks from the front, right, left, top, bottom, or back (e.g. the primary views), and is typically positioned relative to each other according to the rules of either first-angle or third-angle projection.
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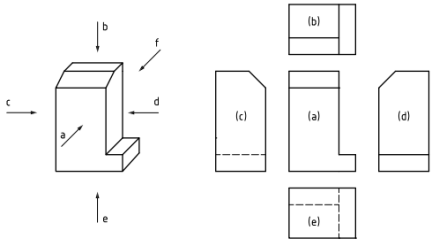
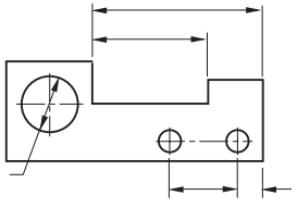


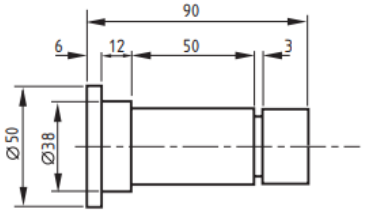
THIRD ANGLE PROJECTION METHOD (above)

With reference to the front view (a), the other views shall be arranged as follows (see Figure 8). • The view from above (b) shall be placed above. • The view from below (e) shall be placed underneath. • The view from the left (c) shall be placed on the left. • The view from the right (d) shall be placed on the right.



Dimension lines are added to show the length of a line. They have an arrowhead at each end.

Dimension lines always move from the smallest to largest – You can see the largest dimension line (90mm) is at the top



SI BASE UNITS

unit	abb	physical quantity	Smallest - - - - - - - - - - Largest
metre	m	length	Micrometre, millimetre, centimetre, metre
second	s	time	Microsecond, millisecond, seconds
kilogram	kg	mass	Milligram, gram, kilogram
ampere	A	electric current	Micro amp, milliamp, amp, kiloamp
kelvin	K	thermodynamic temperature	Kelvin, degrees Celsius
candela	cd	luminous intensity	Microcandela, millicandela, candela
mole	mol	amount of substance	Nanomole, micromole, millimole, mole

ENGINEERING DISCIPLINES

Mechanical	Hydraulics, gears, pulleys
Electrical	Power station, household appliances, integrated circuits
Aerospace	Aircraft, space vehicles, missiles
Communications	Telephone, radio, fibre optic
Chemical	Pharmaceuticals, fossil fuels, food and drink
Civil	Bridges, roads, rail
Automotive	Cars, motorcycles, trains
Biomedical	Prosthetics, medical devices, radiotherapy
Software	Applications, systems, programming

UNDERSTAND THE MAKING PROCESS

1	Preparation	Drawing, CAD, sketches, plans.
2	Marking Out	Pencil, scribe, steel rule, tri square, marking gauge, calipers, centre punch.
3	Modification	Saw, jigsaw, scroll saw, laser cutter, pliers, hammer, drill, file, glass paper.
4	Joining	Riveting gun, spanner, screwdriver, hot glue, gun , soldering iron, nail gun.
5	Finishing	Hand sander, glass paper, disc sander, buffing wheel, polish, spray paint, varnish.

HEALTH & SAFETY LEGISLATION

Health and Safety at work Act	Personal Protective Equipment	Manual Handling Operations	Control of Substances Hazardous to Health	Reporting of Injuries RIDDOR

Keywords

Food additives

Any additive that is used in the UK has to undergo strict testing to be approved.

1. Artificial additives. Additives that are made completely from chemicals.

2. Natural additives. Additives that are obtained from foods naturally (e.g. beetroot juice).

3. Nature identical additives. Additives that are synthetic (made chemically to be the same as a natural product)

Type of additive	Why used	Example foods
Preservative	To extend shelf life	Fruit juice, dried fruits salad dressing
Flavour intensifier	To improve the taste of food by adding flavour. To restore flavours lost during processing	Savoury snacks/savoury foods, vanilla yoghurts
Stabilisers and emulsifiers	To help foods mix together and prevent ingredients separating out when the product is being stored. To give foods a smooth and creamy texture To extend the shelf life of baked goods	
Colourings	To make foods look attractive To boost the colour already present in foods To add colour to food lost during processing	Fizzy drinks, strawberry yoghurt

Keywords

Structure and classification of simple carbohydrates (sugars)

1. Monosaccharide. Simple sugars made of small molecules that are easily digested. They include glucose, fructose and galactose.

2. Disaccharide double molecules of glucose joined together. They take longer to digest, They include sucrose, lactose and maltose.

3. Glucose. Simple sugar found in some fruits and vegetables.

4. Fructose. Similar to glucose and is found mainly in honey. It is very sweet and is often used by manufacturers to replace glucose.

1. **Sucrose.** Made from cane sugar and sugar beet. It is the most common disaccharide.

2. **Lactose.** Found in milk. Some people find this sugar difficult o digest.

3. **Maltose.** Found in grains. They usually have to be fermented to extract the maltose

4. **Intrinsic sugar.** Sugar contained within the cell walls

1. Extrinsic sugars . Sugars that we add to recipes, dishes we make and drinks

Invert sugar. Used extensively in the confectionary manufacturing industry because it does not crystallise out of solution. Because of this quality, it is used to retain moisture in products..

Key points

Sugar is a simple carbohydrate that provides the body with energy. As a food it provides no other nutrient.

Energy from food is used to maintain physical activity, and all body functions.

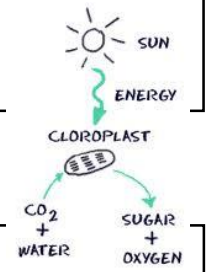
Sugar is used to sweeten and flavour food

Manufacturers sometimes use additives during food processing to extend the shelf life of foods or to improve or change their flavour, taste or appearance.

Additives can be use to keep food safer for longer

Additives can cause some people to have a skin rash and they can cause hyperactivity in children.

An excess of sugar in the diet can lead to tooth decay (dental caries)



Quick test

1. Name two monosaccharides.
2. Name two disaccharides
3. Look at labels on food at home or in your bag/pocket. Which contain invert sugar?
4 Why are sugars said to provide quick release energy?
5. Explain the term dental caries?
6. Look at labels on food at home or in your bag/pocket. Find the preservatives. What are they called? What do they do? Use the table.

YEAR 10 – TRINITY TERM- FOOD AND NUTRITION – VITAMINS AND MINERALS

LEARNING - LOVING - LIVING

Nutrient		Function	Source	Effects of deficiency	Effect f excess
VITAMINS	**Vitamin A** **FAT SOLUBLE**	1. Required for a healthy immune system 2. Keeps mucous membranes of eyes, digestive system and lungs healthy 3. Is an antioxidant	**1. Retinol** from animal sources: Dairy products, Egg yolk, oily fish, **2. Beta-carotene** from plant sources: fortified spreads, yellow and orange fruits and dark green leafy vegetables,.	1. Deficiency is rare in developed countries but can lead to night blindness and a compromised immune system 2. Dry mucous membranes	1. Can be poisonous, Builds up in the liver 2. Pregnant women should avoid eating too much retinol from animal sources as it can cause birth defects
	Vitamin B Group	**1. B1 (thiamine)** release energy from carbohydrates **2. B2 (riboflavin)** release energy from carbohydrates **3. B3 (niacin)** release energy from carbohydrates **4. B6 (pyridoxine)** release energy from carbohydrates **5. B9 (folate, folic acid**) Essential for the formation of DNA **6. B12 (cobalamin).**Needed to form a protective coating around nerve cells Needed to keep the skin, eyes and nervous system healthy	**B1** Cereals such as wheat and rice, yeast, yeast extract (marmite) **B2** Liver, kidneys, eggs, milk, green veg **B3** meat and poultry, pulses e.g. lentils **B6** A wide range of foods **B9** liver and kidneys, wholegrains, dark green vegetables **B12** meat, fish and eggs, dairy products. Vegans need to take a supplement as it is only found in animal foods.	**1. B1** the body will have slow growth and development. Severe deficiency leads to beri-beri **2. B2** dryness of the skin around the mouth, poor growth. **3. B3** deficiency is rare but can lead to a disease called pellagra. **4. B6** can lead to headaches, weakness, anaemia and skin problems **5. B9** tiredness and anaemia. Lack of folate during pregnancy can lead to spina bifida. Folic acid is usually taken **6. B12** tiredness and anaemia.	**1. B1** No evidence to suggest that eating too much is harmful**.** **2. B2** No evidence to suggest that eating too much is harmful **3. B3** unlikely to eat too much in a normal diet. Taking too much in the form of supplements can cause skin flushes and eventually liver damage **4. B6** taking more that 200mg a day can lead to peripheral neuropath**y** **5. B9** taking large dose of Folic acid can disguise a vitamin B12 deficiency which can be a problem in older people **6. B12** No evidence to suggest that eating too much is harmful
	Vitamin C (ascorbic acid)	1. Helps the body absorb iron from food 2. Essential for the formation of collagen (the body's scaffold tissue) 3. Aids wound healing 4. Supports a healthy immune system & fights infection	1. Fruits including – kiwi, strawberry, citrus fruits 2. Peppers, tomatoes 3. Dark green vegetables including cabbage, broccoli (but not lettuce)	1. Extreme deficiency is called scurvy. This is very rare however symptoms include bleeding gums, wounds not healing properly, tiredness. 2. Lack of vitamin C can also be linked to iron-deficiency anaemia as absorption of iron will be affected by lack of vitamin C	1. Excess vitamin C taken in the diet is excreted by the body.
	Vitamin D (cholecalciferol)	Essential for absorbing calcium from foods Helps in the formation and development of strong teeth and bones	1. Sunlight in UK summer 2. Food sources – oily fish, eggs, liver, fortified cereals 3. Added by law to margarine	1. Poor absorption of calcium – rickets (soft bones) in children and osteomalacia in adults	1. It is difficult to eat too much vitamin D in a normal diet. If vitamin D supplements are taken over a LONG period of time, more calcium can be absorbed in the body and deposited in the kidneys. This can damage them.
	Vitamin E (tocopherol)	1. Is an antioxidant. 2. Helps the cell walls in the body stay healthy. 3. Can help in the prevention of some cancers and heart disease.	1. Vegetable oils lettuce, peanut seeds and wheatgerm oil.	Deficiency is rare. Occasionally it can arise if a person has a problem absorbing fat which contains vitamin E.	No evidence that eating too much cause harm
	Vitamin K	Helps the blood to clot	1. Green leafy vegetable, cheese, asparagus	1. Deficiency in adults is rare 2. Babies have an injection of vitamin K straight after birth.	No evidence that eating too much cause harm
MINERALS	**Iron**	Iron is needed to make haemoglobin in red blood cells	**Haem iron** found in meat, offal **Non-haem iron** found in wholegrain foods, leafy green vegetables, fortified breakfast cereals. Iron is only absorbed in the presence of vitamin C.	1. Iron deficiency anaemia is the most common dietary deficiency in the UK. Symptoms include tiredness, paleness, lethargy	Taking more than 20 mg per day causes stomach pain, nausea, vomiting and constipation
	Calcium	1. Calcium is needed by the body to build strong bones and teeth. 2. Essential for blood clotting process 3. Essential for nerve signal transmission and muscle contraction	1. Dairy foods including milk, yogurt, cheese, butter 2. Dark leafy green vegetables, 3. Fish with edible bones 4. Non-dairy milks fortified with added calcium	1. Lack of calcium in children can cause rickets and Osteoporosis (brittle bones) in adults	Taking over 1,500mg per day can cause stomach pains and diarrhoea.

Keyword	Description
7. Embroider	Using sewing and thread to add decoration
2. Stencil	How an image is separated into tones to allow for processes such as spray painting
3. Highlight	Areas of light in an image/ the areas on a surface upon which there is the highest intensity of light being reflected
4. Distort	pull or twist out of shape. "a grimace distorted her fine mouth"
5. Proportion	The correct, attractive, or ideal relationship between one thing and another or between the parts of a whole. "perceptions of colour, form, harmony, and proportion"
6. Contemporary	living or occurring at the same time.
7. Collage	a piece of art made by sticking various different materials such as photographs and pieces of paper or fabric on to a backing.

B. Command Words

Keyword	Description
8. Refine	To improve, enhance and change elements of your work for the better.
9. Response	To produce personal work generated by a subject, theme, starting point, or design brief.
10. Investigate	To enquire into, examine in depth, and/or analyse the relevance of a chosen subject and associated sources.
11. Research	To study in detail, discover and find information about.

C. Technique

C1. **Grid method** requires you to measure and draw a grid over an image
C2 The Grid method provides accurate spacing for your image
C3 Acrylic Paint is a paint that will dry as a plastic
C4 Acrylic paint can be used to paint bold layered painting as it dries quickly
C5 Carbon Paper is paper that is coated in carbon to be used for transferring images

D. Types of Equipment and Materials

Keyword	Description
D1 Round Brushes	Round **brushes** are the most **versatile** and widely used brushes. Their shape makes them suitable for small details and delicate lines. They can also be used to make broader strokes and washes.
D2 Flat Brush	**Flat brushes** aren't as versatile as round brushes but they're useful for blending and creating washes
D3 Spotter Brush	**Spotter brushes** are small round brushes with shorter bristles to give extra control. They are excellent for precise details.
D4 Wash Brush	**Wash brushes** are similar to flat brushes, but are much wider. They are suitable for blending or applying lots of paint.

First Aid Key term	Definition
1. Abrasion	Medical term for a graze to the skin. An abrasion is damage to the superficial layers of the skin.
2. Adrenaline	A hormone released by the adrenal glands (just above the kidneys). It increases the heart rate and causes blood vessels to constrict. This hormone is responsible for the 'fight or flight' response.
3. Anaphylaxis	A life-threatening whole body allergic reaction which causes airway swelling and shock.
4. Concussion (head injury)	An injury to the brain which causes 'shaking' / 'jarring' of the brain.
5. Contusion	A bruise (bleeding beneath the skin)
6. Epi-pen	An auto-injecting syringe containing adrenaline used to counteract a major allergic reaction
7. Epilepsy	A medical condition characterised by repeated seizures. May be controlled by medication
8. Hyperglycaemia	High blood sugar levels
9. Hypoglycaemia	Low blood sugar levels
10. Insulin	A hormone produced by the pancreas that reduces blood sugar levels
11. Cardio	Relating to the heart
12. Pulmonary	Relating to the lungs
13. Resuscitation	the action or process of reviving someone from unconsciousness
14. Primary survey	The quick initial assessment of a patient. Often structured in an 'ABC' approach (airway, breathing, circulation)

First Aid Tips

MAJOR BLEEDING

1. ✓ Call 911 and put on gloves (or a plastic bag) ✓ Have person lie down with head lower than body.
2. ✓ Remove obvious objects from wound, but don't clean it.
3. ✓ If organs have been displace, do not push them back in, simply cover the wound.
4. ✓ Apply direct pressure with gauze / clothing until bleeding stops (don't "look" for at least 20 min), and apply pressure around deeply embedded objects, not over them.
5. ✓ Do not remove gauze / bandage. Simply keep adding more as needed
6. ✓ If limb (arm / leg) is bleeding, elevate it.

HANDS-ONLY CPR (Cardio Pulmonary Resuscitation)

1. ✓ Call 911
2. ✓ Push hard and fast at the center of the chest
3. ✓ IMPORTANT: Hands-Only CRP is most effective if used after you SEE a teen or adult suddenly collapse. If you are trained in conventional CPR, you should use it if victim is found unconscious.

15. Laceration	**An injury where there is cutting or tearing of the skin**
16. Recovery position	A position where the casualty is laying on their side to protect their airway

1. HEALING	2. ENERGIZE	3. AWARENESS	4. LIVE	5. TIME	6. HELP
Practice: **Heal your hurt & pain. Deal with the past or existing issues that are currently causing you problems.**	**Practice:** **Empower your body & mind by looking after yourself. Eat well and exercise.**	**Practice:** **Begin to take notice of what you are experiencing i.e. your bodily reactions or change in mood.**	**Practice:** **Live & learn. Live life in all its fullness. Take opportunities & make opportunities. Look at life as a lesson, learn from your mistakes whilst moving on better equipped.**	**Practice:** **Make time for yourself. Find a comfortable balance, whilst doing the things you have to do, as well as doing the things you enjoy.**	**Practice:** **Help yourself as well as others. Be patient and kind to yourself. Believe in your value and that you are good enough.**
Why? Avoiding pain will over time increase it. Painful experiences can result in defining you, shaping you & clouding your judgements. Ultimately avoidance will eventually steal away a life of self-fulfilment & reaching your full potential. Self-actualization. Talk and make connections with others. Talking can release stress & is particularly a helpful way of offloading, making sense of situations & giving your thoughts a voice. Talking allows for relationships to grow, strengthen & perceive problems from a different perspective**.**	Why? Becoming active both physically & mentally will rebalance you emotionally. Powerful chemical endorphins in the brain are released when we exercise. The same endorphins that make us feel energized & give a feel good feeling are the same endorphins that promote calm & wellbeing. A healthy nutritious diet reduces the risk of chronic diseases & increases concentration and high mood.	Why? Be mindful of not only what is happening for you, but also try to connect with your surroundings & what is happening around you. Once you begin to make these connections, you'll be able to connect & empathise with how others might feel, ultimately promoting the tolerance of people.	Why? We are curious beings. Our learning never comes to an end. What we learn (including the motivation we have for it) can positively have an impact on self-esteem & efficacy, our life satisfaction, our confidence & our capacity to cope. 	Why? Give time to your strengthens, without forgetting to work on the weaknesses. Consider what it is you need and how these needs can be met. Surrounding yourself with people that will bring the best out in you will encourage you and create confidence.	Why? Learn to accept your uniqueness, as well as other's differences. Offering your support can reduce isolation. It can create a sense of belonging & in general make the world more habitable. Your act of kindness can increase low self-esteem, optimism, self-satisfaction & happiness.
How? Seek advice from your GP. Support groups. Self-help books. Twelve step programs. Counselling. Reach out to friends/family**.**	How? Drink plenty of water. Relax & get the recommended 8 hours of sleep. Exercise & keep active - Join the gym/dance class/drama group. Try Tai Chi/swimming/walking/jogging. Read. Learn something new/take a course.	How? Mindfulness/meditation Learn how to actively listen to others, as well as yourself.	How? Try new things. Visit new places. Set realistic goals/ create a bucket list.	How? Volunteer your time to a worthwhile cause. Partake in a creative activity. Take small steps in challenging your fears & weaknesses. Spring clean & organise your home as well as your mind by getting rid of what you no longer need or want.	How? Ask for help when you feel the need. Offer your support where you can. Trust in your capability. Do not let False Evidence that Appears Real (fear) hold you back from reaching your full potential.