ASTREA ACADEMY SHEFFIELD

SAPIENTIA DUCET AD ASTRA

Y10 Knowledge Organiser Booklet

Autumn Term 2021

SAPIENTIA DUCET AD ASTRA

WISDOM LEADS TO THE STARS

NAME: ..... TUTOR GROUP: .....

Please bring this booklet to school every day. Respect it and keep it safe.

Contents

Subject: English	Topic: Macbeth, William Shakespeare, 1606	Term: Autumn

Useful Resources	Mr Bruff 'Macbeth' on: YouTube www.sparknotes.com/Shakespeare/Macbeth/

Characters (and key vocabulary to describe central characters)

Macbeth	Is considered a hero at the beginning of the play. Gets promoted from Thane of Glamis to Thane of Cawdor and eventually King. Is ambitious and manipulated by his wife. ***Ambitious, Courageous, Deceitful, Impulsive, Ruthless, Treasonous, Tyrannical***
Lady Macbeth	Is manipulative and does not follow the stereotypical Jacobean woman of this time. Is presented as strong at the beginning of the text and weak at the end when she becomes insane because of how guilty she feels. ***Cunning, Dominant, Emasculating, Malevolent, Mutinous, Scheming, Vulnerable***
King Duncan	Is the King of Scotland at the beginning of the play. Is murdered by Macbeth after Lady Macbeth persuades him to so he can get the throne. ***Benevolent, Faithful, Honest, Naive, Sincere***
Banquo	Macbeth's best friend. Is ordered to be and is murdered by Macbeth as he poses as a threat to Macbeth's chances of becoming King. Macbeth loses trust in Banquo because he was present when Macbeth saw the witches. Appears as a ghost at the banquet after his murder. **Devoted, Intuitive, Loyal, Trustworthy, Virtuous**
Fleance	Banquo's son. Ordered to be killed by Macbeth as he is a threat to Macbeth becoming King, however, Fleance escapes from the murderers. Foreshadowed that Fleance is a light for Scotland and Fleance will be the first King (in the witches' predictions) who will start the line of descendants.
Macduff	Soldier, Thane of Fife and Macbeth's rival. Grows suspicious of Macbeth after KD's murder. Forms an army with Malcolm in England and kills Macbeth at the end; a figure of mortality. ***Devout, Fervent, Heroic, Merciless, Patriotic, Unwavering***
Lady Macduff	Macduff's wife. Is murdered along with her son after Macduff flees. She represents the archetypal mother and wife and is a sharp contrast to Lady Macbeth.
Malcolm	King Duncan's son. Flees to England after he is killed. Represents order and once that is restored at the end of the play, he becomes King.
Donalbain	King Duncan's other son who flees to Ireland after King Duncan is killed.
The Witches	The three witches open the play and later meet Macbeth with prophecies, which impacts Macbeth's life. The witches guide Macbeth on the path of his own destruction. ***Corrupt, Ignoble, Manipulative, Sinister, Subversive***

The playwright's intentions were to make the audience feel…				
	Astonished	Disgusted	Nonplussed	Surprised
	Appalled	Disquieted	Perturbed	Unnerved
	Bewildered	Distressed	Scandalised	Unsettled

Plot

Act 1 Macbeth and Banquo meet witches, previous Cawdor executed, Lady Macbeth reads letter then manipulates husband, Duncan arrives
Act 2 Macbeth contemplates murder, sees dagger, Kills Duncan, Malcolm flees, Macbeth crowned.
Act 3 Banquo suspects Macbeth, Banquo murdered but Fleance escapes, Banquo's ghost appears at banquet
Act 4 Macbeth goes back to witches, Macduff's family murdered while Macduff is in England, Malcolm tests Macduff's loyalty
Act 5 Lady Macbeth sleepwalks then commits suicide, Macbeth prepares for battle, Macduff kills Macbeth, Malcolm becomes king.

Context

Witchcraft	People believed in witches and bad events were blamed on women who were considered to be witches. Witchcraft charges and witch hunt crazes seen throughout the 1600s.
King James I	Wrote a book about witchcraft and ordered huge witch hunts (bigger than ever seen before) in Scotland. He also survived an assassination attempt (the Gunpowder Plot). **His mother was known as an incompetent ruler and King James J was constantly worried, when he become King of England, that people would rebel and overthrow him.**
The Divine Right of Kings and Regicide	Belief that the monarch was the closest human to God and been divinely selected to be king. Only God, therefore, could choose to judge or dethrone the monarch. Any attempts to remove the king, especially through regicide (killing the monarch) was an act of treachery, a mortal sin.
The Great Chain of Being	Renaissance England believed in this hierarchal structure for organizing society. The chain starts with God and progresses downward to include the monarch (highest human in the chain), nobles, commoners, animals, plants, minerals. People believed that the Great Chain of Being brings order to a disordered world. Everyone should know and respect their place. When it is disrupted, chaos (a deep anxiety in early modern England) is brought into the world.
Machiavelli and Renaissance conceptions of Evil	Machiavelli was a heavily influential Italian political thinker who argued that princes (someone who has power) are justified in behaving immorally (evil) to secure their power. He said that 'when men are no longer obliged to fight from necessity, **they fight from ambition,** which passion is so powerful in the hearts of men that it never leaves them, no matter to what height they rise.'
Renaissance masculinity and feminity	**Masculinity**= defined through physical strength and power. Men proved their honour through fighting/strength and protecting/standing up for their family's rights and privileges. Also masculinity defined through strong and loyal fraternal (brotherly) bonds between men. **Femininity**= defined by nurture, beauty, grace and passivity. Females proved their honour through their virginity and continued chaste behaviour.

Subject: English	Topic: Macbeth, William Shakespeare, 1606	Term: Autumn

Key Terminology

Ambition	The desire to be powerful and successful.
Betrayal	Being disloyal to a person/group/one's country.
Dramatic Irony	When the audience know more than the characters.
Duplicity	Behaving in a deceitful and double-dealing manner.
Emasculation	Make someone weak and ineffective. For a man, to lose male role/identity.
Fate	A power that some people believe controls and decides everything that happens, in a way that cannot be prevented.
Hamartia	Fatal flaw which leads to a downfall. Macbeth's is his unchecked ambition.
Hubris	Excessive pride or self-confidence.
Patriarchy	System in which men have all or most of the power and importance in society.
Regicide	The act of killing the king.
Soliloquy	One character speaking to themselves/audience.
Supernatural	Things that cannot be explained by science e.g. the witches.
Tragedy	A play dealing with tragic events and having an unhappy ending, especially one concerning the downfall of the main character.
Treason	The crime of betraying one's country.
Tyrant	A cruel and oppressive ruler.
Usurp	Taking a position of power illegally and often with force.

Key Quotations

Act 1:
- ***'Fair is foul, and foul is fair/hover through the fog and filthy air.'*** The witches. Foreshadowing that people who are seen as god will turn evil.
- ***'O valiant cousin! Worthy gentleman!'*** Description of Macbeth as the honourable warrior at the start of the play.
- ***'…Stars, hide your fires;/Let not light see my black and deep desires.'*** Macbeth questions his deep ambition and desires after the witches' prophecies.
- ***'Unsex me here/ and fill me from the crown to the toe top-full of direst cruelty!'*** Lady Macbeth after reading Macbeth's letter.
- ***'Look like th'innocent flower, but be the serpent under't.'*** Lady Macbeth ordering Macbeth to be duplicitous towards Duncan.
- ***'When you durst do it, then you were a man.'*** Lady Macbeth emasculating Macbeth when is thinking of not killing Duncan.
- ***'I have given suck and know how tender 'tis to love the babe that milks me:/I would… and dash'd the brains out, had I so sworn as you have done.'*** Lady Macbeth manipulating and convincing Macbeth to not break his word and go forward and commit regicide.

Act 2:
- ***'Is this a dagger which I see before me… Or art though but/ a dagger of the min, a false creation,/Proceeding from the heat-oppressed brain? '*** Macbeth hallucinating.
- **'Had he not resembled/ my father as he slept, I had don't.**' Lady Macbeth reveals why she couldn't kill Duncan herself.
- **'Methought I heard a voice cry, 'Sleep no more:/Macbeth does murder sleep.'** Macbeth explains what he thinks he heard whilst committing murder.
- **'Will all great Neptune's ocean wash this blood/Clean from my hand. No.'** Macbeth after killing Duncan.
- **'My hands are of your colour; but I shame/To wear a heart so white/A little water clears us of this deed.'** Lady Macbeth after framing the bodyguards.

Act 3:
- ***'Thou hast it now: king, Cawdor, Glamis, all/As the weird women promised, and, I fear,/Thou play'dst most foully for't.'*** Banquo about Macbeth.
- ***'To be thus is nothing, but to be safely thus../Upon my head they plac'd a fruitless crown,/and put a barren scepter in my gripe.'*** Macbeth after becoming king, but before Banquo's death.
- ***'O full of scorpions is my mind, dear wife!'*** Macbeth to his wife, explaining that his mind is brooding on the fact that Banquo and Fleance still live.
- ***'Be innocent of the knowledge, dearest chuck/Till thou applaud the deed.'*** Macbeth to Lady Macbeth, not revealing his murderous plotting.
- ***'Thou canst not say I did it. Never shake/thy gory locks at me.'*** Macbeth to Banquo's ghost.

Act 4:
- **'By the pricking of my thumbs/something wicked this way comes.'** The witches about Macbeth.
- **'For none of woman born/Shall harm Macbeth.'** One of the witches' further prophecies.
- **'I will be satisfied. Deny me this,/And an eternal curse fall on you.'** Macbeth threatens to curse the witches if they don't reveal whether Banquo's descendants (up to an including the real-life King James) will become kings.
- **'The castle of Macduff I will surprise,/Seize upon Fife; give to the edge o' the sword/His wife, his babes, and all unfortunate souls/That trace him in his line.'** Macbeth deciding to order the slaughter of the Macduffs.

Act 5:
- **'I think our country sinks beneath the yoke;/It weeps, it bleeds, and each day a gash/Is added to her wounds.**' Malcolm explaining what Macbeth's tyrannous rule is doing to Scotland.
- **'He has no children. All my pretty ones?/…What, all my pretty chickens and their dam in one fell swoop.'** Macduff when he receives news of his family's slaughter.
- **'Out, damned spot!'** Lady Macbeth when hallucinating and sleepwalking, imagining Duncan's blood on her hands.
- **'Here's the smell of blood still; all the perfumes of/Arabia will not sweeten this little hand.'** Lady Macbeth imagining the scent of lingering blood.
- **'I'll fight till from my bones my flesh be hack'd.'** Macbeth planning for battle.
- **'Life's but a walking shadow, a poor player/That struts and frets his hour upon the stage/And then is heard no more.'** Macbeth hearing about wife's death.
- **'Life 'is a tale/Told by an idiot/Full of sound and fury/Signifying nothing.'** Macbeth's final verdict on life, and himself.
- **'This dead butcher and his fiend-like queen.'** Malcolm's final verdict on Macbeth and Lady Macbeth.

Subject: English Langauge	Topic: Y10 - Short Story Writing	Term: Autumn

Short stories are characterised by focusing on the singular:
1. A single main character
2. A single main problem/challenge
3. A single main outcome.

KEY VOCABULARY LIST	
Characterization	Characterization is the way an author shows what a character is like.
Foreshadowing	A sign that suggests something that will happen later.
Protagonist	The main character of a story.
Epiphany	A moment of sudden understanding.
Narrative	A synonym for story.
Metaphor	A way of describing something by referring to something else which is the same in a particular way.
Simile	A way of describing a person or thing as being similar to someone or something else. Often using the words 'as' or 'like'.
In medias res	Beginning a narrative in the middle of events or action
Symbolism	Using an object, part of nature or colour to represent something else; telling the readers something without saying it outright.
Alliteration	Two or more words that begin with the same letter or sound.
Sibilance	The repetition of s, z or soft c sounds.
Ambiguity	Something that it is unclear, or it can be understood in more than one way.

Methods	
Characterization	• The protagonist should be from this world. • The protagonist should be made believable by foreshadowing important details about them early on. • You should use similes and metaphors to give a deeper understanding of your protagonist. • The protagonist should be changed in some way by the end of the story.
Narrative Perspective	• **1st person** – The character tells their own story, often using pronouns like 'I' and 'my'. • **2nd person** – The story is being told directly to the reader, often using pronouns like 'you' and 'you'll'. This is not often used in fiction writing but is often used in rhetorical writing. • **Omniscient 3rd person** – The narrator explains the character's story using pronouns 'she', 'they' etc. The narrator knows everything, including the thoughts and feelings of all of the characters. • **Limited 3rd person** – The narrator explains the character's story using pronouns 'she', 'they' etc. The narrator only knows what they can see happening in the story. • **Unreliable** – The narrator is telling a misleading account of the story.
Openings	• Describe the weather and use this as a symbol for the mood of your narrative. • Start in medias res (in the middle of events or action) • Start with dialogue or 1st person narrative.

Classic narrative	Encounter narrative	Epiphany narrative	Circular narrative
•A brave but vulnerable protagonist suffers a difficult experience. •After a period of struggle, they eventually overcome the 'baddie'/evil force.	•The protagonist is confronted by something/someone which disrupts their routine. •Suddenly, something important is now at stake for the protagonist.	•Focused on the inner-drama of the protagonist. •Usually a short, intense experience has a major impact on them.	•A story that starts and ends with the same line, action or idea.

Useful resources:
https://www.pobble365.com/
https://www.bbc.co.uk/bitesize/guides/zy47xsg/revision/1

Subject: *Y10 English*	Topic: *Examination Knowledge*	Term: *Autumn*

Literature Paper 1 (Macbeth)

Timings	You have **45 minutes** on this question. This should be broken down in the following way: ▪ **5 minutes:** reading and annotating the question and extract ▪ **5 minutes:** planning your essay ▪ **30 minutes:** writing your essay ▪ **5 minutes:** proof reading your work
Structure	▪ Introduction ▪ Analytical paragraph 1 ▪ Analytical paragraph 2 ▪ Analytical paragraph 3 ▪ Conclusion **IMPORTANT: You must speak about the extract and the rest of the play. Choose a contrasting or a complimentary moment from another part of the play to compare with the extract.**
Assessment	**AO1** – Knowledge of the text. **AO2** – Analysis of language, structure and methods. **AO3** – Context and authorial intention.
Tips	▪ **Make sure that you are answering the question**. Use the key words from the question throughout your answer to keep your focus. ▪ **Don't talk about characters as if they are real.** Instead speak about the choices that the writers' made when presenting different characters. ▪ **Use connectives** to show you are sequencing the text (initially, as a result, towards the end etc). ▪ Learn at least **10 quotes**. Make sure that they are short and cover a range of themes and characters.

Language Paper 1 Question 5 – Short Story Writing

- You will have 45 minute to plan, write and proof read.
- There will be a choice of two tasks but you only complete one of them!
- You are marked on technical accuracy (16 marks) and content (24 marks).

Make sure you:

- Plan your work – examiners can award marks to plans.
- Write in paragraphs.
- Include methods, ambitious vocabulary and a range of punctuation.
- Proof read your work before you finish and edit any mistakes.

Essay Writing

Introduction	**Introductions should do these 4 things:** 1.Be short - no longer than a paragraph 2.Be focused on the essay question 3.Outline your key ideas 4.Give some context.
Conclusion	**A conclusion should do these 3 things:** 1.Link back to the question, using the key words from the question. 2.Summarise your key points. 3.Reflect on the author's intentions – make comment on what the author hoped to teach us through the character or theme.

Analytical paragraphs

An analytical paragraph analyses the choices that an author has made and usually includes the following:

- ✓ A topic sentence
- ✓ A quotation/evidence
- ✓ Say what the quotation/evidence suggests
- ✓ Use the word because to show your workings out
- ✓ Zoom in on a key word/phrase/method/punctuation mark and explain why it's important
- ✓ Comment on the impact on the reader / authorial intention

Subject definitions

Authorial Intention	The authorial intention is the writer's message; it's what they intend for the reader to learn.
Methods	Methods is any writer's technique that the author uses to make their readers think or feel something. Examples of methods include: similes, repetition, alliteration, metaphors, foreshadowing etc.

Subject: MATHS	Booklet 1 - Number 1	Term: Autumn 1

You should know:

- Addition and subtraction of numbers less than 20.
- How to multiply and divide whole numbers.
- How to multiply and divide numbers by 10 and 100.
- What a fraction and a negative number represent.

Key Terms

Approximation	When using approximations to estimate the solution to a calculation, round each number in the calculation to 1 significant figure.
Combination	A collection of things, where the order does not matter.
Error interval	A range of values that a number could have taken before being rounded or truncated.
Factorial	The factorial symbol '!' means to multiply a series of descending integers to 1.
Inequality	A statement that one expression is greater or less than another.
Lower bound	The smallest number that would round up to the estimated value.
Permutation	A collection of things, where the order does matter.
Upper bound	The smallest value that would round up to the next estimated value.

Estimating Calculations

Example:

Estimate the value of

$$(59.3 \div 12.09) + 23.4$$

We can approximate this sum to be

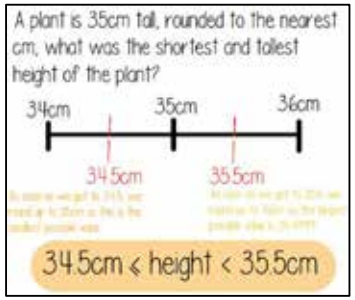
$$(60 \div 12) + 20 = 25$$

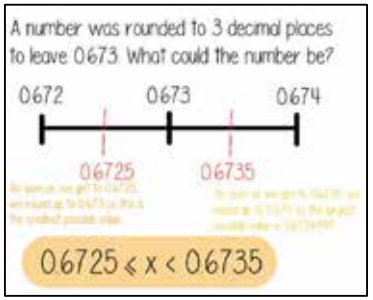
Therefore,

$$(59.3 \div 12.09) + 23.4 \approx \mathbf{25}$$

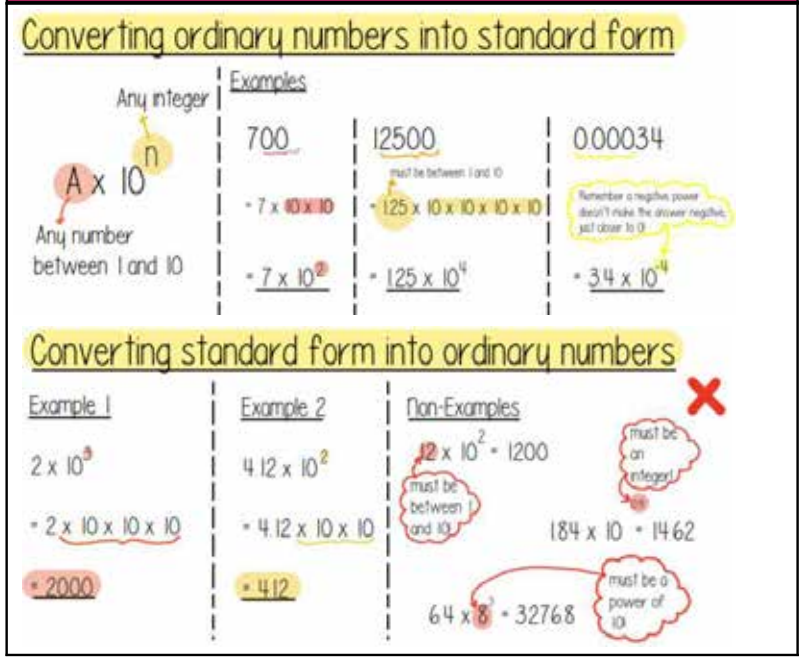
Error Intervals

If a number has been rounded, it is important to consider what possible values the exact value could have been. If we have a puppy that weighs 4kg to the nearest kg, it could actually weigh anything from 3.5kg to 4.5kg! To describe all the possible values that a rounded number could be, we use upper and lower bounds.





Standard form



Hegarty clip Numbers

Place value and ordering numbers: 14, 37, 46
Order of operations (BIDMAS): 24, 44, 120, 150
The four rules of arithmetic: 18, 19, 21, 22
Negative Numbers: 41-44
Rounding: 17, 56, 130
Approximating calculations: 131, 132
Calculating with decimals: 47-50
Basic calculations on a calculator: 128, 129, 131
Limits of accuracy: 137-139, 774-777
Choices and outcomes: 670-673

GCSEpod

Order of operation

Example:

$$(6 + 4 - 3)^2 \times 4$$

So we need to evaluate the brackets first and we work left to right ;

$$6 + 4 - 3 = 7$$

This is now

$$7 \times 4 = 49 \times 4$$
$$= 196$$

You should know:

- how to find multiples and factors
- what prime numbers are
- how to break a number down into its prime factors
- how to work out lowest common multiples (LCM)
- how to work out highest common factors (HCF)
- how to find squares, cubes and their roots

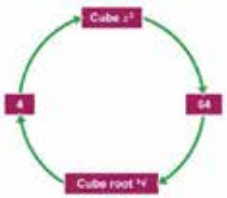
Powers and Roots

Square root

The opposite of squaring a number is called finding the **square root**. The symbol for the square root is $\sqrt{\ }$

EXAMPLE:

The square root of 16 is 4 (because $4^2 = 4 \times 4 = 16$).
The square root of 25 is 5 (because $5^2 = 5 \times 5 = 25$).
The square root of 100 is 10 (because $10^2 = 10 \times 10 = 100$).



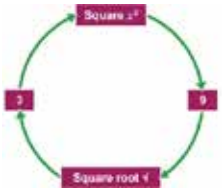
The symbol $\sqrt{\ }$ means square root, so:

$\sqrt{36}$ means 'the square root of 36'.

$\sqrt{36} = 6$

$\sqrt{81}$ means 'the square root of 81'.

$\sqrt{81} = 9$



The symbol $\sqrt[3]{\ }$ means cube root, so:

$\sqrt[3]{125}$, means 'the cube root of 125.

$\sqrt[3]{125} = 5$

$\sqrt[3]{64}$ means 'the cube root of 64.

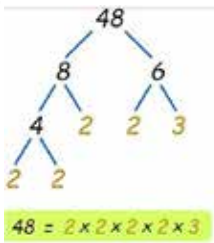
$\sqrt[3]{64} = 4$

You will also find a square root key on your calculator.

Prime Factorisation - Factor Tree

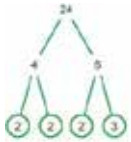
48 = 8 × 6, so we write down "8" and "6" below 48
Now we continue and factor 8 into **4 × 2**
Then 4 into **2 × 2**
And lastly 6 into **3 × 2**

We can't factor any more, so we have found the prime factors.
Which reveals that **48 = 2 × 2 × 2 × 2 × 3**
(or **48 = 2^4 × 3** using index notation)



EXAMPLE

Find the HCF and LCM of 24 and 180.
Start by writing 24 and 180 as the **product** of their prime factors.



The product of prime factors for 24 is: **2 × 2 × 2 × 3**
The product of prime factors for 180 is: **2 × 2 × 3 × 3 × 5**

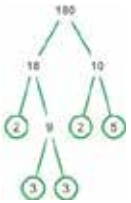
To find the HCF, find any prime factors that are in **common** between the products. Each product contains two 2s and one 3, so use these for the HCF.

HCF = **2 × 2 × 3 = 12**

Cross any numbers used so far off from the products.

The product of prime factors for 24 is: ~~2 × 2 × 2 × 3~~

The product of prime factors for 180 is: ~~2 × 2 × 3~~ × 3 × 5



To find the LCM, multiply the HCF by all the numbers in the products that have not yet been used.

To find the LCM, multiply the HCF by all the numbers in the products that have not yet been used.

LCM = **12 × 2 × 3 × 5 = 360**

Key Terms

Multiple	Triangular numbers
Factor	Square root
Prime number	Cube
Square	Cube root

Hegarty clip numbers

Prime numbers: 28
Prime factorisation: 29 & 30
HCF: 31 & 32
LCM: 34-36

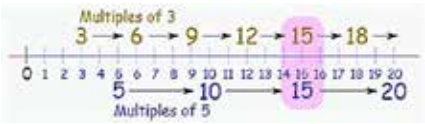
GCSEpod

LCM - Lowest Common Multiple

Lowest Common Multiple of 3 and 5:

List the **Multiples** of each number,
The multiples of **3** are 3, 6, 9, 12, 15, 18, ... etc
The multiples of **5** are 5, 10, 15, 20, 25, ... Etc

Find the first Common (same) value:



The Least Common Multiple of 3 and 5 is 15

(15 is a multiple of both 3 and 5, and is the smallest number like that.)

HCF - Highest Common Factor

Highest Common Factor of 12 and 16
Find all the **Factors** of each number,
Circle the **Common** factors,
Choose the **Highest** of those

Subject: MATHS	Booklet 3 - Statistical Representation	Term: Autumn 1

You should know:

- How to collect data
- Basic Averages
- Fractions and Percentages
- Angles

Key Terms

Pictogram	A pictogram is a visual way to display data, it uses symbols and a relevant key to help.
Bar Chart	Bar Charts allow data to be present while also showing its values.
Pie Chart	Pie charts are a visual tool to help display the proportion of data sharing.
Line Chart	Line graphs are a way to show how data changes over time. This can be minutes, hours, days, months or even years.
Mean. Median & Mode	Three different types of averages
Discrete	Discrete data is data is counted, for example, the number or proportion of people waiting in a queue, or the number of defective items in a sample.
Continuous	Continuous data is data that can be measured on an infinite scale, It can take any value between two numbers. Measures of time, height, temperature, and thickness are all examples of continuous data.
Stem and Leaf	Stem and leaf diagrams is way to represent data where the data is split into its Tens and Units

Displaying data: Frequency Tables, Pictograms, Bar and Pie Charts

Advantages and disadvantages of each.

Pie Chart Advantages:
- Graph are created proportionally to that it needs to represent
- Displays multiple classes of data Puts large sums of data into visual form for easy understanding

Disadvantages:
- Doesn't reveal exact values
- Manipulated easily, causing false impressions or interpretations

Bar Graph Advantages:
- Each data category is displayed in a frequency distribution pattern
- Allows for visualization of relative numbers or proportions of multiple categories
- Easy summarization of large sets of data

Disadvantages:
- Additional explanation is required
- Can be manipulated to show false results
- Unable to show key assumptions, causes, effects, or patterns present

Line Graph

Line Graph

A Line graph is a chart that shows data recordings taken at regular time intervals. These types of graphs are often used to show trends and patterns for different categories or subject matters that exist.

Advantages:
- Allows for the understanding of past behaviors and future predictions
- Subject matters are identified easily
- Offers comparisons of two subjects at the same time
- Gives the ability to follow present performance more closely

Disadvantages:
- Not always accurate with finding
- Factors being monitored may not always stay the same over extended time periods, causing unreliable data

Stem and Leaf Diagram

Stem and leaf diagrams are charts that allow you to split data values into a "stem" and "leaf" pattern. This type of graph is used for showing the frequency of the values that occur.

Advantages:
•Provide simplified methods for keeping scores
•Easy to use and create
•Offers the ability to show ranges, minimums, and maximums for numbers quickly

Disadvantages:
•Not a visually appealing method for interesting an audience
•Can become messy and disorganized when a lot of data is added

Key: 3|1 means 31 minutes

3	1 9
4	0 3 6
5	1 7 7 8 9
6	0 3 4 6
7	5

Hegarty clip Numbers

Averages (Mean, Median, Mode):404-410, 414-418
Types of data: 392, 393
Frequency Tables: 401, 402
Pictograms: 426
Bar Charts: 425
Pie Charts: 427, 428, 429
Line Graphs: 450
Stem and Leaf Diagrams: 430, 431, 432, 433

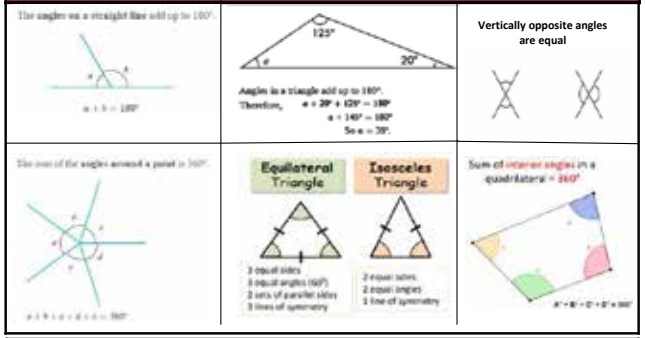
GCSEpod

Averages

Average are a way to find central values from data sets. There are 4 main types of average, mean, median, mode and range.
These can be found from discrete or group data tables as well and we call these the estimated mean and median.

Subject: MATHS | Booklet 4 - Angles | Term: Autumn 2

Basic Angle Facts



Key Terms

Interior Angles: angles inside the shape.
Exterior Angles: angle between the side of a shape and a line extended from the adjacent side.
Regular Polygon: A 2D shape made with straight lines that are the same size with the same sizes angles.
Irregular Polygon: A 2D shape with straight lines of different lengths and different sized angles.
Parallel: Lines on a plane that do not meet.
Bearing: An angle in degrees measured clockwise from north.

Hegarty clip numbers

Angles on a straight line & around point: 477-479
Angles of triangle: 485-487
Angles around a point: 812-814
Interior angles: 560 - 562
Exterior angle: 563 & 564

GCSEpod

Angles and Polygons

The sum of interior angles is given by $(n-2)\times 180$ where n is the amount of sides.

Exterior angles and interior angles on a straight line sum to 180°.

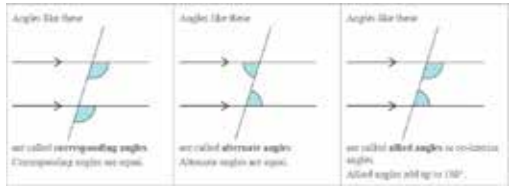
	Interior	Exterior
Sum of all Angles	$(n-2)180°$	$360°$
Each Angle (Regular Polygon)	$180 - \frac{360°}{n}$ $\frac{(n-2)180°}{n}$	$\frac{360°}{n}$

Exterior angles of a polygon sum to 180°

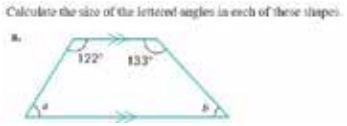
You need to be able to:

Know the basic angle facts and use them to solve multi-step questions.
Find interior and exterior angles of a polygon.
Find missing angles using the parallel line rules.
Draw and work with bearings.

Angles in parallel lines



Parallel lines can be camouflaged in polygons like in this example



Step 1: allied (co-interior angles) sum to 180.

a = 180 – 122 = 58°

Step 2: allied (co-interior angles sum to 180).

b = 180 – 133 = 47°

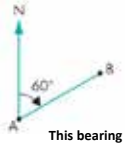
Bearings

A bearing is:

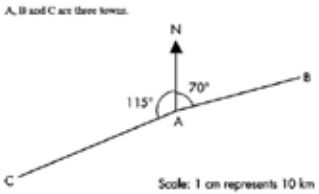
Measured from north.

Measured clockwise.

Has 3 digits.



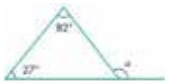
This bearing is 060°



EXAMPLES

EXAMPLE 1

Find angle a



Step 1: Angles in a triangle = 180°

27 + 82 = 109
180 – 109 = 71°

Step 2: Angles on a straight line = 180°

180 – 71 = **109°**
a = **109°**

EXAMPLE 2

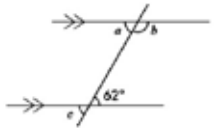
Calculate one interior angle of this regular hexagon.

There are 6 sides, so n = 6.

$$\frac{(6-2)\times 180}{6} = 120°$$

EXAMPLE 3

Find each lettered angle and give a reason.



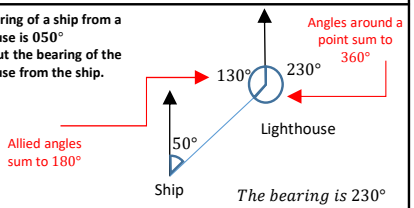
$a = 62°$ because alternate angles are equal.

$b = 180 - 62 = 118°$ because co-interior angles sum to 180 °.

$c = 62°$ because vertically opposite angles are equal.

EXAMPLE 4

The bearing of a ship from a lighthouse is 050°
Work out the bearing of the lighthouse from the ship.



The bearing is 230°

Subject: MATHS	Booklet 5 – Fractions	Term: Autumn 2

EXAMPLES

EXAMPLE 1 Expressing a quantity as a fraction of another	Write £5 as a fraction of £20. Note that $\frac{5}{20} = \frac{1 \times 5}{1 \times 5}$ so you can cancel by a factor of 5 to $\frac{1}{4}$. So £5 is one-quarter of £20.
EXAMPLE 2 Adding or subtracting fractions	$\frac{5}{6} - \frac{3}{4}$ Find the lowest common denominator (LCM) of 4 and 6. This is 12. Convert to equivalent fractions. $\frac{5}{6} - \frac{3}{4} = \frac{5}{6} \times \frac{3}{4} - \frac{3}{4} \times \frac{3}{3}$ Subtract 9 from 10. $= \frac{10}{12} - \frac{9}{12} = \frac{1}{12}$
EXAMPLE 3 Multiplying fractions	$\frac{4}{9} - \frac{3}{10}$ Simplify the fractions 2 is a factor of 4 and 10.3 is a factor of 3 and 9. So cancel by 2 and 3. $\frac{\cancel{4}^{2}}{\cancel{9}_{3}} \times \frac{\cancel{3}^{1}}{\cancel{10}_{5}} = \frac{2}{15}$ factor of 3 and 9. Then multiply.
EXAMPLE 4 Dividing fractions	$\frac{5}{6} \div \frac{3}{4}$ Convert the division calculation into a multiplication calculation. Cancel any common factors. $\frac{5}{6} \div \frac{\cancel{3}^{1}}{\cancel{4}_{5}} = \frac{5}{6} \times \frac{4}{3}$ Then multiply. Convert to a mixed number. $= \frac{5}{\cancel{6}_{3}} \times \frac{\cancel{4}^{2}}{3} = \frac{10}{9} = 1\frac{1}{9}$
EXAMPLE 5 Using fractions on a calculator	$\frac{1}{2} - \frac{1}{3}$ Keying in the calculations gives:  The display should show $\frac{4}{3}$

Hegarty clip numbers

Express a quantity as a fraction of another - 58	Adding and subtracting fractions – 65 & 66	Dividing fractions - 70
Calculate fractions of quantities - 77	Reciprocals – 71	Reciprocals – 71

Key Terms

Fraction - How many parts of a whole; the top number says how many parts we have; the bottom number (the denominator) says how many equal parts the whole is divided into.
Numerator - The top number in a fraction; it shows how many parts we have.
Denominator - The bottom number in a fraction; it shows how many equal parts the item is divided into.
Equivalent - Having the same value.
Simplify - To simplify (or reduce) a fraction means to make it as simple as possible. We can try dividing both top and bottom by 2, 3, 5, 7 ,... etc, until we can't go any further.
Improper fraction - A fraction where the numerator (the top number) is greater than or equal to the denominator (the bottom number).
Mixed number - A whole number and a fraction combined into one "mixed" number.
Reciprocal - The reciprocal of a number is: 1 divided by the number. Examples: • the reciprocal of 2 is 1/2 (=0.5) • the reciprocal of 10 is 1/10 (=0.1)
Rational number – A number that can be expressed as a fraction.
Irrational number – A number that cannot be expressed as a fraction.
Terminating decimal – A decimal that has digits that end.
Recurring decimal – A decimal that has digits that never end.

You need to be able to:

Express a quantity as a fraction of another
Calculate fractions of quantities
Add and Subtract fractions
Multiply fractions
Divide fractions
Use fractions on a calculator
Understand reciprocals, rational and irrational numbers, terminating and recurring decimals

GCSEpod

You should know:

- how to cancel, add and subtract fractions
- that an event or trial has outcomes
- that outcomes cannot always be predicted and that the laws of chance apply to everyday events
- the meaning of the term 'bias'.

Key Terms

Outcome	An outcome is a possible you would expect to see when finding probability. For example when tossing a coin the outcome can be heads or tails.
Probability	Probability is the calculation of how likely a thing will happen. You will use probability on a daily basis but most likely call it chance or likelihood. All probabilities lie somewhere in the range of 0 to 1. Something that is impossible has a probability of 0. For example, the probability that pigs will fly is 0. Something that is certain to happen has a probability of 1. For example, the probability that the sun will rise tomorrow is 1.
Mutually Exclusive	Outcomes that are mutually exclusive cannot happen at the same time, such as 'throwing an odd number' and 'throwing an even number' with a dice. When two outcomes are mutually exclusive, you can work out the probability of them occurring by adding up their separate probabilities.
Experimental/ Theoretical Probability	The value calculated as $\frac{number\ of\ successes}{number\ of\ trial}$ is the experimental probability of the desired outcome. As the number of trials or experiments increases, the value of the experimental probability gets closer to the true or theoretical probability.
Two way table	A two-way table is a table that links together two variables. For example the type of car vertically and the colour of the car horizontally. It lets you find specific probabilities based on either of the population sizes.
Venn Diagram	Diagrams that represent connections between different sets are called Venn diagrams. They are named after John Venn who introduced them in about 1880. They are draw with 2 or more circles slightly overlapping. Each circle is a set of data.
Union	The combined set that contains all of A and all of B is called the union and is written $A \cup B$.
Intersection	The region where the sets overlap represents the elements that are in both sets. It is called the intersection and written as $A \cap B$.

Calculating Probabilities

Suppose a bag contains three black, two yellow and five white balls and only one ball is allowed to be taken at random from the bag. We represent probability with the notation P(Outcome), so

P(black ball)=$\frac{3}{10}$.

P(yellow ball)=$\frac{2}{10}$, which cancels to $\frac{1}{5}$.

P(white ball)=$\frac{5}{10}$, which cancels to $\frac{1}{2}$.

We could also look for calculating not picking a black ball.
This would be 1-P(Black ball) as all probabilities need to sum to one

$$1 - \frac{3}{10} = \frac{7}{10}$$

Expectation vs Theoretical

When you know the probability of an outcome, you can predict how many times you would expect that outcome to occur in a certain number of trials. This is called **expectation**.
Note that this is what you *expect*. It is not what is going to happen.

From above the probability of picking a yellow ball is $\frac{2}{10}$
If I picked a ball, noted the colour, and put it back in the bag, and repeated it 100 times. How many times should I get a yellow ball
$\frac{2}{10} \times 200 = 40$ yellow balls

We can use expectation vs theoretical probability to see if something is bias or unfair.
For example, when rolling a dice we should have the same chance for every number to appear.
So P(Rolling a 6) should be $\frac{1}{6}$
If I rolled a dice 60 times I would expect to get 10 6's. If I only get 1 then I know the dice would be biased

Hegarty clip Numbers

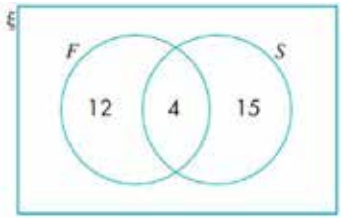
Expressing Probabilities: 349, 350
Probabilities of single events: 351, 352, 353
Mutually Exclusive: 354
Expectation: 355
Working with Venn Diagrams: 372 - 379
Probabilities with Venn Diagrams: 383 - 388
Two way tables: 422, 423, 423

GCSEpod

Venn Diagrams

Venn diagrams tell us information about a set via the placement of the numbers

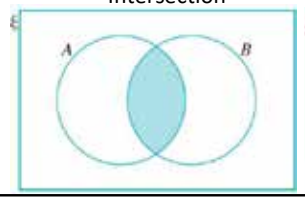
This Venn diagram shows that 12 people speak French, 4 speak both French and Spanish and 39 people speak different languages



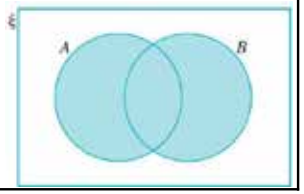
Languages spoken by scholars, French or Spanish

We can also use Venn diagrams to find probabilities if we know the total and one part of the set. For example here the probability someone speak Spanish but not French is $\frac{15}{39}$

Intersection



Union



Subject: Biology	Topic: Bioenergetics	Term: Autumn 1

Key words	Definitions
Diffusion	The spreading out of the particles in a solution or gas, resulting in a net movement of particles from an area of higher concentration to an area of lower concentration down a concentration gradient.
Adaptation	Evolutionary process in which an organism becomes better suited to its environment and subsequently passes these adaptations to its offspring through successive breeding.
Photosynthesis	The process by which plants make 'food'/create energy by using carbon dioxide, water and light.
Respiration	A chemical process which occurs in cells to release energy by breaking down glucose. Respiration can be aerobic or anaerobic.
Cellulose	The complex carbohydrate that makes up the cell wall in plants and algae, providing additional strength.
Insoluble	A solute which is incapable of dissolving in a solvent.
Glycogen	The carbohydrate store in animals.
Hydroponics	A technique used to grow plants. Plants are grown in water, rather than soil. The water contains a perfect balance of nutrients to ensure maximum plant growth.
Homeostasis	The regulation of internal conditions of a cellular organism to maintain optimum conditions for function, in response to internal and external stimuli/changes.
Fermentation	Anaerobic respiration in microorganisms, such as yeast, producing ethanol and carbon dioxide. Used in the manufacture of bread and alcohol.
Metabolism	The sum of all the reactions that take place in the cell or in the body.

Photosynthesis

Plants produce glucose by a process called photosynthesis. The plant uses glucose to grow.
Photosynthesis is an endothermic reaction represented by the following equation:

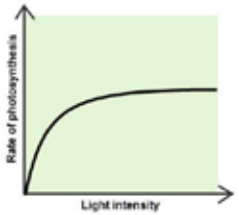
$$carbon\ dioxide + water \rightarrow glucose + oxygen$$

$$CO_2 + H_2O \rightarrow C_6H_{12}O_6 + O_2$$

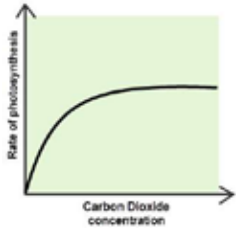
Photosynthesis only occurs when the plant receives enough energy in the form of light.

Limiting factors of photosynthesis:

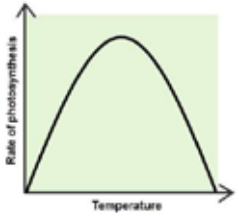
Light intensity:



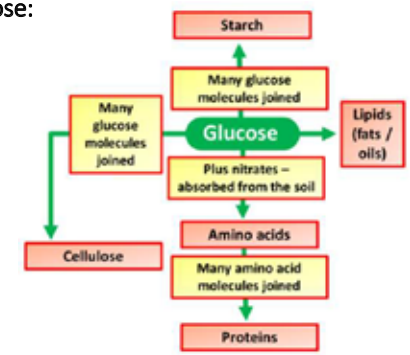
Concentration of CO_2:



Temperature:



Plant uses of glucose:

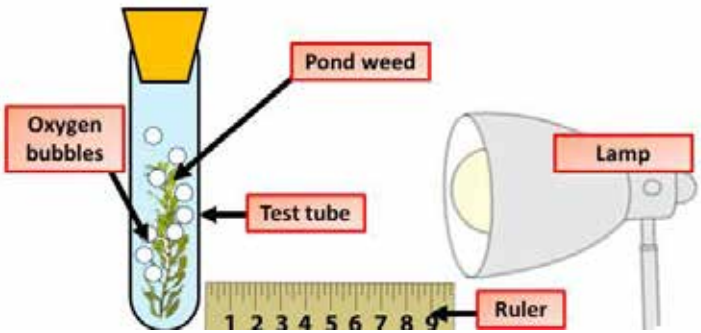


Subject: *Biology*	Topic: *Bioenergetics*	Term: Autumn 1

Photosynthesis required practical

Method:

1. Set up a boiling tube containing 45 cm^3 of sodium hydrogen carbonate solution (1%). Allow the tube to stand for a few minutes and shake to disperse any air bubbles that might form.
2. Cut a piece of the pondweed, *Cabomba*. The pondweed should be 8 cm long.
3. Use forceps to place the pondweed in the boiling tube carefully. Make sure that you don't damage the pondweed, or cause the liquid to overflow.
4. Position the boiling tube so that the pondweed is 10 cm away from the light source. Allow the boiling tube to stand for five minutes. Count the number of bubbles emerging from the cut end of the stems in one minute. Repeat the count five times and record your results.
5. Calculate the average number of bubbles produced per minute.
6. Repeat the experiment at different distances away from the light source.



The further away from the pondweed that the light source is, fewer oxygen bubbles will be produced. This is because the light intensity falls as the light source moves further away.

Respiration

Respiration is a cellular process that continually occurs in all living organisms.

Photosynthesis is an exothermic reaction that has two forms: aerobic (with oxygen) and anaerobic (without oxygen). They can be represented by the formula below.

Aerobic respiration:

$$glucose + oxygen \rightarrow carbon\ dioxide + water + energy$$

$$C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O + energy$$

Anaerobic respiration:

$$glucose \rightarrow lactic\ acid + energy$$

Anaerobic respiration in plants:

$$glucose \rightarrow ethanol + carbon\ dioxide + energy$$

The effect of exercise on the body:
During exercise the human body reacts to the increased demand for energy.
The heart rate, breathing rate and breath volume increase during exercise to supply the muscles with more oxygenated blood.
If insufficient oxygen is supplied anaerobic respiration takes place in muscles. The incomplete oxidation of glucose causes a build up of lactic acid and creates an oxygen debt. During long periods of vigorous activity muscles become fatigued and stop contracting efficiently.

Metabolism

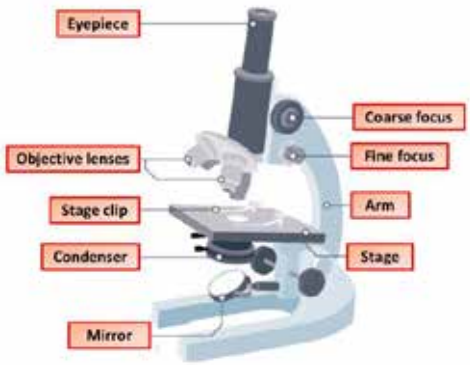
Metabolism is the sum of all the reactions in a cell or the body.

The energy transferred by respiration in cells is used by the organism to synthesise new molecules. These processes are controlled by enzymes.

Subject: Biology	Topic: Cell biology	Term: Autumn 2

Organelle	Function
Cytoplasm	Where chemical reactions take place
Nucleus	Contains genetic material (genes & chromosomes) & controls cell activity.
Cell membrane	Controls what enters & leaves the cell
Mitochondria	Organelles that contain the enzymes for respiration, and where most energy is released in respiration.
Ribosomes	Tiny structures where protein synthesis occurs.
Chloroplast	Site of photosynthesis in plants
Cell wall	Strengthen plant cells
Vacuole	Store of water & nutrients in plant cells

Microscopes

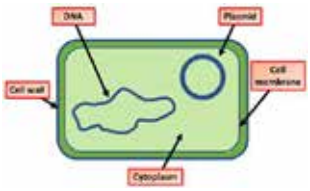


To calculate the magnification of a microscope, you can use the equation below:

$$magnification = \frac{image\ size}{actual\ size}$$

Prokaryotic and eukaryotic cells

Eukaryotic cells contain membrane-bound organelles, including a nucleus. Eukaryotes can be single-celled or multi-celled, such as animals, plants, fungi, and insects. Bacteria are an example of prokaryotes. Prokaryotic cells do not contain a nucleus or any other membrane-bound organelle.



Specialised cells in plants

Cell location and name		Specialised to...
Leaf	Palisade mesophyll	Carry out photosynthesis
	Spongy mesophyll	Allow gases to circulate for the exchange of gases between the leaf and the environment, carry out some photosynthesis
	Guard cells	Open and close to control the exchange of gases – carbon dioxide, water vapour and oxygen
Phloem	Sieve tubes	Transport products of photosynthesis, including sugars and amino acids, from the leaf to where they are needed
	Companion cells	Provide the energy required for transporting substances in sieve tubes
Xylem	Xylem vessels	Transport water and dissolved minerals from the roots, up the plant
Growing points	Meristem	Produce new cells as they divide

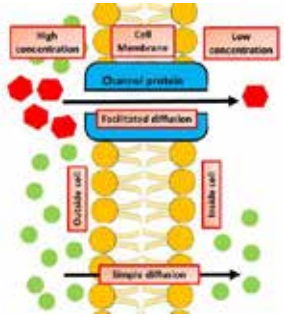
Specialised cells in animals

Cells of the...	Are specialised to...
Circulatory system	Transport substances, defend the body, regulate temperature
Excretory system	Remove waste products and unwanted substances, regulate the water content of the body
Muscular system	Bring about movement
Nervous system	Respond to internal and external stimuli and conditions, carry messages for the body work as a coordinated whole
Respiratory system	Deliver oxygen for respiration and remove waste
Reproductive system	Bring about fertilisation to produce new offspring
Skeletal system	To bring about movement, support and protect internal structures, produce blood cells, store and release calcium

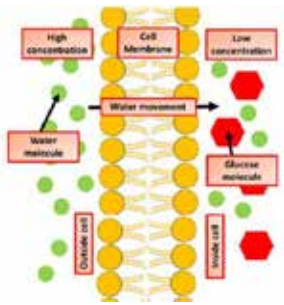
Subject: Biology	Topic: Cell biology	Term: Autumn 2

Transport of molecules in plants

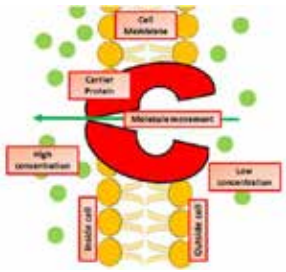
Diffusion is the movement of a substance from an area of high concentration to an area of low concentration. Diffusion happens in liquids and gases because their particles move randomly from place to place.



Osmosis is the movement of water or other solvent through a plasma membrane from a region of low solute concentration to a region of high solute concentration. Osmosis is passive transport, meaning it does not require energy to be applied.

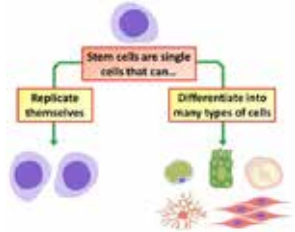


Active transport is the movement of molecules across a membrane from a region of their lower concentration to a region of their higher concentration—against the concentration gradient. Active transport requires cellular energy to achieve this movement.



Stem cells

A stem cell is an undifferentiated cell of an organism which is capable of giving rise to many more cells of the same type, and from which certain other cells can arise from differentiation.



- Stem cells from an embryo can grow into any type of tissue.
- Stem cells may grow out of control, to form cancers.
- Large numbers of stem cells can be grown in the laboratory.
- Collecting and growing stem cells is expensive
- Stem cells may be used in medical research or to treat some human diseases.
- Patients treated with stem cells need to take drugs for the rest of their life to prevent rejection.

Cell division

In cells with a nucleus, as in eukaryotes, the cell cycle is also divided into two main stages: interphase and the mitotic phase. During interphase, the cell grows, accumulating nutrients needed for mitosis, and undergoes DNA replication preparing it for cell division.

During mitosis:

Stage 1: The cell spends most of its life in the interphase. During this phase the cell grows to its maximum size and performs its normal functions.

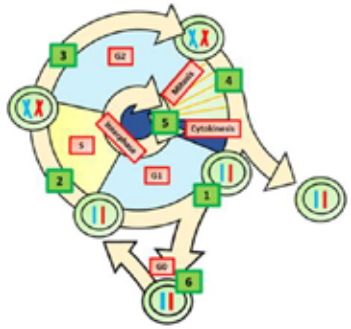
Stage 2: The DNA condenses into chromosomes (human cells have 46 chromosomes – 23 from your father and 23 from your mother). Each chromosome eventually can be seen to consist of two strands or chromatids joined at a central centromere in an X shape.

Stage 3: The nuclear membrane disappears. Spindle threads form between the poles.

Stage 4: Chromosomes lie on the equator of the cell. Each chromosome is attached to the spindle microfibers by its centre. The chromosomes appear in a straight line across the middle of the cell.

Stage 5: The centre of the chromosome splits. Each chromosome divides into two sister chromatids. Each chromatid is moved to opposite poles of the cell by the shortening of the spindle fibres. Chromatids (now called daughter chromosomes) gather at opposite poles of the cell.

Stage 6: A nuclear membrane forms around each of the daughter chromosomes that have gathered at the poles. The daughter chromosomes uncoil.



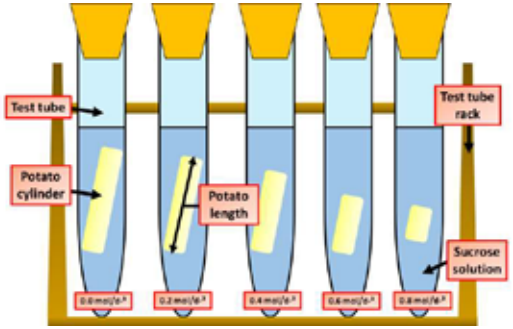
Subject: Biology	Topic: Cell biology	Term: Autumn 2

Culturing microorganisms required practical

1. Set up your working area by first spraying the bench with the disinfectant spray and wiping with paper towels.
2. Place the Bunsen burner on the heatproof mat in the middle of your working area and light the Bunsen on a yellow flame.
3. Wash your hands with the antibacterial hand wash.
4. Mark the underneath of an agar plate (not the lid) as follows (making sure that the lid stays in place to avoid contamination):
    - divide the plate into three equal sections as if you were cutting a pie into three and number them 1, 2 and 3 around the edge
    - place a dot into the middle of each section
    - around the edge write your initials, the date and the name of the bacteria (E. coli)
5. Turn the Bunsen flame to blue.
6. Remove the lid of the bottle containing the culture of bacteria (keep the lid in your hand) and flame the neck of the bottle through the Bunsen flame, quickly twisting the bottle from side to side. Using the disposable pipette, collect approximately 1 ml of the bacterial culture.
7. Quickly flame the neck of the bottle again and replace the lid.
8. Lift the lid of the agar plate at an angle so that it is only fully open on the Bunsen burner side.
9. Pipette the bacteria onto the agar plate and replace the lid.
10. Place the pipette into the 'discard beaker' and turn the Bunsen burner flame back to yellow.
11. Dip the glass spreader into the ethanol. Remove the glass spreader and tap off the excess ethanol, then pass the glass spreader through the flame (holding the glass spreader horizontally to ensure nothing drips down onto your hand).
12. Allow the flame on the glass spreader to go out and allow the spreader to cool for a count of 20.
13. Lift the lid of the agar plate, again at an angle so only the side next to the Bunsen burner is fully open, and spread the bacteria around the plate using the glass spreader.
14. Lower the lid of the agar plate and place the glass spreader into the discard beaker.
15. Place different antiseptics onto the three filter paper discs by either soaking them in the liquid or spreading the cream or paste onto them.
16. Lift the lid of the agar plate as before and, using the forceps, carefully place each disc onto one of the dots drawn on with the wax pencil.
17. Make a note of which antiseptic is in each of the three numbered sections of the plate.
18. Secure the lid of the agar plate in place using two small pieces of clear tape (do not seal the lid all the way around as this creates anaerobic conditions, which will prevent the E. coli bacteria from growing and can encourage some other very nasty bacteria to grow).
19. Incubate the plate at 25 °C for 48 hours.
20. Measure the diameter of the clear zone around each disc by placing the ruler across the centre of the disc. Measure again at 90° to the first measurement so that the mean diameter can be calculated.

You should see a difference in the size of the bacteria "clear zone" with each type of antiseptic. The better the antiseptic, the bigger the clear zone.

Osmosis required practical



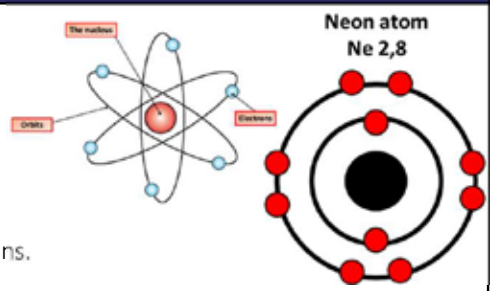
1. Using a cork borer, cut three potato cylinders of the same diameter.
2. Trim the cylinders so that they are all the same length (about 3 cm).
3. Accurately measure and record the length and mass of each potato cylinder.
4. Measure out 10 cm3 of the 1 M sugar solution and place into the first boiling tube (labelled 1 M sugar).
5. Measure out 10 cm3 of 0.5 M sugar solution and place into the second boiling tube (labelled 0.5 M sugar).
6. Measure out 10 cm3 of the distilled water into the third boiling tube (labelled water).
7. Add one potato cylinder to each tube (make sure you know which one is which in terms of the length and mass).
8. Record your lengths and masses in a table such as the one below.
9. Leave the potato cylinders in the boiling tubes overnight in the test tube rack.
10. Remove the cylinders from the boiling tubes and carefully blot them dry with the paper towels.
11. Re-measure the length and mass of each cylinder (make sure you know which is which).

The potatoes left in the higher concentrations of sugar solution should lose more water and therefore shrink in size mass more.

Subject: Chemistry	Topic: Atomic Structure and the Periodic Table	Term: Autumn 1

Atomic structure

Atoms are the basic building blocks of ordinary matter. Atoms can join together to form molecules, which in turn form most of the objects around you. Atoms are composed of particles called protons, electrons and neutrons.

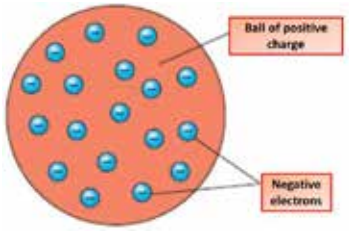


Electrons exist in shells. Electrons in atoms occupy energy levels, also called electron shells, outside the nucleus . Different shells can hold different maximum numbers of electrons. The electrons in an atom occupy the lowest available energy level first.

KEY WORDS	DEFINTIONS
Proton	A positively charged subatomic particle in the nucleus of an atom. A proton has a relative mass of 1 and relative charge of +1.
Neutron	A subatomic particle in the nucleus of an atom that has no charge. A neutron has a relative mass of 1 and relative charge of 0.
Electron	A negatively charged subatomic particle. Can be found in atoms in shells orbiting the nucleus. An electron has a very small relative mass and relative charge of -1.
Element	A substance made from only one type of atom.
Mixture	Two or more substances that have not chemically reacted with each other. A mixture can be separated by physical methods.
Compound	A molecule made of atoms from different elements that are chemically bonded together.
Periodic table	A table showing the all of the chemical elements arranged according to their atomic numbers.

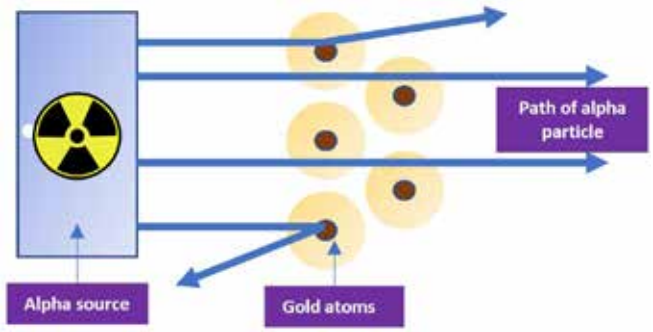
History of the atom

The Plum Pudding Model is a model of atomic structure proposed by J.J. Thomson in the late 19th century. Thomson had discovered that atoms are composite objects, made of pieces with positive and negative charge, and that the negatively charged electrons within the atom were very small compared to the entire atom.



In 1909 Ernest Rutherford designed an experiment to test the plum pudding model. In the experiment, positively charged alpha particles were fired at thin gold foil. Most alpha particles went straight through the foil. But a few were scattered in different directions. This evidence led Rutherford to suggest a new model for the atom, called the nuclear model. In the nuclear model:

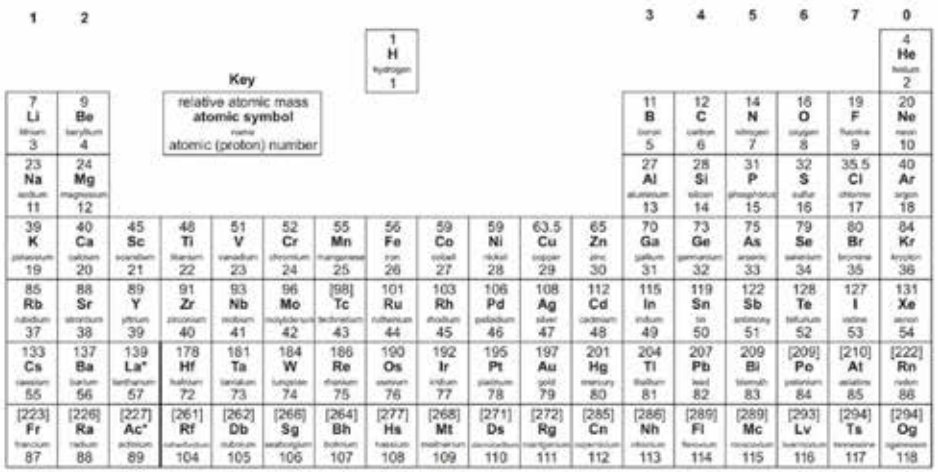
- the mass of an atom is concentrated at its centre, the nucleus
- the nucleus is positively charged



Niels Bohr adapted Ernest Rutherford's nuclear model. Bohr did calculations that led him to suggest that electrons orbit the nucleus in shells. The shells are at certain distances from the nucleus. Further experiments led to the idea that the nucleus contained small particles, called protons. James Chadwick found evidence for the existence of particles in the nucleus with mass but no charge. These particles are called neutrons. This led to another development of the atomic model, which is still used today.

Subject: Chemistry	Topic: Atomic Structure	Term: Autumn 1

Periodic table



1	2											3	4	5	6	7	0
							1 H hydrogen 1										4 He helium 2
7 Li lithium 3	9 Be beryllium 4											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	63.5 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	[98] Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La* lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86
[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[264] Bh bohrium 107	[277] Hs hassium 108	[268] Mt meitnerium 109	[271] Ds darmstadtium 110	[272] Rg roentgenium 111	[285] Cn copernicium 112	[286] Nh nihonium 113	[289] Fl flerovium 114	[289] Mc moscovium 115	[293] Lv livermorium 116	[294] Ts tennessine 117	[294] Og oganesson 118

* The Lanthanides (atomic numbers 58 – 71) and the Actinides (atomic numbers 90 – 103) have been omitted.

Relative atomic masses for **Cu** and **Cl** have not been rounded to the nearest whole number.

In each period (horizontal row), the atomic numbers increase from left to right. The periods are numbered 1 through 7 on the left-hand side of the table. Elements that are in the same period have chemical properties that are not all that similar.

The column of the periodic table are called groups. The groups are numbered 1 through 7 and 0 (these can be seen at the top of the periodic table). Elements that are in the same group have similar chemical properties.

Mendeleev

Early periodic tables ordered elements by their atomic weights but were incomplete and sometimes placed elements in incorrect group. Mendeleev overcame these problems by leaving gaps in his table for elements not known at the time. By looking at the properties of the elements next to a gap, he could also predict the properties of these undiscovered elements. For example, Mendeleev predicted the existence of 'eka-silicon', which would fit into a gap below silicon. Another scientist later discovered the missing element, germanium. Its properties were found to be similar to the predicted ones and confirmed Mendeleev's periodic table.

Group 1 elements

The Group 1 elements in the periodic table are known as the alkali metals. They include lithium, sodium and potassium, which all react vigorously with water to produce an alkaline solution.

Group 7 elements

The Group 7 elements are called the halogens. They are placed in the vertical column, second from the right, in the periodic table . Chlorine, bromine and iodine are the three common Group 7 elements. Group 7 elements form salts when they react with metals.

Group 0 elements

The group 0 elements, the noble gases, are all unreactive non-metal gases. They show trends in their physical properties. Their uses depend on their inertness, low density and non-flammability.

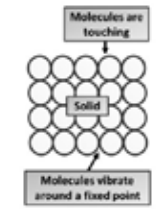
Properties of metals

Properties of a typical metal (when solid)	Properties of a typical non-metal (when solid)
Good conductor of electricity	Poor conductor of electricity
Good conductor of heat	Poor conductor of heat
Shiny	Dull
High density	Low density
Malleable	Brittle
Ductile	Brittle

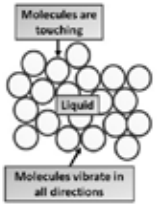
Subject: Chemistry | **Topic**: Bonding, structure and the properties of matter | **Term**: Autumn 2

States of matter

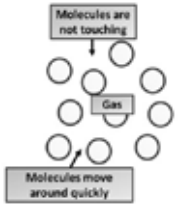
Solids:
- have a fixed shape and cannot flow, because their particles cannot move from place to place
- cannot be compressed (squashed), because their particles are close together and have no space to move into



Liquids:
- flow and take the shape of their container, because their particles can move around each other
- cannot be compressed, because their particles are close together and have no space to move into



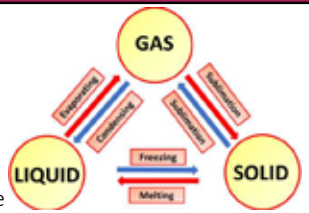
Gases:
- flow and completely fill their container, because their particles can move quickly in all directions
- can be compressed, because their particles are far apart and have space to move into



Key words	Definitions
Ions	Ions are charged atoms. Ions are formed when an atom gains or loses electrons
Lattice	A regular geometrical arrangement of points or objects over an area or in space
Free electrons	Electrons from the outer shell of atoms are free to move through an entire structure of atoms. They are effectively shared by the structure.
Nano	Very, very small. $1x10^{-9}$m – one billionth of a metre.
Tetrahedron	Triangular based pyramid.

Changes of state

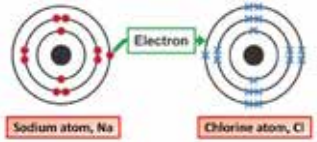
Substances can exist as a solid, liquid or gas. Converting from one state to another usually involves heating or cooling.



Heat must be supplied to a substance for it to melt, evaporate or boil. For example, you need to heat ice to melt it, and you need to heat water to make steam. Heat must be removed from a substance to condense or freeze it. In other words, the substance must be cooled down.

Ionic bonding and giant ionic compounds

Positive and negative ions form when a metal reacts with a non-metal, by transferring electrons. The oppositely charged ions are strongly attracted to each other, forming ionic bonds.



A dot and cross diagram models the transfer of electrons from metal atoms to non-metal atoms. The electrons from one atom are shown as dots, and the electrons from the other atom are shown as crosses.

An ionic compound is a giant structure of ions. The ions have a regular, repeating arrangement called an ionic lattice. The lattice is formed because the ions attract each other and form a regular pattern with oppositely charged ions next to each other.
The ions in an ionic compound held together in a giant ionic lattice. Ionic compounds have high melting points and boiling points. Ionic compounds form crystals (which can be cleaved along certain planes). Ionic compounds do not conduct electricity when solid.

Group	Element	Ion charge	Ion symbol
1	Na	+	Na^{+}
2	Mg	2+	Mg^{2+}
6	O	2-	O^{2-}
7	Cl	-	Cl^{-}

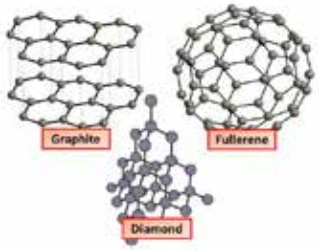
Subject: Chemistry	Topic: Bonding, structure and the properties of matter	Term: Autumn 2

Covalent bonds, molecules and structures

A covalent bond is formed when two atoms share a pair of electrons. Covalent bonding occurs in most non-metal elements, and in compounds formed between non-metals. These shared electrons are found in the outer shells of the atoms. Usually each atom contributes one electron to the shared pair of electrons.

Simple covalent molecules:
Hydrogen, ammonia, methane and water are also simple molecules with covalent bonds. All have very strong bonds between the atoms, but much weaker forces holding the molecules together. When one of these substances melts or boils, it is these weak 'intermolecular forces' that break, not the strong covalent bonds.

Giant covalent structures:
These have very high melting points because a lot of strong covalent bonds must be broken. Giant covalent structures have variable conductivity. Diamond does not conduct electricity, however, graphite contains free electrons so it does conduct electricity.

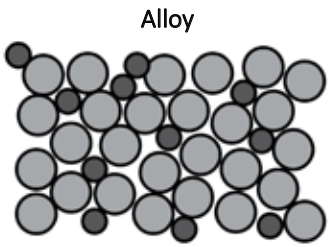


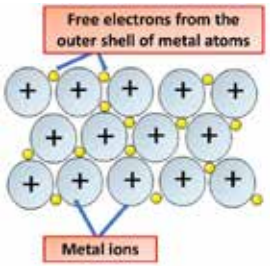
Metallic bonding

Metals consist of giant structures of atoms arranged in a regular pattern. The electrons from the outer shells of the metal atoms are delocalised, and are free to move through the whole structure. This sharing of delocalised electrons results in strong metallic bonding.

- Metals are electrical conductors because their delocalised electrons carry electrical charge through the metal.
- They are good conductors of thermal energy because their delocalised electrons transfer energy.
- Metals have high melting points and boiling points, because the metallic bonding in the giant structure of a metal is very strong - large amounts of energy are needed to overcome the metallic bonds in melting and boiling

Alloys:
In a pure metal, the force needed to make the layers slide over each other is small. This explains why many pure metals are soft. In an alloy, there are atoms of different sizes. The smaller or bigger atoms distort the layers of atoms in the pure metal. This means that a greater force is required for the layers to slide over each other. The alloy is harder and stronger than the pure metal.





Nano science

Properties and uses:
Nanoparticulate materials have many uses. These include medical treatments, cosmetics, deodorants and sunscreens, electronics and catalysts

Nanotubes are a type of fullerene and are molecular-scale tubes of carbon arranged similarly to the layers in graphite.

Carbon nanotubes have a very high melting point, as each carbon atom is joined to three other carbon atoms by strong covalent bonds. This also leaves each carbon atom with a spare electron, which forms a sea of delocalised electrons within the tube, meaning nanotubes can conduct electricity.

Subject: Physics	Topic: Energy	Term: Autumn 2

Energy stores

Internal energy	The thermal energy stored inside a material. A hotter material stores more energy.
Chemical energy	The energy stored by the chemical bonds between atoms in a compound.
Kinetic energy	The energy stored by a system when it's moving.
Electrostatic energy	The energy stored when charged particles are attracting or repelling each other.
Elastic potential	The energy stored in a spring or elastic when they are stretched.
Gravitational potential energy	The energy a system gains when it is raised higher.
Magnetic energy	The energy stored when two magnetic materials are attracting or repelling.

Energy pathways/transfers

Heating	Energy can be transferred by an object getting hotter as this increases the amount of energy an object stores. Energy can also be transferred when an object cools as this releases the energy from the object.
Work done by forces	A force can cause an object to accelerate or change shape. This means that energy must have been transferred to make this happen
Work done when a current flows	When charges move due to potential difference this transfers energy.
Radiation	Energy can be transferred via a wave such as light. This is how the Sun's energy is transferred to Earth.

Conservation of energy

The amount of energy stays the same or is said to be conserved. This fact is known as the Principle of Conservation of Energy.

Energy can neither be created nor destroyed, but can be changed from one form to another.

What is an energy system?

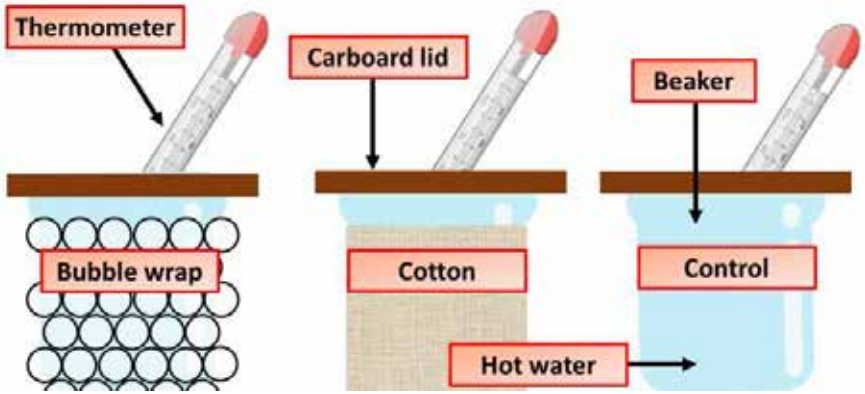
A system is an object or group of objects.
There are changes in the way energy is stored when a system changes.

Equations to remember	Symbol Equations
$kinetic\ energy = \frac{1}{2} \times mass \times velocity^2$	$KE = \frac{1}{2} \times m \times v^2$
$work\ done = force \times distance$	$E = F \times d$
$power = \frac{work\ done}{time\ taken}$	$P = \frac{E}{t}$
$efficiency = \left(\frac{useful\ energy}{total\ energy}\right) \times 100$	
$GPE = mass \times gravitational\ field\ strength \times height$	$\text{GPE} = m \times g \times h$

Equations given to you	Symbol Equations
$change\ in\ energy = mass \times speficic\ heat\ capacity \times temperature\ change$	$\Delta E = m \times c \times \Delta\theta$
$energy\ required\ to\ change\ state = mass \times specific\ latent\ heat$	$E = m \times L$

Insulation required practical

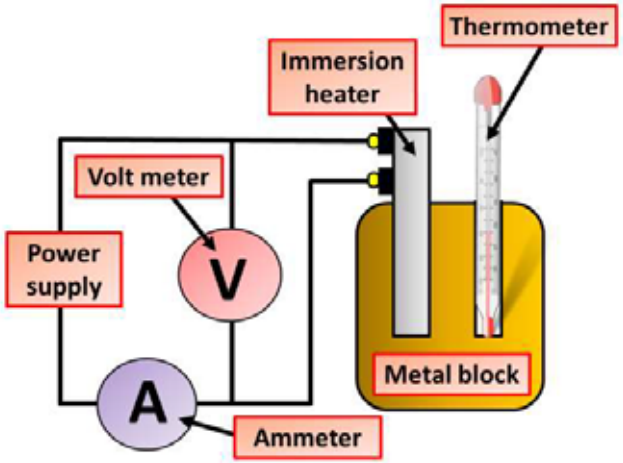
1. Cut a hole in the middle of a piece of cardboard large enough for a thermometer to fit through. The cardboard should be big enough to cover the beakers you will be using.
2. Place a small beaker into a larger beaker.
3. Fill the small beaker with hot water from a freshly boiled kettle.
4. Put the piece of cardboard over the beakers as a lid.
5. Place a thermometer into the smaller beaker through the hole.
6. Record the temperature of the water in the small beaker and start the stopwatch.
7. Record the temperature of the water every 2 minutes for 20 minutes.
8. Repeat steps 1-6, each time packing the space between the large beaker and small beaker with insulating material (bubble wrap, cotton wool, paper).



Materials that are better insulations should make the water store energy for longer. If the material used between the two beakers is a good insulator, the temperature decrease in the water should be less.

Specific heat capacity required practical

1. Place the immersion heater into the central hole at the top of the block.
2. Put a couple of drops of oil into the smaller hole to ensure that the thermometer is in contact with the block as much as possible.
3. Place the thermometer into the smaller hole.
4. Fully insulate the block by wrapping it loosely with cotton wool. This means that when the block heats up, it doesn't lose as much heat to its surroundings.
5. Record the temperature of the block.
6. Connect the heater to the power supply and turn it on.
7. Ensure that the current (measured by the ammeter) stays constant.
8. Turn it off after ten minutes.
9. After ten minutes the temperature will still rise even though the heater has been turned off and then it will begin to cool. Record the highest temperature that it reaches and calculate the temperature rise during the experiment.



A material with a smaller specific heat capacity will heat up more quickly as it takes less energy to raise its temperature by 1°C. Materials with a high specific heat capacity will take longer to heat up as they require more energy to be supplied by the immersion heater.

Subject: Physics	Topic: Particle Model of Matter	Term: Autumn 1

Key words	Definitions
Specific Heat Capacity	The energy required to increase the temperature of 1 kg of a substance by 1°C
Specific Latent Heat	The energy required to make a 1kg of a substance change state
melting	State change from solid to liquid
freezing	State change from liquid to solid
evaporating	State change from liquid to gas without reaching boiling point
sublimating	State change directly from solid to gas
boiling	State change from liquid to gas at boiling point
condensing	State change from gas to liquid
Kinetic Energy	Movement energy in the particles in a substance (gases have the most because particles move fastest)
Potential Energy	Stored energy in the particles in a substance (gases have the most because particles are furthest away)
Internal energy	Total kinetic and potential energy in a substance

Equations to remember	Symbol Equations
$density = \frac{mass}{volume}$	$\rho = \frac{m}{v}$

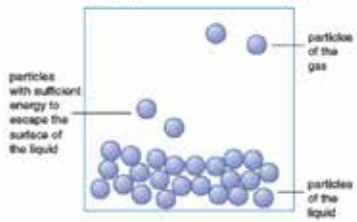
Equations given to you	Symbol Equations
$change\ in\ energy = mass \times specific\ heat\ capacity \times temperature\ change$	$\Delta E = m \times c \times \Delta\theta$
$energy\ required\ to\ change\ state = mass \times specific\ latent\ heat$	$E = m \times L$

Quantity being measured	Units
density	Kilograms per metre cubed (kg/m^3)
mass	Kilograms (kg)
volume	Metres cubed (m^3)
Thermal energy	Joules (J)
Temperature	Degrees Celcius (°C)
Specific heat capacity	Joules per kilogram per degree Celsius (J/kg°C)
Specific latent heat	Joules per kilogram (J/kg)

Diagrams and explanations

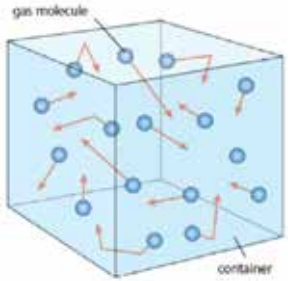
Cooling by evaporation

Particles with enough kinetic energy can escape a liquid and become a gas.
This reduces the average kinetic energy of the liquid.

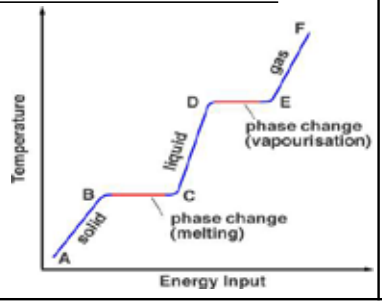


Gas Pressure

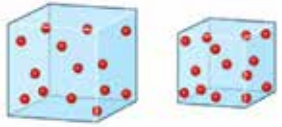
Gas Pressure is caused by the force exerted when particles collide with their container.



Temperature of a substance as state changes



Changing volume and pressure



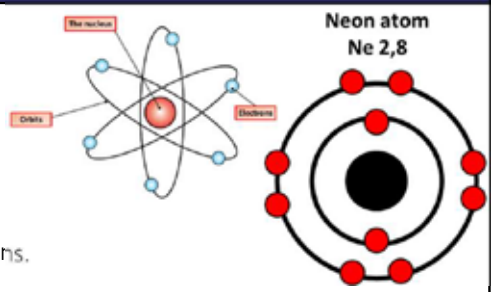
Halving the volume of a container will double the pressure of the gas because the particles will hit the sides more often (if the temperature is constant).

Pressure x Volume = constant

Subject: Physics	Topic: Atomic Structure	Term: Autumn 1

Atomic structure

Atoms are the basic building blocks of ordinary matter. Atoms can join together to form molecules, which in turn form most of the objects around you. Atoms are composed of particles called protons, electrons and neutrons.

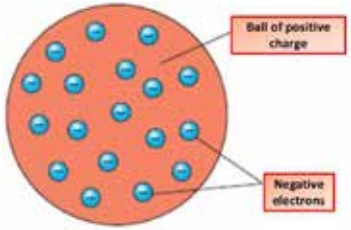


Electrons in shells. Electrons in atoms occupy energy levels, also called electron shells, outside the nucleus . Different shells can hold different maximum numbers of electrons. The electrons in an atom occupy the lowest available energy level first.

Key words	Definitions
Proton	A positively charged subatomic particle in the nucleus of an atom.
Neutron	A subatomic particle in the nucleus of an atom that has no charge.
Electron	A negatively charged subatomic particle. Can be found in atoms in shells orbiting the nucleus.
Emit	To give out. When used in terms of radiation, an emitter is a substance that gives out radiation.
Nuclear radiation	Particles or energy given out by an unstable nucleus of an atom.
Ionisation	Any process which causes atoms to become positively or negatively charged.
Penetration	To enter in to something. A more penetrating type of radiation will go further into a substance.

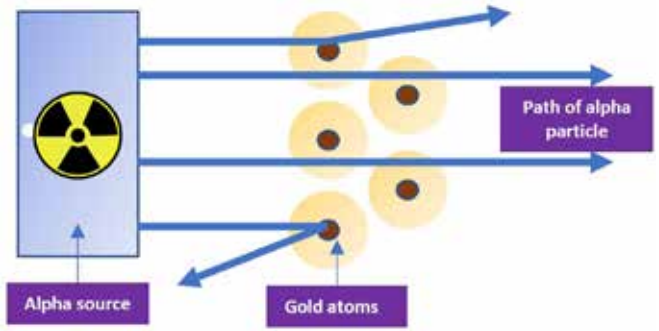
History of the atom

The Plum Pudding Model is a model of atomic structure proposed by J.J. Thomson in the late 19th century. Thomson had discovered that atoms are composite objects, made of pieces with positive and negative charge, and that the negatively charged electrons within the atom were very small compared to the entire atom.



In 1909 Ernest Rutherford designed an experiment to test the plum pudding model. In the experiment, positively charged alpha particles were fired at thin gold foil. Most alpha particles went straight through the foil. But a few were scattered in different directions. This evidence led Rutherford to suggest a new model for the atom, called the nuclear model. In the nuclear model:

- the mass of an atom is concentrated at its centre, the nucleus
- the nucleus is positively charged



Niels Bohr adapted Ernest Rutherford's nuclear model. Bohr did calculations that led him to suggest that electrons orbit the nucleus in shells. The shells are at certain distances from the nucleus. Further experiments led to the idea that the nucleus contained small particles, called protons. James Chadwick found evidence for the existence of particles in the nucleus with mass but no charge. These particles are called neutrons. This led to another development of the atomic model, which is still used today.

Subject: Physics	Topic: Atomic Structure	Term: Autumn 1

Types of radiation

There are three different types of nuclear radiation; alpha, beta, gamma.

What is alpha (α) radiation?

Description	2 neutrons, 2 protons Note:– An alpha particle is the same as a helium nucleus
Electric charge	+2
Relative atomic mass	4
Penetrating power	Stopped by paper or a few centimetres of air
Ionizing effect	Strongly ionizing
Effect of magnetic/ electric field	Weakly deflected

What is beta (β) radiation?

Description	High energy electron
Electric charge	-1
Relative atomic mass	1/1860
Penetrating power	Stopped by a few millimetres of aluminium
Ionizing effect	Weakly ionizing
Effect of magnetic/ electric field	Strongly deflected

Gamma (γ) radiation

Description	High energy electromagnetic radiation
Electric charge	0
Relative atomic mass	0
Penetrating power	Stopped by several centimetres of lead or several metres of concrete
Ionizing effect	Very weakly ionizing
Effect of magnetic/ electric field	Not deflected

Atomic structure

Ionisation is useful for smoke detectors. Radioactive americium releases ***alpha*** radiation, which ionises the air inside the detector. Smoke from a fire absorbs alpha radiation, altering the ionisation and triggering the alarm.
Beta radiation is used for tracers and monitoring the thickness of materials.
Radiation is used in industry in detectors that monitor and control the thickness of materials such as paper, plastic and aluminium. The thicker the material, the more radiation is absorbed and the less radiation reaches the detector. It then sends signals to the equipment that adjusts the thickness of the material.
Gamma radiation is used in the treatment of cancer, testing equipment and sterilising medical instruments.

Half-life

Half-life is the time it takes for half of the unstable nuclei in a sample to decay or for the activity of the sample to halve or for the count rate to halve. Count-rate is the number of decays recorded each second by a detector, such as the Geiger-Muller tube.

Radioactive contamination

Radioactive materials in the environment, whether natural or artificial, expose people to risks.
This can happen in two ways:

- The radiation from the material can damage the cells of the person directly. This is damage by irradiation.
- Some of the radioactive material can be swallowed or breathed in. While inside the body, the radiation it emits can cause damage. This is damage by contamination.

Fission

Nuclear fission is the splitting of a large atomic nucleus into smaller nuclei. In a nuclear reactor , a neutron is absorbed into a nucleus (typically uranium-235). This causes the nucleus to become uranium-236, which is violently unstable. The entire nucleus splits into two large fragments called 'daughter nuclei'.

Fusion

Nuclear fusion involves a deuterium and a tritium nucleus colliding and being forced together. Both nuclei are positively charged and therefore will repel each other. This is known as electrostatic repulsion. The nuclei have to get very close in order to collide, which is approximately a million millionth of a millimetre. If the nuclei are moving very fast then they can overcome the electrostatic repulsion. The hotter a molecule is, the faster it will move and the more likely it is to collide. For a nuclear fusion reactor to work, the temperature and pressure would each have to be very high.

Subject: History	Topic: Normans, Conquest and Control	Term: Autumn 1
Useful resources:	https://www.bbc.co.uk/bitesize/topics/zywk4j6	

Key word	Definition
Anglo-Saxons	The name given to the main inhabitants of England from 410 to 1066
Normans	The name given to the main inhabitants of the Normandy region of France
Economy	The system according to which the money, industry, and trade of a country are organised
Claimant	Somebody who asks to be given something they feel they are entitled to
Usurp	To take something from someone when they have no right to
Legitimate	Something that is acceptable according to the law
Exile	Someone who is living in another country because they cannot live in their own country (usually for political reasons)
Invasion	A foreign army entering of a country by force
Conquer	A country taking complete control of another country's land

Claimants to the throne

- From 1042 to 1066, England was ruled by King Edward the Confessor (a nickname which was a result of how religious he was).
- The country was split into different earldoms – each one was controlled by an Earl (the closest friends and advisers to the King).
- On 5th January 1066, Edward the Confessor died. There were four claimants to his throne:
- Harold Godwinson: a powerful English Earl who was married to the former King's sister. He was a strong military leader and was very popular amongst the Anglo-Saxon population of England.
- William, Duke of Normandy: a powerful Norman Duke who was a distant cousin to the former King. He also claimed that both Edward and Harold had sworn that he would be the next King of England.
- Harald Hardrada: a powerful Viking and King of Norway. He claimed that his father should have been made King in 1042 and that Edward the Confessor had stolen the throne from him.
- Edgar the Aetheling: the closest blood-relative of the former King However, Edgar was only 14 years old, had no soldiers, money or experience.
- The Witan chose Harold Godwinson and he was crowned King of England on 6th January 1066.

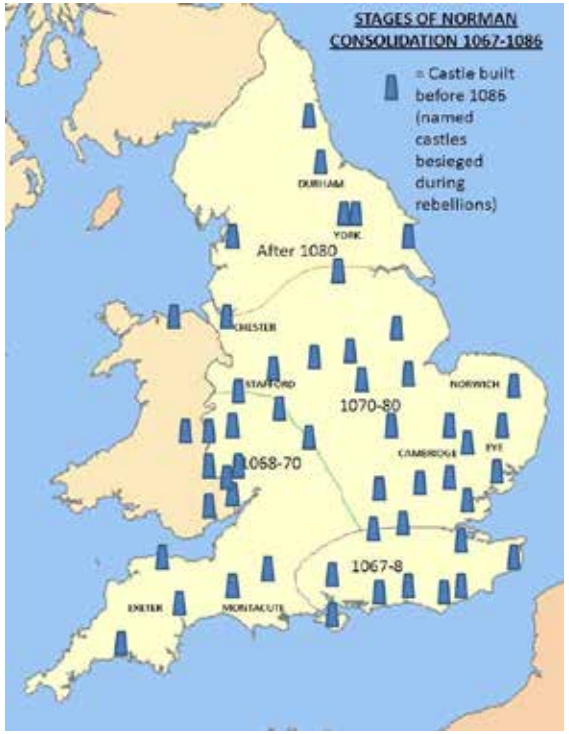
The Battle of Hastings

- The first of the other claimants to attack Harold was Harald Hardrada. He, with the help of Tostig Godwinson, invaded the north of England with 700 ships and 7,000 soldiers in September 1066.
- This invading army was defeated by Harold Godwinson at the Battle of Stamford Bridge. Two days later, William invaded the south of England.
- On 14th October 1066, William and Harold's armies met at the Battle of Hastings. The Norman victory at the battle has several reasons:
- William prepared well – he spent months building up a well-equipped army of soldiers, cavalry and archers. He also ensured that he had the support of the Pope before invading England.
- William used clever tactics – as well as the use of different fighting techniques, William used a famous Norman tactic known as the 'feigned retreat' (this involved pretending to run away from the Anglo-Saxon army and then, when they were chased, turning around and attacking them!)
- William was very lucky – he had no idea that Harald Hardrada would invade only a few weeks before he did and this made Harold's army very tired and battle weary.

Subject: History | **Topic**: Normans, Conquest and Control | **Term**: Autumn 1

Establishing control

- After the Battle of Hastings, William waited for the Witan to come and crown him King, but no one ever came. Therefore, he marched his army to London via many other settlements, which he attacked and burned to the ground.
- This shock tactic worked and, when he reached London in December 1066, Edgar the Aetheling and remaining Anglo-Saxon earls swore allegiance to William. He was crowned King of England on Christmas Day 1066.
- All Anglo-Saxon nobles who had sworn loyalty to William were allowed to keep their land. Many, included Edwin and Morcar, were able to keep their titles too.
- However, William dealt harshly with the families of those who had died at the Battle of Hastings – he took their land and have it to his Norman supporters. In this way, William established a network of loyal Normans across the country to ensure he was in control.
- In March 1067, William felt secure enough to return to Normandy. He left England in the hands of his half-brother, Bishop Odo and the Earl of Hereford, William Fitzosbern.
- The Normans also built Motte and Bailey castles across the country to ensure that the local Anglo-Saxons would follow the new Norman laws and prevent revolts against William.
- Castles were built for two main reasons:
- Strategic reasons – they housed soldiers that could be used to put down any attempted rebellions in that area.
- Symbolic reasons – the castles were a permanent physical reminder to the English that they were now a conquered people who needed to follow their Norman rulers.



Revolts against William

- Despite the Normans established control over England, there were many revolts against William: Hereford (1067) – led by Eadric 'the wild', ended before William was even made aware of it.
- Exeter (1068) – led by Harold Godwinson's mother, Gytha, ended after William's army surrounded the city for 18 days and demanded surrender.
- Mercia (1068) – led by Edwin and Morcar, ended when they surrendered to William who they built many castles in the north of England to help prevent further revolts.
- York (1069) – led by Edgar the Aetheling and King Swein of Denmark, ended when William paid King Swein to return to Denmark, leaving Edgar's forces seriously weakened
- Harrying of the North (1070) – after one of William's Norman supporters was killed, he marched an army to the north of England and destroyed all settlements, leading to over 100,000 deaths.
- East Anglia (1071) – led by Hereward the Wake, ended after locals helped Normans reach revolt.
- The Revolt of the Earls (1075) – planned by Roger Earl of Hereford (a Norman) but never happened.

Subject: History	Topic: Life under the Normans	Term: Autumn 2
Useful resources:	https://www.bbc.co.uk/bitesize/topics/zywk4j6	

Key word	Definition
Homage	A special honour or respect that is shown publicly.
Ecclesiastical	Something relating to the Christian Church.
Tenant	A person who occupies land owned by someone else (a landlord).
Patronage	The support given by someone (a patron).
Villein	A peasant who is not free and must live and work on his lord's land.
Vassal	A person who is subordinate (lower on the hierarchy) than another person.
Social	Relating to society or the people within it.
Economic	Relating to a country's wealth and movement of money.
Survey	A record or description of something.
Government	A group of people with the authority to govern an area or country.

Land for loyalty

- The foundation of Norman control over England was the Feudal System. This was a hierarchy imposed onto society to ensure that William had total control over the country.
- The Feudal System worked by giving land from the King to his Barons to their Knights and then finally to the Peasants of England. In return for this land, which the Peasants farmed, they gave loyalty to the Knights who gave it to their Barons who gave it to the King.
- The Act of Homage was important. This involved the vassal kneeling before his lord with a bare head and without. He would swear the 'Oath of Fealty (loyalty' and the lord would take the vassal's hand and declare his acceptance.
- As well as loyalty, the Barons also provided the King with a certain number of Knights which he could use to fight in wars or put down any revolts.
- Knights also had to provide 40 days a year of military service to their Barons in return for their land.
- In 1100, there were 180-200 Barons and nearly 5,000 Knights in England. The rest of the population (about 2 million) were Peasants.
- The territory of Wales and Scotland were independent of England during the Norman period.

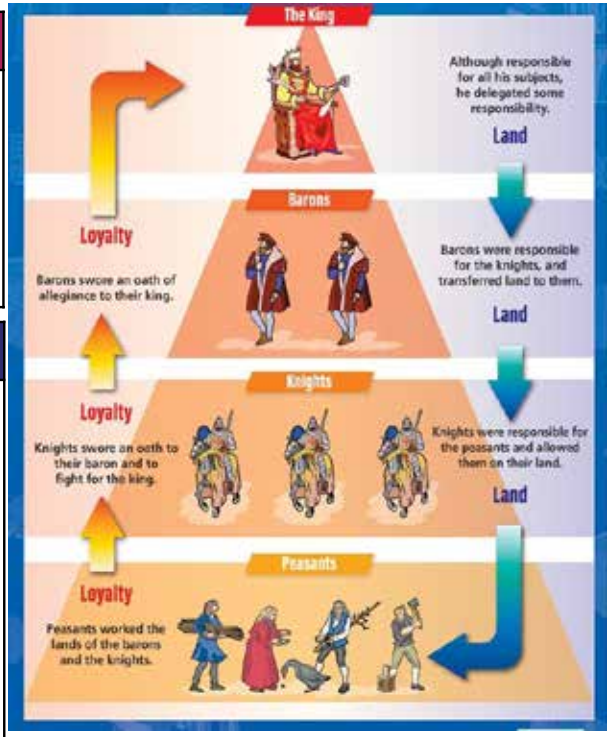
Government and the law

- The Normans kept a very similar form of government to the Anglo-Saxons – the King was the ultimate authority within the country (he could pass/change the law, raise taxes, and declare war), but he was advised by his supporters. These supporters were known as the 'Great Council'.
- In Anglo-Saxon times the main instrument of government was the issue an order in writing (called a 'writ'). This was a short list of new orders which was sent around the country. The Normans continued this system, but issued far more orders.
- However, to ensure that his orders were followed, William needed to ensure that there was an effective system of local government as well. Therefore, England was split into 134 areas called 'shires'. Each shire had a leader, called a 'shire-reeve' and his job was ensure that all Peasants in the area obeyed the King's orders.
- For people who refused to follow the orders and broke the law, there were many ways of catching them. These included constables, watchmen, the 'hue and cry' and the use of 'tithings'.
- Suspects were then tried using 'oaths', 'trial by ordeal', or 'trial by battle'.
- Norman punishments were harsher than Anglo-Saxon and included mutilation or hanging.

Subject: History	Topic: Life under the Normans	Term: Autumn 2

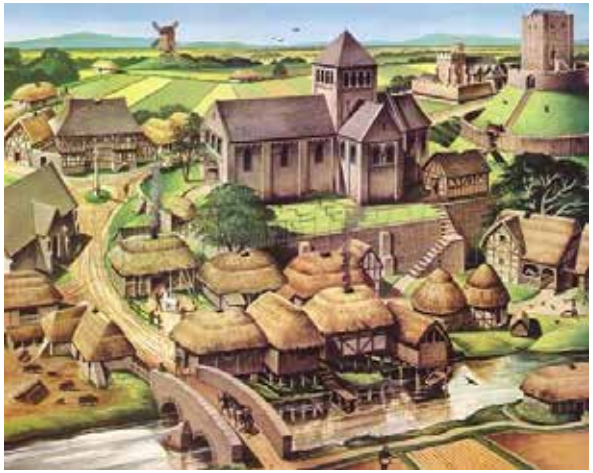
The Domesday Survey

- In 1085, William asked his officials to conduct a survey of all property and resources in England. This project took a year to compile and it showed exactly who owned what in virtually every part of the country. The document was nicknamed 'The Domesday Book' by the locals, as they felt they were being judged.
- The Domesday Survey demonstrated that the Normans (since 1066) had completely changed the ownership of land in England. William owned 20% of the land, the Church owned 25%, and the rest had been shared out amongst William's supporters (around 200 Norman Barons and Bishops).



Economic changes

- Before 1066, most people in England lived in the countryside. They grew crops and kept animals. Life was tough for people. Laws favoured the landowner. Sometimes the harvest was good but famine could also strike. Towns had started to develop but only 5% of the population lived in them by 1086.
- The economic impact of the Norman conquest was negative to start with:
- Taxes – the Normans increased rent and taxes from the Anglo-Saxon period.
- Land – the Normans took away nearly all land from the Anglo-Saxon owners, leading to some poverty.
- Destruction – the Harrying of the North led to large groups of people being homeless and unable to grow food on that land.
- Buildings – the Normans used forced labour to build many of their castles, cathedrals and churches.
- Freedom – the Domesday Survey shows that the number of freemen declined dramatically after the Norman conquest. Many had to resort to being villeins for local lords in order to feed their families.
- However, from the late 1090s, Norman England entered a period of economic growth due to the increased security of the country, the closer ties with mainland Europe and wealthy moneylenders.



Social changes

- Working life was changed very little by the Norman conquest. Just like Anglo-Saxons, people in Norman England were nearly all farmer so life varied depending on the seasons.
- Each village was surrounded by fields which were divided into strips and each villager had a few strips to farm and feed his family with. The crops that were commonly grown were wheat, rye, and barley.
- The lords and the bishops were the richest people after the King. Bishops had the job of running an area of churches. Lords (Barons and Knights) owned land but were not farmers. Their income came from the rent paid to them by their vassals.
- Amongst the Peasants, an informal hierarchy developed with merchants and craftsmen (blacksmiths, carpenters, bakers etc.) at the top and unskilled workers and villeins at the bottom.
- Housing, diet, and manners (they ate with their hands) did not change under the Normans.

Subject: History	Topic: The Norman Church and monasticism	Term: Autumn 2

Useful resources:	https://www.bbc.co.uk/bitesize/topics/zywk4j6

Key word	Definition
Abbots	A person who is in charge of an abbey of monks.
Clergy	A group of people who work for the Church.
Excommunicate	To remove membership to the Catholic Church.
Consecrate	To declare something is officially for religious purposes.
Papacy	The authority of the Pope.
Celibacy	The state of abstaining from marriage or sexual relations.
Monastic orders	A specific type of Christian worship done by monks. For example, 'The Order of St. Benedict'.
Secular	Something that is not connected to a religion.
Liturgy	The customs of public worship done by a religious group.
Synod	A council of Church members which gathers to decide religious issues.

Problems with the Church

- William had gained the support of the Pope before his invasion in 1066 and now that he was King of England, he had to repay the favour. He promised that he would reform the English Church. There were four issues that he and Pope had with the Church:
- Pluralism – there were a number of clergy who held more than one position and it was argued they could not effectively fulfil either role.
- Simony – some positions within the Church were not given to the best candidate but to the person who offered the most money for the job.
- Nepotism – some positions within the Church were often given to friends and relatives of existing Church workers (again, rather than the best candidates!)
- Celibacy – many members of the clergy were married and this went against Christian tradition.

Lanfranc's reforms

- William appointed one of his best friends, Lanfranc the Archbishop of Canterbury (the most important position in the English Church). Lanfranc made many reforms to the Church, such as:
- Establishing synods – these were ecclesiastical councils that helped spread the message of reform. Bishops were ordered to hold their own councils at least twice a year to improve communication within the Church.
- Moving cathedrals to places with higher populations – the Normans moved around one third of cathedrals (and the Bishops that worked in them) to important towns and cities. These changes helped centralize the Church.
- A new Church hierarchy – this was a more centralized system, with each level being answerable to the level above. The hierarchy (from bottom to top) was: Priests, Deans, Archdeacons, Bishops, Archbishops, Pope.
- Developing parishes – parish churches had started to develop before the conquest but the number of village churches doubled between 1070 and 1170. Over 2,000 village churches were recorded in the Domesday Survey.
- No married clergy – all marriage was banned amongst the clergy.
- Lanfranc also thought that secular courts didn't have the right t judge the clergy and so 'Church courts' were established. This effectively meant that the Church had its own set of laws!

Relations with the Pope

- William I does seem to have been genuinely religious and wanted to make the Church a more holy place. His relationship with the Pope was good and there was peace with Rome during his reign.
- His son, however, was very different – William II (William Rufus) came into conflict with the Pope many times.
- In 1088, after a rebellion was discovered led by the Bishop of Durham, William II was keen to make an example of him. He tried the Bishop in a secular court, found him guilt and exiled him from England. This angered the Pope as he believed that the Bishop should have been tried in a Church court.
- When Archbishop Lanfranc died in 1089, William II deliberately didn't replace him, as he wanted all the Church land (and money) for himself. This also angered the Pope. In 1093, however, when he fell ill, he became concerned that God would judge him poorly and finally appointed someone: Anselm.
- William II also reestablished the practice of simony so he could financially gain from the Church.
- Henry I had a much better relationship with the Pope and promised to stop his brother's policies of plundering the Church.
- However, there were controversies over investiture (the practice of making Bishops swear loyalty to the King when they were consecrated) that led to some conflict with the Pope.

Monasticism

- A monk was someone who volunteered to withdraw from society and live with other monks (in a Monastery or Abbey) and devote their lives to worshipping God. This monastic life was very popular amongst young men in the 11th and 12th centuries.
- The most popular monastic order was that of St. Benedict. Monks that practiced this order had to: devote 8 hours a day to pray, wear a habit, swear vows of poverty, chastity, and obedience, care for the sick, be clean shaven and shave a bald spot on their heads known as a 'tonsure'.
- The Normans built many monasteries across England. They also introduced new monastic orders, such as the Cluniacs (a very strict form of Benedictine monks). The Pope particularly liked this extreme form of monastic life and used it to increase his power within the country.
- Archbishop Lanfranc's reforms also included the monasteries. He introduced a new set of constitutions, changed the liturgy practiced and set up a new hierarchy, which was (from bottom to top): Novies, Monks, Obedientaries, Priors, Abbots, Pope.
- Monasteries also served other functions, aside from housing monks. For example, they were also:
- Hospitals – it was part of the monks duty to care for the sick and, whilst they had no medical training, they could offer people food and shelter until they naturally got over their illness.
- Libraries – monks were the historians and many of them wrote or copied out books on the events of their time. They were more complimentary to the Kings who had good relations with the Church.
- Schools – monks also taught local boys how to read, write and understand Christianity.

Subject: Geography	Topic: Hot Deserts	Term: Autumn 2
Useful resources:	https://www.bbc.co.uk/bitesize/examspecs/zy3ptyc	

Key word	Definition
Climate Change	A long-term change in the earth's climate, especially a change due to an increase in the average temperature.
Desertification	The process by which land become drier and degraded, as a result of climate change or human activities (or both)
Conservation	Managing the environment in order to preserve, protect or restore it.
Ecosystem	A community of plants and animals that interact with each other and their physical environment.
Ecotourism	Nature tourism usually involving small groups with minimal impact on the environment.
Irrigation	Artificial application of water to the land or soil.
Development	The process of a country in terms of economic growth, the use of technology and human welfare.

Hot Deserts

- Hot deserts have an extreme climate and challenging environment. There is very little biodiversity in hot deserts because of the harsh climate. Few species are specialised enough to survive there. Plants and animals which do survive there have adapted to difficult conditions.
- The biotic or living components and the abiotic or non-living components of the hot desert rely on one another - a change in one will lead to a change in the other.
- Climate: The climate is very hot. Summer day time temperatures can exceed 40°C. However, at night the temperature can drop below 0°C. The climate is very dry with less than 250 mm of rainfall a year. Hot deserts have two distinct seasons: summer, when the temperature ranges between 35-40°C, and winter, when the temperature ranges between 20-30°C.
- Soil: Desert soils are thin, sandy, rocky and generally grey in colour. Desert soils are very dry. When it does rain they soak up the water very quickly. The surface of the soil may appear crusty. This is due to the lack of rainfall. As it is so hot water is drawn up to the surface of the soil by evaporation. As the water evaporates, salts are left behind on the surface of the soil.
- Plants and animals: Hot deserts have distinct characteristics that allow certain species to thrive in such an extreme environment. Plants and animals have developed adaptations which allow them to survive in hot and dry conditions.
- Plants with adaptations which allow them to live in hot and dry conditions are called xerophytic. The following adaptations allow plants to survive in the hot desert environment:
- Small leaves - these ensure that less water is lost from the plant by transpiration because the leaf has a smaller surface area.
- Tap roots - these are long roots (7-10 metres long) that reach deep under the ground to access water supplies. The tap roots are much longer and bigger than the plant which is visible at the surface.
- Spines - some plants have spines instead of leaves, eg cactuses. Spines lose less water than leaves so are very efficient in a hot climate. Spines also prevent animals from eating the plant.
- Waxy skin - some leaves have a thick, waxy skin on their surface. This reduces water loss by transpiration.
- Water storage - some plants, known as succulents, store water in their stems, leaves, roots or even fruits. Plants which store water in their leaves and stems also have a thick waxy skin so that they lose less water by transpiration.

Development (Case Study: The Thar Desert, India)

- The Thar Desert is located in northwest India. It is one of the major hot deserts of the world with the highest population density. Many people living in this desert are subsistence farmers but with increasing development opportunities, the human population is also growing. Due to population pressures this environment is increasingly under threat.
- Despite having an extreme climate, the Thar Desert can provide development opportunities. These include:
- Mining - the desert has valuable reserves of minerals such as feldspar, phospherite, gypsum and kaolin. These minerals are used to produce a range of things from cement to fertilisers and are therefore valuable. Limestone and marble are also quarried in the area. Limestone is used for building and producing cement, and marble is used in construction.
- Energy generation - energy is produced in the Thar Desert using solar panels. This energy is used to clean water supplies contaminated with salt (desalination). Wind energy is also used to generate electricity. A wind farm consisting of 75 wind turbines has the capacity to produce 60MW.
- Farming - irrigation in the Thar Desert has made commercial arable farming viable. Producing crops such as wheat and cotton has created many jobs and generated income for the local economy.
- Tourism - the Thar Desert National Park attracts many visitors who want to see some of the 120 species found there. Tourists explore the desert with local guides on camels. Tourism is an important source of income and creates many jobs for local people and many development opportunities.
- Development in the Thar Desert includes many challenges such as:
- Extreme temperatures - temperatures in the Thar Desert can exceed 50°C in the summer months. It is hard for people to farm, work in mines or as tourist guides during these months as it is simply too hot. This makes development difficult.
- Water supply - the supply of water to the Thar Desert is precious and limited. With only 120-240 mm of rain falling per year in the desert, water must be used sensibly and sustainably. Without water the development of mining, farming and tourism and therefore the economy would not be possible. Some parts of the desert have experienced over-irrigation, which has caused waterlogging of the ground. Here the excess water has evaporated, leaving a layer of salt on the surface making it difficult to grow crops.
- Inaccessibility - the desert covers a huge area of 200,000 sq km. Most of the desert is inaccessible due to the extreme environmental conditions and poor infrastructure. Beyond the city of Jaisalmer, development is limited. This has created a honeypot site for tourists in Jaisalmer but not beyond. Inaccessibility to many parts of the desert has led to greater differences between rich and poor.

Desertification

- Desertification is the process of land turning into desert as the quality of the soil declines over time. The main causes of desertification include:
- Population growth - the population in some desert areas is increasing. In places where there are developments in mining and tourism, people are attracted by jobs. An increased population is putting greater pressure on the environment for resources such as wood and water.
- Removal of wood - in developing countries, people use wood for cooking. As the population in desert areas increases, there is a greater need for fuel wood. When the land is cleared of trees, the roots of the trees no longer hold the soil together so it is more vulnerable to soil erosion.
- Overgrazing - an increasing population results in larger desert areas being farmed. Sheep, cattle and goats are overgrazing the vegetation. This leaves the soil exposed to erosion.
- Soil erosion - this is made worse by overgrazing and the removal of wood. Population growth is the primary cause of soil erosion.
- Climate change - the global climate is getting warmer. In desert regions conditions are not only getting warmer but drier too. On average there is less rain now in desert regions than there was 50 years ago.

Subject: Geography	Topic: Resource Management and Food	Term: Autumn 2

Useful resources: https://www.bbc.co.uk/bitesize/examspecs/zy3ptyc

Key word	Definition
Aeroponics	Growing plants in an air or mist environment without the use of soil.
Famine	Widespread, serious, often fatal shortage of food.
Food insecurity	Being without reliable access to enough affordable, nutritious food.
Hydroponics	Growing plants in water using nutrient solutions, without the use of soil.
Inequalities	Differences between poverty and wealth, as well as wellbeing and access to jobs, housing, education etc.
Low income country (LIC)	A country with GNI per capita lower than $1,025.
High income country (HIC)	A country with GNI per capita higher than $12,376.
Gross national income (GNI)	Measurement of economic activity calculated by dividing gross (total) national income by the size of the population.
Surplus	When supply is greater than demand.

Resource distribution

- There are inequalities in the global distribution of resources. The balance between the supply and demand for resources affects a country's wealth and security.
- Wealthier countries import food and subsidise farming to make food more affordable. This creates a food surplus and there is plenty to go around. Poorer countries have a food deficit. They struggle to grow enough to feed people and cannot afford to subsidise farming or import more food.
- Water surplus and water deficit: There is a fixed amount of water on the planet. Some is stored in the oceans and ice caps and some circulates as the water cycle. The amount of water available in an area is dependent on factors such as rainfall, temperature and population.
- Higher rainfall leads to more water. Some places can have too much rainfall, which leads to flooding.
- Higher temperatures cause evaporation. If water evaporates then less is available for people to use.
- Higher populations use more water. This means there is less available to share around.
- Areas of water surplus have more water than they need. Excess water flows along rivers and out into the sea, but can become a problem if it floods the land. Areas of water deficit have too little water.
- Energy security and energy insecurity: High income countries (HICs) and new emerging economies (NEEs) consume a lot of energy. The people living in these countries are usually linked to a national electricity grid. They use a lot of technology in their lives and have a high standard of living.
- Factories in NEEs also use energy to manufacture products. Low income countries (LICs) use less energy. Many people living in LICs are not connected to an electricity grid, but rely on primary energy sources, such as fuel-wood or animal dung.
- Some countries produce large supplies of energy. They may have fossil fuel reserves or access to other energy sources, such as geothermal heat. Other countries are dependent upon imported fuel. Fuel prices are set by the exporting countries and so those importing fuel often have to pay high prices.
- Places that have energy security produce a high percentage of the energy that they consume. Places that have energy insecurity consume more than they produce. Energy security is determined by the balance between the amount of energy produced in that country and energy imported from abroad.

Subject: Geography	Topic: Resource Management and Food	Term: Autumn 2

Food security

- Food consumption has been rising globally for over 50 years. High income countries (HICs) consume the most calories, but low income countries (LICs) are experiencing the biggest increase in calorie intake. There are two main reasons for increasing food consumption:
- Economic development. As countries become wealthier, people can afford to eat more food. People in Chad and Somalia eat less than 2,850 calories a day, whereas those in the USA and Italy consume more than 3,440 calories a day. Many HICs have high levels of food wastage because people buy more food than they need. Fast food and food advertising also increase food consumption in wealthier places.
- Rising population. World population continues to grow and is likely to exceed 8 billion people by 2030. This means there are more mouths to feed. The most rapid growth is taking place in LICs and some newly emerging economies (NEEs), like China and India.
- Some places produce more food than others. There are many reasons why some countries produce more food than others:
- Climate – global warming is increasing temperatures by around 0.2°C every 10 years. Rainfall is increasing in some places, but decreasing in others. Higher temperatures and unreliable rainfall make farming difficult, especially for those farming marginal lands, who already struggle to survive. Even developed countries can be affected by drought. Countries such as Russia and Australia are huge exporters of wheat and barley respectively. When they suffer drought there is less food available globally and global food prices increase, leaving the poor most vulnerable.
- Technology – improvements in technology have increased the amount of food available. Technology can overcome temperature, water and nutrient deficiencies in the form of greenhouses, irrigation and fertilisers. High income countries (HICs) import food from across the globe, all year round. However, the growth of the biofuel market is taking up valuable farmland.
- Pests and disease – pesticides have increased crop yields. Farmers in wealthier countries can afford pesticides, most farmers in poorer countries cannot.
- Water stress – irrigation systems provide water for countries with unreliable or low rainfall. Irrigation can double crop yields, but it is expensive to put these systems in place. Water can be taken either from underground aquifers or directly from rivers. Both have environmental consequences.
- Conflict – war forces farmers to flee their land or to fight in conflict. Food can be used as a weapon, with enemies cutting off food supplies in order to gain ground. Crops can also be destroyed during fighting. Food shortages have caused riots and conflict, eg the Darfur region has faced conflict for many years because of disagreements over land and grazing rights.
- Poverty – when people have less money, they cannot afford food and they become unable to work.

Increasing food supply

- Irrigation: this can double the amount of food produced. Some parts of the world still do not have irrigation systems in place. Only 10% of the food produced in Africa comes from irrigated crops and so there is the potential to improve yields in these countries.
- Aeroponics and hydroponics: These are systems that allow plants to be grown without soil. Plants grown in this way take in water and nutrients efficiently. Aeroponics involves suspending plants in the air and spraying their roots with a fine mist of water and nutrients. Hydroponics involves growing plants in a porous material (other than soil) and allowing water containing nutrients to filter through it.
- The New Green Revolution: This first began in the 1940s. It refers to the application of modern farming techniques in LICs, eg fertilisers and pesticides, irrigation and high-yield crop varieties. From the 1960s to 1990s, yields of rice and wheat in Asia doubled. Many LICs could still benefit from the Green Revolution. The New Green Revolution involves using different seeds to help specific areas that are experiencing the impact of global warming, such as drought and flooding. There is also a focus on improving the nutritional value of crops, rather than just providing more calories.
- Biotechnology and appropriate technology: This is the selective breeding or genetic modification (GM) of plants and animals to produce specific traits. Both involve mixing two species, both of which have beneficial characteristics. Selective breeding has been used on dairy cows to increase milk yields. GM has been used on wheat to produce crops that are disease resistant. Appropriate technology involves using suitable machinery an techniques in LICs.

Subject: Geography	Topic: Small-scale ecosystems and Tropical Rainforests	Term: Autumn 1
Useful resources:	https://www.bbc.co.uk/bitesize/examspecs/zy3ptyc	

Key word	Definition
Adaptation	Actions taken to adjust to natural events.
Biodiversity	The variety of life in the world or a particular ecosystem.
Conservation	Managing the environment in order to preserve, protect or restore it.
Deforestation	The cutting down and removal of forest.
Ecosystem	A community of plants and animals that interact with each other and their physical environment.
Ecotourism	Nature tourism usually involving small groups with minimal impact on the environment.
Floodplain	Relatively flat area forming the valley floor on either side of a river channel.
Sustainability	Actions that meet the needs of the present without reducing the ability of future generations to meet their needs.

Small-scale ecosystems

- An ecosystem is a natural environment and includes the flora (plants) and fauna (animals) that live and interact within that environment. Flora, fauna and bacteria are the biotic or living components of the ecosystem. Ecosystems are dependent on the following abiotic or non-living components:
- climate - the temperature and amount of rainfall are very important in determining which species can survive in the ecosystem
- soil - the soil type is important as this provides nutrients that will support different plants
- water - the amount of water available in an ecosystem will determine what plants and animals can be supported
- The biotic parts of the ecosystem have a complex relationship with the abiotic components - changing one will lead to a change in the other.

Tropical Rainforests

- Tropical rainforests have distinct characteristics that support a wide variety of different species. This means that they have a high biodiversity. The biotic or living components of the ecosystem and the abiotic or non-living components of the ecosystem depend on one another - a change in one leads to a change in the other.
- Climate: Very wet with over 2,000 mm of rainfall per year. Very warm with an average daily temperature of 28°C. The temperature never drops below 20°C and rarely exceeds 35°C. The atmosphere is hot and humid. The climate is consistent all year round. There are no seasons.
- Soil: Most of the soil is not very fertile. A thin layer of fertile soil is found at the surface where the dead leaves decompose.It is red in colour because it is rich in iron. Due to heavy rainfall the nutrients are quickly washed out of the soil.
- Plants and animals: The warm and very wet climate provides perfect conditions for plant growth. The wide range of plant species supports many different animals, birds and insects. Species have adapted to the conditions of the rainforest, eg trees and plants have shallow-reaching roots to absorb nutrients from the thin fertile layer in the soil.
- A tropical rainforest is made up of the following layers: ground level, shrub layer, under canopy, (main) canopy, emergent.
- Famous tropical rainforests include: The Amazon (South America) and The Congo (Africa).

Deforestation

- The tropical rainforests of the Amazon Basin face the threat of deforestation. Deforestation is happening due to the following reasons:
- Farming - large areas are cleared for pastoral farming. As the global demand for meat has increased many cattle farms have opened in the Amazon Basin for beef farming. Arable farming is also responsible for the loss of tropical rainforest as many farmers are clearing land to grow cash crops.
- Logging - tropical rainforests are cut down so that valuable trees like mahogany can be accessed and sold for timber to make furniture. Other trees are cut down for making paper products.
- Mining - the Amazon Basin is rich in natural resources such as iron ore, copper, tin, aluminium, manganese and gold. This has led to the development of mines which results in the clearance of tropical rainforest. The Carajas mine in Brazil is the world's largest iron ore mine.
- Roads - the construction of access roads for farmers, loggers and miners results in large parts of the tropical rainforest being destroyed.
- Hydroelectric power (HEP) - The creation of HEP stations in the Amazon Basin has resulted in large areas of forest being flooded to create the reservoirs and dams. The flooding of the Balbina dam in Brazil resulted in the loss of 920 square miles of tropical rainforest.
- Population - population growth has resulted in the loss of tropical rainforest as land is cleared to build houses and infrastructure.
- The impacts of the deforestation of the Amazon Basin include the following:
- Soil erosion: Once the land is cleared of rainforest vegetation the soil is left bare. When it rains, the nutrients in the soil are washed away. The nutrient cycle stops because there are no plants or trees shedding leaves to replace the nutrients in the soil. The soil is no longer able to support plant life because it is not fertile. The roots of plants and trees no longer hold the soil together so it is easily eroded.
- Loss of biodiversity: Many different species of plants and animals die because of deforestation. As plants and animals are closely connected through the food web, deforestation this reduces the biodiversity, or variety of species found in the tropical rainforest.
- Climate change: The trees and plants of the Amazon Basin absorb carbon dioxide during the process of photosynthesis. If there are fewer trees and plants, due to deforestation, then less carbon dioxide is removed from the atmosphere. In this way deforestation contributes to global warming and therefore climate change.
- Economic development: The creation of mines, farms and roads - which caused deforestation - has also led to economic development. The money created from these enterprises allows a country to generate foreign income, which can then be used to pay off debts or be invested in further development projects.

Sustainable management

- Tropical rainforests can be managed in the following ways to reduce deforestation:
- Logging and replanting - selective logging of mature trees ensures that the rainforest canopy is preserved. This method allows the forest to recover because the younger trees gain more space and sunlight to grow. Planned and controlled logging ensures that for every tree logged another is planted.
- Education - It is important that local people, businesses and politicians understand the true value of the tropical rainforest. Once they understand the value of biodiversity, particularly in terms of tourism, they will be more likely to want to protect it from deforestation.
- Ecotourism - this encourages sustainable tourism that creates jobs for local people whilst ensuring that the money generated is used to protect and conserve the tropical rainforest for future generations to enjoy.
- International agreements - agreements to protect tropical rainforests have been made between different countries through debt-for-nature swaps. This is when a country which is owed money by another country cancels part of the debt if an agreement is made by the debtor country to ensure the conservation of its tropical rainforests.

Subject: Religious Education	Topic: Christian Beliefs and Teachings	Term: Autumn

Key Words	Definition
Benevolent	God's nature as all-loving.
Holy	Set apart for a special purpose and worthy of worship.
Incarnation	God becoming flesh in the form of Jesus Christ.
Just	God's nature as fair.
Omnipotent	God's nature as all-powerful.
Problem of Evil	The question of why evil exists in the world when God has the power and knowledge to prevent it.
Trinity	God's nature as three 'persons'; the Father, Son and Holy Spirit.

Key Figures	Definition
God	Supreme being; the creator and the sustainer of the universe.
Jesus	A Jewish man who was considered by some to be a messiah and God in human form.
Mary	Jesus' human mother, who gave birth to Jesus despite being a virgin.
Pontius Pilate	Roman governor of Jerusalem who sentenced Jesus to death.

GCSE Pod
Christianity: Beliefs I

Nature of God

- Christians believe in **one God** who is the creator and the sustainer of all that exists.
- God is **omnipotent** which means they are almighty and have unlimited power.
- God is **benevolent** which means they are all-loving and all-good.
- God is **just** which means they are a perfect and fair judge who will bring about what is right and fair or who will make up for a wrong that has been committed.

Problem of Evil

- Many people question why a loving God, who is almighty and has unlimited power, would allow people to suffer, rather than prevent the evil actions of others from happening.
- Christians believe that a just God treats all people fairly and is incapable of making a wrong judgment.
- Therefore, Christians are sure that they can trust God even when things appear to be going wrong.

Trinity

- Christians believe God is three persons in one. This idea is called the **Trinity**. Each person of the Trinity is fully God, but the three persons of the Trinity are not the same.
- The Father is the creator of all life.
- The Son is Jesus Christ who is both fully human and fully God.
- The Holy Spirit is the unseen power of God at work in the world, especially answering prayers.
- *"We believe in one God, Father, Son and Holy Spirit"* – The Nicene Creed

Incarnation

- Christians believe that God was **incarnated** in human form as **Jesus Christ** at Jesus' birth.
- **Mary** was impregnated by the Holy Spirit and gave birth as a virgin – for Christians this is proof of Jesus' status as the son of God.
- Jesus was fully God and fully human, which helps explain his miracles and resurrection.
- His words, deeds and promises have great authority as they are the word of God.
- Christmas is the festival that celebrates the incarnation.
- *"The Word became flesh"* – John 1:14

Subject: Religious Education	Topic: Christian Beliefs and Teachings	Term: Autumn

Key Words	Definition
Ascension	Jesus returning to be with God in heaven after the crucifixion.
Atonement	Making things better after sinning, asking for forgiveness from God.
Crucifixion	Jesus' execution by the Romans on the cross.
Free Will	When people can make decisions for themselves. Christians believe God has given this to people.
Heaven	The place of eternal peace ruled over by God, or the state of eternal happiness in the presence of God.
Hell	The place of eternal suffering or the state of being without God.
Original Sin	The built-in tendency to do wrong which comes from Eve's disobedience.
Resurrection	Jesus returning from the dead after he was crucified.
Salvation	Being saved from sin and given eternal life in heaven by God.
Sin	Any thought or action which goes against God's will.

GCSE Pod
Christianity: Beliefs II

Crucifixion

- Jesus travelled to Jerusalem to preach; whilst there he was sentenced to death by Pontius Pilate before being nailed to a cross.
- In his last moments Jesus was able to forgive those who were killing him showing Christians how important forgiveness is.
- This event is remembered on Good Friday during the Easter celebrations.
- *"Forgive them father, they know not what they do"* – Luke 23:34

Resurrection

- After Jesus was dead and buried Christians believe he rose from the dead – this is the **resurrection**. Early on the Sunday three women visited his tomb expecting to find his body but it was not there. After his resurrection Jesus appeared to his disciples and told them to spread the word of him.
- This event is celebrated on Easter Sunday.
- *"He is risen"* – Christians say this to each other on Easter Sunday.

Ascension

- Forty days after he rose from the dead Jesus **ascended** (went up) into heaven.
- A belief in resurrection and ascension is important for a number of reasons.
- It shows that eternal life – life after death – is real.
- It assures Christians they will rise again after death and live on in the afterlife.
- It leads Christians to try and lead a good life.

Sin and Salvation

- Christians believe you are judged after you die which determines if you go to **heaven** or **hell**.
- **Sin** is any action or thought that goes against God's will, Christians can look in the Bible for advice on what is a sin.
- God gave humans **free will** but they should use that freedom to make good choices and not sin.
- **Salvation** is the idea that Jesus's crucifixion saves human beings from eternal damnation.
- The death of Jesus made up for **original sin** – the idea that we were all damned by Eve's choice to disobey God – it allows us to atone for sins and reach eternal life in heaven.

Subject: Religious Education	Topic: Christian Practices	Term: Autumn

Key Words	Definition
Believer's Baptism	Service where those old enough to decide for themselves are welcomed into the church.
Bible	The special book that the religion of Christianity is based on.
Consecration	When a priest blesses bread and wine in order to use it for Eucharist.
Eucharist	Service where bread and wine is received by Christians to remember Jesus' sacrifice.
Holy Water	Water that has been blessed by a priest.
Infant Baptism	Service where babies are welcomed into the church with holy water.
Liturgical Worship	Formal worship with set prayers, hymns and Bible readings.
Non-liturgical worship	Worship with no set pattern, may have modern music and sermons.
Prayer	A communication with God, can be private or during worship.
Sacraments	Holy rituals through which believers receive a special gift of grace. Examples are baptism and the Eucharist
Worship	Acts of religious praise, honour or devotion.

GCSE Pod
Christianity: Practices I

Worship

- **Worship** refers to acts of praise, honour or devotion. For Christians, this is aimed at God.
- **Liturgical worship** takes place in a church and is led by a priest, who reads out set prayers. This form of worship is traditional and quite formal.
- **Non-liturgical worship** also takes place in a church but is less formal. There are no set prayers, instead people take turns to preach and read from the **Bible**. This form of worship is modern and can be appealing to young people.

Prayer

- Prayer means communicating with God, either silently or out loud, sometimes through song. It is one of the most important parts of the spiritual life of a Christian and enables them to have a personal relationship with God.
- Intercessions are prayers made on behalf of others.
- Thanksgiving is when people pray to say thank you to God.
- Set prayers are written down and used in liturgical worship.
- Informal prayer is off-the-cuff and often used in non-liturgical worship.

Baptism

- Baptism is an initiation ritual in which people are welcomed to the Christian Church.
- **Infant baptism** is a formal service welcoming a new child into the Church. **Holy water** is sprinkled over the baby's head. Catholics baptise their children close to birth to ensure they go to heaven.
- A **believer's baptism** welcomes someone into the church who is old enough to decide themselves. They are submerged in a pool of holy water**.** They make promises to stay away from evil. **Baptists** only practice this type of baptism.

Eucharist

- In the Eucharist, commonly known as Holy Communion, a priest **consecrates** (blesses) bread and wine, and the congregation then receives these. It recalls the Last Supper.
- Catholics believe the Holy Spirit transforms the bread and wine into Jesus' body and blood whilst Anglicans believe the bread and wine are symbolic. Christians take part in this ritual to remember the sacrifice Jesus Christ made for them by being crucified on the cross.

Subject: Religious Education	Topic: Christian Practices	Term: Autumn

Key Words	Definition
Christmas	Christian festival which celebrates the incarnation (birth) of Christ.
Easter	Christian festival which celebrates the resurrection of Christ.
Faith	Complete trust or confidence in something. For Christians, this refers to God.
Holy Week	The week leading up to Easter.
Monastic	Referring to monks and nuns – devout followers of Christianity.
Nativity	The time and place of someone's birth, usually refers to the birth of Jesus.
Pilgrimage	Going on a special journey to visit a holy site.

Lourdes, France

Iona, Scotland

GCSE Pod
Christianity: Practices II

Festivals: Easter

- **Easter** is the most important Christian festival, where Christians celebrate Jesus' resurrection from the dead leading up from **Holy Week**. Jesus was crucified on Good Friday and rose on Easter Sunday.
- Special services take place and processions led by someone carrying a cross.
- On Easter Sunday special services take place with hymns which celebrate the resurrection.
- Eggs are used as a reminder of new life.

Festivals: Christmas

- **Christmas** remembers the birth of Jesus – his incarnation. It is celebrated on the 25th December.
- Trees and homes are decorated with nativity scenes.
- Lights remember Jesus is the light of the world.
- Carol services happen in Churches with readings from the Bible.
- Children act out nativity plays and midnight mass takes place on Christmas Eve.

Pilgrimage: Lourdes

- A **pilgrimage** is a special religious journey and can be seen as an act of worship in itself. For Christians the Holy Land, where Jesus lived and died is particularly important. Pilgrimage is important as it allows people to get closer to God, strengthen **faith**, ask for forgiveness, pray, ask for a cure, help others and meet others who share your faith.
- Lourdes in France is dedicated to Jesus' mother Mary, after a young girl in the 19th century believed to have seen visions of her there, speaking of a spring of water which had healing powers. Now millions of people have been to drink from the spring of water in the hope of being healed. Many sick or disabled people go to Lourdes.

Pilgrimage: Iona

- Iona is an Island off the west coast of Scotland. In 6th Century St. Columba, an Irish missionary brought Christianity to Scotland and set up a small **monastic** community there.
- Pilgrimages happen there in dedication to the virgin Mary. The community in Iona hold daily services in the church leading a seven mile hike to holy spots.

Subject: Religious Education	Topic: The Church in the Community	Term: Autumn

Key Words	Definition
Agape	Unconditional love.
Church	The Church is the name given to the global community of Christians, whilst a church is the Christian place of worship.
Disciples	The twelve closest followers of Jesus.
Evangelism	Spreading the word of God through action or speech.
Great Commission	The instruction that Jesus gave to his disciples, telling them to spread his message.
Mission	The calling to spread the word of God and evangelise.
Missionary	A person sent on a religious mission to promote their religion in a different country through preaching or charity work.
Persecution	Hostility and ill-treatment of a group of people.
Poverty	When people live without having basic human rights such as having enough food, water or shelter.
Reconciliation	Restoring friendly relations after a conflict or falling out.

GCSE Pod
Christianity: Role of the Church

Food Banks

- The Church is the holy people of God, also called the Body of Christ, among whom Christ is present and active.
- A church is a building where Christians worship.
- Individual churches and the Church as a whole help the local community in a variety of ways, including the provision of food banks. These give food for free to people who cannot afford to buy it.

Street Pastors

- Christians should help others in the local community because Jesus taught that people should show **agape** love, which is a Biblical word meaning selfless, sacrificial and unconditional love.
- Christians believe it is important to put their faith into action. They do this through many organisations and project that help vulnerable people in the community.
- Street Pastors are people who are trained to patrol the streets in urban areas. They help vulnerable people by providing a reassuring presence on the street.

Mission and Evangelism

- A **mission** is a vocation or calling to spread the faith. The Church has a mission to tell non-believers that Jesus Christ, the Son of God, came into the world as its saviour.
- Christians spread the faith through **evangelism**, which is showing faith in Jesus by example or by telling others.
- They do this to fulfil Jesus' instructions to the **disciples** to spread his teachings, which is called the **Great Commission**.

Importance of the Worldwide Church

- Up to a third of the world's population claim to be Christian, and around 80,000 people become Christians each day. The Church expects new Christians to help spread the faith as part of their commitment to Jesus.
- The worldwide Church has a mission to restore people's relationship with God and with one another.
- The Church therefore plays an important role in **reconciliation** through initiatives to develop peace and understanding.

Subject: Español	Topic: ¡Desconectate! Las vacaciones Theme 2: Local area, holiday and travel	Term: Autumn 1
Useful resources:	Viva Textbook. Vocabulary Lists. GCSE Pod.	QR

Key Vocabulary

Alojamiento – Accommodation
Un albergue juvenil
Un camping
Un hotel de cinco estrellas
Un parador
Una pensión

Instalaciones – Facilities
Una cama de matrimonio
Un cuarto de baño
Una habitación individual
Una piscina cubierta
La recepción
Un restaurante

Actividades – Activities
Comí muchos helados
Compré recuerdos
Descansé
Hice turísmo
Saqué fotos
Tomé el sol

Connectives

Que
Quien
Donde
Lo malo fue que
Lo bueno fue que

Key Questions

¿Qué tipo de vacaciones prefieres?	**Prefiero** las vacaciones culturales.
¿Adónde vas normalmente de vacaciones?	Normalmente **voy** a España.
¿Dónde te alojas?	**Me alojo** en una pensión
¿Adónde fuiste de vacaciones el año pasado?	**Fui a** Italia con mi familia.
¿Dónde te alojaste?	**Me alojé** en un hotel.
¿Cómo era el hotel?	El hotel **era** muy lujoso y grande.
¿Qué tal lo pasaste?	**Lo pasé** fenomenal.
¿Qué hiciste?	**Saqué** muchas fotos y **hice** vela**.**
¿Adónde vas el próximo año?	**Voy a ir** a Escocia.
¿Adónde te gustaría ir?	**Me gustaría ir** a los Estados Unidos.

Describing accommodation – The imperfect

It was – era (SER)
El hotel **era** acogedor y limpio.
It was – estaba (ESTAR)
El hotel **estaba** en la playa.
It had – tenía
El hotel **tenía** un gimnasio y una piscina cubierta.
There was – había
Había unos jardínes bonitos.

Giving opinions in the past – The preterite

Me gustó
Me encantó
Lo pasé bien
Lo pasé fatal
Me aburrí
Lo disfruté
Fue un desastre
Fue inolvidable
El tiempo hizo bien / mal

Remember to always justify your opinions.
e.g.
Lo pasé muy bien ***porque*** *hizo sol todos los días.*

Useful adjectives

barato/a	caro/a	animado/a
lujoso/a	feo/a	cultural
moderno/a	antiguo/a	amable
ruidoso/a	tranquilo/a	hermoso/a
grande	pequeño/a	ideal

Sequencing words

Primero	al día siguiente	mientras
Antes	antes de + inf	luego
Después	después de + inf	acabo de
Luego	por la mañana	
Al llegar	por la tarde	

Useful verbs

viajar
volver
aburrir(se)
salir
hacer turismo
alojarse
divertir(se)
disfrutar
visitar
acostar(se)
ver
llegar
pasar tiempo
entrar
bailar
decir
reservar

Synonyms

Porque
ya que / dado que / puesto que

Me encanta
Me flipa / me chifla / me mola

Hay
Tiene / existe / se encuentra

Pero
Sin embargo / no obstante

Subject: Español	Topic: ¡Desconectate! Las vacaciones	Term: Autumn 1
Useful resources:	Viva Textbook. Vocabulary Lists. GCSE Pod.	QR

Key Questions	
¿Qué tipo de vacaciones prefieres? ¿Por qué?	
¿Qué haces en verano?	
¿Adónde fuiste de vacaciones el año pasado?	
¿Dónde te alojaste?	
¿Cómo era el alojamiento/el hotel?	
¿Cómo era el pueblo/la ciudad?	
¿Qué tal lo pasaste? ¿Por qué?	
¿Qué planes tienes para el próximo año?	
¿Adónde te gustaría ir el próximo año? ¿Por qué?	
¿Por qué son importantes las vacaciones?	
¿Por qué veranea tanta gente en el extranjero?	
¿Adónde irías si tuvieras mucho dinero? ¿Por qué?	

Subject: Español	Topic: ¡Desconectate! Las vacaciones Theme 2: Local area, holiday and travel	Term: Autumn 1
Useful resources:	Viva Textbook. Vocabulary Lists. GCSE Pod.	QR

SECTION 1 – ¿Qué haces en verano? What do you do in summer?	
En verano / invierno	In summer / winter
Chateo en la red	I chat online
Cocino para mi familia	I cook for my family
Descargo canciones	I download songs
Escribo canciones	I write songs
Hago natación / esquí/ windsurf	I swim / ski / windsurf
Hago una barbacoa	I do BBQs
Juego al balconcesto / fútbol	I play basketball / football
Monto a caballo / en bici	I ride a horse / bike
Nado en el mar	I swim in the sea
Salgo con mis amigos/as	I go out with my friends
Trabajo como voluntario/a	I work as a volunteer
Veo la tele	I watch TV
Voy al polideportivo / al parque	I go to the sports centre / park
Voy de paseo	I go for a walk

SECTION 2 – ¿Qué tiempo hace? What's the weather like?	
Hace buen / hace mal tiempo	It's nice / bad weather
Hace calor / frío/ sol /viento	It's hot / cold / sunny / windy
Llueve / nieva	It's raining /it's snowing
El tiempo es variable	The weather is changeable
El clima es caluroso / soleado	The climate is hot / sunny
Hay niebla / tormenta	It's foggy / stormy
Hay chubascos	There are showers
Está nublado	It's cloudy

SECTION 3 – ¿Qué te gusta hacer? What do you like doing?	
Soy adicto/a a	I'm addicted to
Soy un(a) fanático/a de	I'm a fan of
ya que /dado que /puesto que	Given that / since
Prefiero	I prefer
Me gusta	I like
Me encanta / me mola / me chifla	I love
Me flipa / me apasiona	I love
No me gusta (nada)	I don't like (at all)
Odio	I hate
A (mi padre) le gusta	My dad likes
Nos encanta	We like
Bucear / estar al aire libre	To dive
Estar en contacto con los amigos	To be in contact with friends
Hacer artes marciales	To do martial arts
Hacer deportes acuáticos	To do water sports
Ir al cine / a la pista de hielo	To go to the cinema / ice rink
Ir de compras	To go shopping
Leer (un montón de revistas)	To read (lots of magazines)
Usar el ordenador	To use a computer
Ver películas	To watch films
Prefiero veranear	I prefer to summer
En el extranjero / en España	Abroad / in Spain
En la costa / en el campo	On the coast / in the countryside
En la montaña / en la ciudad	In the mountains / in the city

Subject: Español	Topic: ¡Desconectate! Las vacaciones Theme 2: Local area, holiday and travel	Term: Autumn 1
Useful resources:	Viva Textbook. Vocabulary Lists. GCSE Pod.	QR

SECTION 4 – ¿Con qué frecuencia? How often?

Siempre	Always	**De vez en cuando**	Once in while
A menudo	often	**Una vez a la semana**	Once a week
Todos los días	Everyday	**Dos o tres veces al año**	Two or three times a year
A veces	Sometimes	**(casí) nunca**	(almost) never

SECTION 5– ¿Adónde fuiste de vacaciones? What do you do in summer?

Hace una semana /un mes / un año	A week / month / year ago
Hace dos semanas/ meses / años	2 weeks / months/ years ago
Fui de vacaciones a	I went on holiday to
Francia / Italia / Turquía	France / Italy / Turkey
¿Con quién fuiste?	Who did you go with?
Fui….. con mi familia	I went…with my family
Con mi mejor amigo/a	With my best friend
Solo/a	Alone
¿Cómo viajaste?	How did you travel?
Viajé…en autocar / avión	I travelled by car / plane
En barco / coche /tren	By boat / car / train

SECTION 6– ¿Qué hiciste? What did you do?

Primero	Firstly
Luego	Then
Más tarde	Later
Después	After
finalmente	Finally
Lo mejor fue cuando	The best thing was when

SECTION 7 – ¿Qué hiciste? What did you do?

Lo peor fue cuando	The worst thing was when
Aprendí a hacer vela	I learnt to windsurf
Comí muchos helados	I ate lots of ice-creams
Compré recuerdos	I bought souvenirs
Descansé	I rested
Fui al acuario	I went to the aquariam
Hice turismo	I went sightseeing
Llegué tarde al aeropuerto	I arrived late at the airport
Perdí mi móvil	I lost my mobile
Saqué fotos	I took photos
Tomé el sol	I sunbathed
Tuve un accidente en la playa	I had an accident on the beach
Vi un partido	I watched a match
Visité el Park Güell	I visited Park Guell
Vomité en una montaña rusa	I was sick on a roller coaster

Unos verbos importantes			
Descubrir	To discover	**subir**	To go up
disfrutar	To enjoy	**ver**	To see
pasear	To go for a walk		

Subject: Español	Topic: ¡Desconectate! Las vacaciones Theme 2: Local area, holiday and travel	Term: Autumn 1
Useful resources:	Viva Textbook. Vocabulary Lists. GCSE Pod.	QR

SECTION 8 – ¿Qué tal lo pasaste? How was it?

Me gustó / Me encantó	I liked it/I loved it
Lo pasé bomba / fenomenal	I had a great time
Lo pasé bien / mal /fatal	I had a good/bad/awful time
Fue …	It was…
Inolvidable / increíble	Unforgetable/incredible
Impresionante / flipante	Impressive/awesome
horroroso	Awful
Un desastre	A disaster
¿Qué tiempo hizo?	What was the weather like?
Hizo buen / mal tiempo	It was good/bad weather
Hizo calor / frío / sol / viento	It was hot/cold/sunny/windy
Hubo niebla / tormenta	It was foggy/stormy
Llovió /Nevó	It rained / it snowed

SECTION 9 – ¿Cómo era el hotel? What was the hotel like?

Me alojé / Me quedé	I stayed
Nos alojamos / Nos quedamos	We stayed
En un albergue juenvil	In a youth hostel
En un apartamento	In an apartment
En un camping	At a campsite
En un hotel de cinco estrellas	In a 5 star hotel
En un parador	In a state run luxury hotel
En una casa rural	In a house in the country
En una pensión	In a guest house
Fui de crucero	I went on a cruise

SECTION 10 – ¿Cómo era el hotel? What was the hotel like?

Estaba…	It was…
Cerca de la playa	Close to the beach
En el centro de la cuidad	In the city/town center
En las afueras	On the outskirts
Era…	It was…
Acogedor/a	Welcoming
Antiguo/a	Old
Barato/a	Cheap
Caro/a	Expensive
grande	Big
Lujoso/a	Luxurious
Moderno/a	Modern
Pequeño/a	Small
Ruidoso/a	Noisy
Tranquilo/a	Quiet
Tenía/ había	It had / There was or were
No tenía ni…..ni	It had neither…nor…
No había ni…ni	There was neither…nor…
Tampoco tenía…	Nor did it have…

SECTION 11 – Instalaciones / Facilities

Un aparacamiento	A car park	**Una lavandería**	A laundrette
Un bar	A bar	**Una piscina cubierta**	An indoor pool
Un gimnasio	A gym	**Mucho espacio**	Lots of space
Un restaurante	A restaurant	**Una cafetería**	A café

Subject: Español	Topic: ¡Desconectate! Las vacaciones Theme 2: Local area, holiday and travel	Term: Autumn 1
Useful resources:	Viva Textbook. Vocabulary Lists. GCSE Pod.	QR

SECTION 12 – ¿Cómo era el pueblo? What was the town/village like?	
Lo bueno / lo malo	The good thing / the bad thing
del pueblo	Of the town/village
de la ciudad	Of the city
era que era	was that it was
Demasiado / muy / bastante	Too / very /quite
Animado/a	Lively
Bonito/a	pretty
Histórico/a	Historical
Pintoresco/a	Picturesque
Turístico/a	Touristic
Tenía…	It had…
Mucho ambiente / tráfico	Lots of atmosphere /traffic
Mucho que hacer	Lots to do
Mucha contaminación/gente	Lots of pollution/ people
Muchos espacios verdes	Lots of green spaces
Muchos lugares de interés	Lots of places of interest
Muchas discotecas	Lots of discos

SECTION 13 – Quisiera reservar… I would like to book…	
¿Cuándo está abierto/a el/la?	When is the …open?
¿Cuánto es el suplemento por…?	How much is the supplement for?
¿Se admiten perros?	Are dogs allowed?
Quisiera reservar…	I would like to book…
Una habitación individual/doble	A single/double room
Con/sin balcón	With/without a balcony
Con bañera/ducha	With/without a bath / shower
Con cama de matrimonio	With a double bed
Con desauyno incluido	With breakfast included
Con media pensión	With half board
Con pensión completa	With full board
Con vistas al mar	With sea views
¿Para cuántas noches?	For how many nights?
Para…noches	For ..nights
Del…al….de	From the ..to the…of
¿Puede repetir por favor?	Can you repeat, please?
¿Puede hablar más despacio?	Can you talk more slowly?

SECTION 13 – Quisiera reservar… I would like to book…	
¿Hay….?	Is there? Are there?
wifi gratis	Free wifi
aire acondicionado	Air conditioning
En el hotel/las habitaciones?	In the hotel /the rooms
¿Cuánto cuesta una habitación?	How much does a room cost?
¿A que hora se sirve el desayuno?	What time is breakfast served?

SECTION 14– Quiero quejarme… I would like to complain	
Quiero hablar con el director.	I want to speak with the manager.
Quiero cambiar de habitación.	I want to change room.
El aire acondicionado	The air conditioning
El ascensor	The lift
La ducha	The shower
La habitación	The room

Subject: Español	Topic: ¡Desconectate! Las vacaciones Theme 2: Local area, holiday and travel	Term: Autumn 1
Useful resources:	Viva Textbook. Vocabulary Lists. GCSE Pod.	QR

SECTION 14– Quiero quejarme… I would like to complain	
Está sucio/a	Is dirty
La luz	The light
No funciona	Doesn't work
Hay ratas en la cama	Therev are rats in the bed
No hay	There isn't / aren't
Necesito	I need
Papel higiénco	Toilet paper
Jabón/champú	Soap / shampoo
Toalles / un secador	Towels / a dryer
¡Socorro!	Help
¡Es inacceptable!	It's unacceptable
Lo siento/perdone	I'm sorry.
El hotel está completo	The hotel is full.

SECTION 15 – Mis vacaciones desastrosas… My disastrous holiday	
Por desgracia	Unfortanately
Por un lado…por otro lado	On one hand..on the other hand
El primer / último día	The first / last day
Al día siguiente	On the next day
Tuve / tuvimos	I had / we had
Un accidente / un pinchazo	An accident / a puncture
Un retraso/ una avería	A delay/ a breakdown
Tuve / tuvimos que …	I had to / we had to
Esperar mucho tiempo	To wait a long time
Ir al hospital / a la comisería	To go to the hospital / the police station

SECTION 15 – Mis vacaciones desastrosas… My disastrous holiday	
Llamar un mecánico	To call a mechanic
Cuándo llegamos….	When we arrived
era muy tarde	It was very late
estaba cansado/a	I was tired
la recepción ya estaba cerrada	The reception was already closed
acampar	To camp
decidir	To decide
alquilar bicicletas	To hire bikes
chocar con	To crash into
Hacer alpinismo	To go mountain climbing
volver	To return

Subject: Spanish	Topic: Mi vida en el insti	Theme 3: School	Term: Autumn 2
Useful resources:	Viva Textbook. Vocabulary Lists. GCSE Pod.		QR

Key Vocabulary

El alumno
El instituto
El colegio
La escuela
La universidad
Compañero de clase
Una asignatura difícil / fácil
La clase / el aula
El examen / los exámenes
La cafetería / la cantina
El gimnasio
Los laboratorios
La sala de informática
El patio
El recreo
La biblioteca
La pizarra (interactiva)
El curso
El edificio
Los deberes
Las pruebas

Key Questions

¿Te interesan las matemáticas? Me chiflan las matemáticas porque son lógicas.
¿Qué tal los estudios? La historia me fascina dado que saco buenas notas.
¿Cómo son los profesores? Mi profesor de español es muy trabajador.
¿Cómo es tu insti? Mi insti es muy grande y moderno…
¿Cómo era tu escuela primaria? Era muy antigua y había menos aulas.
¿Qué piensas de las normas de tu insti? Son muy estrictas pero imprescendibles.
¿Cómo es tu uniforme? ¿Te gusta? Nuestro uniforme es elegante y me gusta.
Describe un día típica de tu insti Empezamos a las ocho y terminamos a las..
¿Haces actividaded extraescolares? Si, soy miembro del club de música..
Describe un viaje escolar que hiciste en el pasado. El año pasado fuimos a..

Verbs with an infinitive

When describing school rules, the following structures need to be followed by an **infinitive**:
Está prohibido **hablar** en clase
No se permite **comer** chicle
No se debe **correr** en los pasillos
Hay que **ser** punctual
Tenemos que mantener limpio el patio

Using desde hace

To say how long you have been doing something for use **desde hace** and the **present tense** of the verb.
e.g.
Hago natación **desde hace** mucho tiempo.
Toco la guitarra **desde hace** tres años.
Juego al balconcesto **desde hace** seis meses.

Useful verbs

asistir
sacar (buenas notas)
participar
completar
hacer (los deberes)
preguntar
usar
aprender
enseñar
llevar
repasar
mejorar
aprobar
tener (éxito)
faltar (a clases)
hacer novillos
restringir
respetar
pasar
estudiar

Connectives

que
además
por lo tanto
no obstante
sin embargo
así que
por un lado / por otro lado

Useful adjectives

adecuado/a	colorido/a
moderno/a	antiguo/a
corto/a	largo/a
fácil	duro/a
mejor	peor
listo/a	tonto/a
trabajador/a	perezoso

Sequencing words

primero	al día siguiente	mientras
antes	antes de + inf	luego
después	después de + inf	acabo de
luego	por la mañana	
al llegar	por la tarde	

Synonyms

Importante
Imprescendible / necesario / crucial

Grande
enorme/ numeroso/ gigante

Aburrido
Tedioso / pesado / cansado

Interesante
curioso / fascinante / útil

Subject: Español	Topic: Mi vida en el insti	Theme 3: School	Term: Autumn 2
Useful resources:	Viva Textbook. Vocabulary Lists. GCSE Pod.	QR	

Key Questions	
¿Qué cosas te interesas? ¿Cuáles son tus intereses?	
¿Qué asignaturas estudias? ¿Cuál es tu favorita?	
¿Qué tal los estudios? ¿Cómo son tus profesores?	
¿Cómo es tu insti?	
¿Cómo era tu escuela primaria?	
¿Qué normas hay en tu insti?	
¿Cómo es tu uniforme? ¿Te gusta?	
¿Qué opinas de las normas?	
¿Cómo es un día en tu insti?	
¿Hay excursiones en tu insti? ¿Qué vas a hacer?	
¿Haces actividades extraescolares? ¿Qué piensas de ellas?	
¿Qué hiciste? ¿Qué vas a hacer?	

Subject: Español	Topic: Mi vida en el insti	Theme 3: School	Term: Autumn 2
Useful resources:	Viva Textbook. Vocabulary Lists. GCSE Pod.	QR	

SECTION 1 – ¿Te interesa(n)...? *Are you interested in...?*			
El arte dramático	Drama	Me encanta(n)/me chifla(n)...	I love
El dibujo	Art/drawing	Me interesa(n)/me fascina(n)	I am interested in/fascinated by
El español	Spanish	Me gusta(n)/no me gusta(n)	I like/I don't like
La biología	Biology	Odio	I hate
El inglés	English	Prefiero	I prefer
La educación física	PE	Porque es/son	Because it's/they are
La física	Physics	Mi día preferido es el (viernes)	My favourite day is (Friday)
La geografía	Geography	Mi horario	My timetable
La historia	History	¿Qué día tienes...?	What day do you have...?
La informática	ICT	Tengo (inglés) los (martes)	I have (English) on (Tuesdays)
La lengua	Language	¿A qué hora tienes...?	What time do you have...?
La química	Chemistry	A la una/a las dos	At one o'clock/two o'clock
La religión	RE	y / menos cuarto	Quarter past / to
La tecnología	Technology	y / menos cinco	Five past / to
Los idiomas	Languajes	Y media	Half past
Las empresariales	Business studies	La educación infantil / primaria	Pre-school /primary education
Las matemáticas	Maths	La educación secundaria	Secondary education
Las ciencias	Science	El bachillerato	A levels
La materia/la asignatura	subject	La formación professional	Vocational training
El instituto	Secondary school		

SECTION 2 – ¿Qué tal los estudios? How are your studies?		Opinions on subjects and teachers	
La física es más/menos... que...	Physics is more/less... than...	Mi profesor(a) (de ciencias) es...	My (science) teacher is...
Es mejor/peor que...	It's better/worse than	Paciente/impaciente	Patient/impatient
Tan...como...	As...as...	Tolerante / severo/a	Tolerant/harsh
Fácil/difícil	Easy/difficult	Listo/a / tonto/a	Clever/stupid
Divertido/aburrido	Fun/boring	Trabajador/perezoso	Hard-working/lazy
Útil/relevante/práctico	Useful/relevant/practical	Simpático/estricto	Nice/strict
Creativo/relajante	Creative/relaxing		
Exacto/lógico/exigente	Precise/logical/demanding		

Subject: Español	Topic: Mi vida en el insti	Theme 3: School	Term: Autumn 2
Useful resources:	Viva Textbook. Vocabulary Lists. GCSE Pod.		QR

SECTION 2 – ¿Qué tal los estudios? How are your studies?	El profesor The teacher
Mi profe…	My teacher…
Enseña/explica bien	Teaches/explain well
Tiene buen sentido del humor	Has a good sense of humour
Tiene expectativas altas	Has high expectations
Crea un buen ambiente de trabajo	Creates a good working atmosphere
Nunca se enfada	Never gets anger
Me hace pensar	Makes me think
Nos da consejos/estrategias	Gives us advice/strategies
Nos pone muchos deberes	Gives us lots of homework
El curso académico	Academic year
Las pruebas/las evaluaciones/los exámenes	Tests/assessments/exams
Suspender/aprobar	To fail/to pass

SECTION 3 – ¿Cómo es tu insti? *What is your school like?*	
En mi instituto hay…/mi instituto tiene…	In my school there is…/my school has…
Un salon de actos	A hall
Un comedor	A canteen
Un campo de futbol	A football pitch
Un patio	A playground
Un gimnasio	A gym
Una piscina	A swimming pool
Una pista de tenis/atletismo	A tennis court/ an athletics track
Lo bueno / malo es que…	The good/bad thing is that…
Lo mejor/peor es que…	The best/worst thing is that…
Lo que más me gusta es/son…	What I like the most is/are…
Lo que menos me gusta es /son…	What I like the least is/are…
No… ningún/ninguna	Not a single
Ni…ni…	(n)either…(n)or…
Nada	Nothing/anything

SECTION 3 – ¿Cómo era tu escuela primaria? *What was your primary school like?*	
En mi escuela primaria había… / Mi escuela primaria tenía…	In my primary school there was/were… / my primary school had…
Más/menos	More/less
Exámenes/deberes/alumnus	Exams/homework/pupils
Muebles/espacios verdes	Furniture/green spaces
Oportunidades/instalaciones	Opportunities/facilities
Pizarras interactivas/clases	Interactive boards/lessons
Aulas de informatica	ICT rooms
Donde jugar	Somewhere to play
Poco espacio	Little space
Antes/ahora	Before/now
El edificio/el colegio/el día escolar	The building/the school/the school day
Es/era	Is/was…
(in)adecuado/a / corto/a / largo/a	(in)adequate/short/long
Las clases son/eran	The lessons are/were
Instituto de Educación Secundaria (IES)	Secondary school

Nadie	No-one/anyone
Tampoco	Not either
Mi insti es…	My school is…
Mixto/femenino/masculine	Mixed/all girls/all boys
Público/privado	State/private
Pegueño/grande	Small/big
Moderno/antiguo	Modern/old

Subject: Español	Topic: Mi vida en el insti	Theme 3: School	Term: Autumn 2
Useful resources:	Viva Textbook. Vocabulary Lists. GCSE Pod.		QR

SECTION 4 – Las normas del insti (el uniforme) School rules (uniform)			
Tengo/tenemos que llevar…	I/ we have to wear…	Amarillo/a/os/as	Yellow
(no) llevo/llevamos	I / we (don't) wear	Blanco/a/os/as	White
Es obligatorio llevar	It's compulsory to wear	Rojo/a/os/as	Red
Un jersey (de punto)	A (knitted) sweater	Morado/a/os/as	Purple
Un vestido	A dress	Naranja/rosa	Orange/pink
Una camisa	A shirt	Verde/azul	Green/blue
Una chaqueta (a rayas)	A (striped) jacket	Gris/marrón	Grey/brown
Una chaqueta de punto	A cardigan	Oscuro/claro	Dark/light
Una corbata	A tie	Bonito/feo	Pretty/ugly
Una falda (a cuadros)	A (checked) skirt	(in)cómodo	(un)comfortable
Unos pantalones	Trousrs	El uniforme	Uniform…
Unos calcetines	Socks	Mejora la disciplina	Improves discipline
Unos zapatos	Shoes	Limita la individualidad	Limits individuallity
Unos vaqueros	Jeans	Da una imagen positiva del insti	Gives a positive image of the school
Unas medias	Tights	Ahorra tiempo por la mañana	Saves time in the morning

SECTION 4 – Las normas del insti (los problemas) School rules (the problemas)	
Un problema en mi insti es que…	One problema in my school is..
El estrés de los exámenes	Exam stress
El acoso escolar	Bullying
La presión de grupo	Peer presure
Hay (unos) alumnos que…	There are (some) students who…
Se burlan de otros	Make fun of others
Sufren intimidación	Are victims of intimidation
Tienen medio de…	Are afraid of…
Hacen novillos/se piran	Skive
Quieren ser parte de la pandilla	Want to be part of the group of friends
Son una mala influencia	are a bad influence

SECTION 4 – Las normas del insti (las normas) School rules (rules)	
Está prohibido	It's forbidden
No se permite	It's not allowed
No se debe	You/one must not
Comer chicle	To chew a chewing gum
Usar el móvil en clase	To use your phone in lessons
Dañar las instalaciones	To damage the facilities
Ser agresivo o grosero	To be agressive or rude
Correr por los pasillos	To run in the corridors
Llevar piercings	To have piercings
Hay que…	It is necessary…
Ser puntual	To be punctual
Respetar el turno de palabra	One voice rule
Mantener limpio el patio	To keep the playground clean

SECTION 4 – Las normas del insti (las razones) School rules (the reasons)	
Las normas son…	The rules are…
Necesarias/demasiado severas	Necessary/too strict
Para fomentar la buena disciplina	For promoting good discipline
Para limitar la libertad de expresión	For limiting freedom of expression
Para fastidiar a los alumnos	For annoying the pupils
Sacar buenas/malas notas	To get good/bad grades
Estoy de acuerdo	I agree
¡Qué va!	No way!
¡Qué horror!	How awful!
¡Que bien!	How great!

Subject: Español	Topic: Mi vida en el insti	Theme 3: School	Term: Autumn 2
Useful resources:	Viva Textbook. Vocabulary Lists. GCSE Pod.	QR	

SECTION 5– ¿Cómo es tu día escolar? (rutina) What is your school day like? (routine)

Normalmente	Normally/usually
Salgo de casa a las…	I leave home at…
Voy…	I go
A pie/andando	On foot/walking
En bici/autobus/coche	By bike/bus/car
En metro/taxi/tren	By underground/taxi/train
Las clases empiezan/terminan a las…	Lessonss start/finish at…
Tenemos…clases al día	We have…lessons per day
Cada clase dura…minutos	Each lessons lasts…minutes
El recreo/la hora de comer es a la(s)…	Break/lunch time is at...

SECTION 6 – ¿Qué vas a hacer? (excursiones) What are you going to do? (trips)

Voy/vas/vamos a…	I am going / you/we are going
Llegar/salir/estar	Arrive/go out/be
Ir en coche/andando	Go by car/walk
Llevar ropa de calle	Wear casual clothes/non uniform
Ir/comer juntos	Go/eat together
Hacer una visita guiada	Do a guided tour
Ver los edificios	See the buildings
Pasar todo el día en…	Spend the whole day in…
Asistir a clases	Attend lessons
Practicar español	Practise Spanish
Ir de excursión	Go on a trip
Tener una programación variada	Have a varied programme
Va a…	It's going to..
Ser fácil/guay	Be easy/cool

SECTION 7 – Las actividades extraescolares (qué haces) Extracurricular activities (what do you do)

Toco la trompeta	I play the trumpet/I've been playing the trumpet…		
Canto en el coro	I sing/I've been singing in the choir	**Ajedrez/judo/teatro/periodismo**	Chess/judo/drama/reporters
Voy al club de…	I go/I've been going to the … club	**Lectores/ecoescuela/fotografía**	Reading/eco-schools/photography
Soy miembro del club de…	I am/I've been a member of the…club	**Desde hace…años/meses**	For...years/months

SECTION 7 – Las actividades extraescolares (las opiniones) Extracurricular activities (the opinions)

Creo/pienso que	I think that	**Desarrollar tus talentos**	Develop your talents
Las actividades extraescolares son…	Extracurricular activities are…	**Hacer nuevos amigos**	Make new friends
Muy divertidas	A lot of fun	**Te dan…**	They give you...
Algo diferente/un éxito	Something different/an achievement	**Una sensación de logro**	A sense of achievement
Te ayudan a...	They help you to	**Mas confianza**	More conficence
Olvidar las presiones del colegio	Forget the pressures of the school	**La oportunidad de ser creativo/a / de expresarte**	The opportunity to be creative/to express yourself

Subject: Español	**Topic**: Mi vida en el insti	Theme 3: School	Term: Autumn 2
Useful resources:	Viva Textbook. Vocabulary Lists. GCSE Pod.	QR	

SECTION 7 – Las actividades extraescolares (qué hiciste) Extracurricular activities (what did you do)	
El año/trimestre/verano…	Last year, term, summer...
Participe en un evento especial/un concierto/un concurso/un torneo	I took part in a special event/a concert/a competition/a tournament
Gane un trofeo	I won a trophy
Toqué un solo	I played a solo
Conseguimos la clasificación como…	We achieved the award/designation as…
Tuvimos una charla	We had a talk/presentation
Ganamos una competición nacional	We won a national competition
Dimos un concierto	We gave a concert
¡Fue un éxito!	It was a success!

SECTION 7 – Las actividades extraescolares (qué vas a hacer) Extracurricular activities (what are you going you do)	
Este trimestre/ el próximo trimestre	This term/next term
Voy a	I am going to
Aprender a…+ infinitive	Learn to…
Continuar con...+ noun	Continue with...
Dejarlo	Stop doing it
Apuntarme al club de…	Sign up for the … club
Vamos a…	We are going to...
Montar una obra de teatro	Put on a play
Conseguir…+ noun or infinitive	Achieve…

Subject: GCSE Computer Science	Topic: Memory and Storage	Term: Autumn

Useful resources	https://members.gcsepod.com/shared/podcasts/title/13838/83779

KEY WORDS	DEFINITION
Primary Storage	Used to store programs and data currently used by the computer. When a user needs to run a program, it is loaded from disk to primary storage. Another term for primary storage is RAM
RAM	Random Access Memory. It is given this name because data can be stored anywhere within the available memory
Volatile	RAM is volatile (any data stored in RAM is lost when the device is powered off)
ROM	Read Only Memory. ROM can be used to store the BIOS
Non-Volatile	ROM is non-volatile (any data stored in RAM is not lost when the device is powered off) – it is stored permanently
BIOS	Basic Input Output System. The program that boots up and loads the Operating System when the computer is turned on
Virtual Memory	Used when the computer is short of RAM. This involves the hard disk being used as memory instead of RAM. This is not ideal as the speed of a hard disk is MUCH much slower than RAM

Storage

- **Optical Storage** includes CD, DVD and Blu-ray. Data is written to optical storage media using a laser
- The capacity of this type of media ranges from 640 megabytes (CD) to 50 gigabytes (Blu-ray)
- Since it involves the use of moving parts, access/data transfer speeds are slower than for other types of media

- **Magnetic Storage** media include hard drives and tape and can have a huge capacity (100's of terabytes)
- Magnetic storage media devices involve the use of moving parts
- This means that they have comparatively slow data read and write speeds and can be prone to damage

- **Solid state** media is also known as electrical or flash storage
- Solid state has the fastest transfer speed out of all the three types of media, since it features no moving parts
- This also makes it more robust than other forms of storage and in addition they consume less power
- However, this form of storage offers lower capacity than other forms of media and is still comparatively expensive

Criteria	Meaning
Cost	How much does it cost per GB?
Capacity	How much space is there to store files?
Speed	How fast can it read/write data?
Portability	Can it be carried easily or is it a device that is impractical to move?
Durability	How robust is it? Will it break or damage easily?
Reliability	How likely is it to fail? How long will it last?

When recommending a method of secondary storage, always consider the context in which the data will be used

Subject: GCSE Computer Science	Topic: Binary	Term: Autumn

Useful resources	https://members.gcsepod.com/shared/podcasts/title/13838/83779

KEY WORDS	DEFINITION
Denary	Base 10 number system. Uses digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9
Binary	Base 2 number system. Uses digits 0 and 1 only
Hexadecimal	Base 16 number system. Uses digits 0 – 9 and characters A(10), B(11), C(12), D(13), E(14) and F(15) . Notation is used as shorthand for binary num to avoid errors
ASCII	American Standard Code for Information Interchange: a 7-bit character set used by all machines. There is also an extended ASCII character set that uses 8 bits
Character Set	The list of characters recognised by a computer's hardware or software. eg. ASCII, Unicode. Each character is represented by a numerical code that is stored as a binary integer
Overflow	When a number becomes too large to fit into the number of bits allocated to it is said to 'overflow' and some bits are lost leaving an incorrect value
Resolution	The number of pixels per inch of a picture
Colour depth	The number of bits used to store the colour of each pixel
Pixel	Short for picture element. The smallest single point of colour in an image
RGB	The colours that make up all on-screen colours - red, green & blue
Base 2	The number system which we also call binary. Numbers go up in twos
Sample Rate	The number of times the sound is sampled per second, measured in Hertz (Hz)
Bit Rate	The amount of bits processed per second
Compression	A reduction in the number of bits needed to represent data
Lossy	Compressions where data is permanently lost or discarded to reduce file size
Lossless	Compression where there is no loss of data, instead the data is rewritten in a more efficient way
Bit Depth	The number of bits per sample

Binary
Computers are electrical devices; their components are made up of millions of circuits. Each circuit contains switches which can be either 'on' or 'off'. These can be represented by the values 1 and 0
ALL data is stored and processed in binary form – this includes text, images, sound and video
To convert from denary to binary, start by subtracting the biggest place value you can from the denary number, then place a 1 in that place value column. Next, subtract the second biggest place value you can, and place a 1 in the column. Repeat this process until you reach zero. Finally, place a 0 in any empty place value columns
There are four rules that need to be followed when adding two binary numbers. These are: 0 + 0 = 0 → 1 + 0 = 1 → 1 + 1 = 10 → 1 + 1 + 1 = 11
When transmitting data, errors may occur and some data may be incorrectly received. To overcome this, an extra value is transmitted to help determine if the data received is correct or incorrect. This value is known as a check digit
All data must be converted into binary in order for a computer to process it. Sound is no exception. To do this, sound is captured - usually by a microphone - and then converted into a digital signal
The higher the sampling rate, the better the quality of audio

Criteria	Meaning
Bit	A single binary digit. A 1 or a 0
Nibble	4 bits
Byte	8 bits
Kilobyte	1000 Bytes
Megabyte	1000 KB
Gigabyte	1000 MB
Terabyte	1000 GB

Subject: GCSE Computer Science	Topic: Networks	Term: Autumn

Useful resources	https://members.gcsepod.com/shared/podcasts/title/13839/83797

KEY WORDS	DEFINITION
LAN	Computers and devices connected over a single site or small geographical area
WAN	Computers and devices connected over a wider area
Protocol	Rules which allow different devices to send/receive data to/from each other. Different protocols exist depending on (i.e. uploading or downloading data, displaying a webpage, sending/receiving an email
Router	Connect devices across a WAN, including the internet
Switch	Allows devices to connect within a LAN. Physical networks are possible with transmission media such as
NIC	Network Interface Card. All devices need a NIC in order to connect to a network
Transmission Media	Types of cables → ethernet cables, twisted pair copper, coaxial, fiber optic etc.
Client	A computer that requests data or services stored on a server. The computer you use in school is a client
Server	A powerful computer attached to a network that awaits and responds to requests for data from the clients
Node	Any single machine connected to a network
The Cloud	Refers to services that allow users to use software or store files
Star Network	All computers connect to a central hub/server/switch
Mesh Network	LAN/WAN or VLAN - Only one 'node' connected to router

Types of Topologies
In a star topology all nodes indirectly connect to each other through one or more switches. The switch acts as a central point through which all communications are passed
In a mesh topology there is no central connection point. Instead, each node is connected to at least one other node. Each node is capable of sending messages to and receiving messages from other nodes. The nodes act as relays, passing on a message towards its final destination

Types of Networks
A wired network uses cables (copper or fibre optic) to form the connections between the networked devices. Ethernet is a protocol that describes how data is transmitted in wired networks
A wireless network uses wireless Wi-Fi signals to connect nodes. Wi-Fi signals use radio frequencies in the 2.4 gigahertz (GHz) and 5 GHz wavebands. Each node has a radio transceiver, which allows it to connect to a wireless access point (WAP). WAPs can be physically connected by wire to a network switch, or wirelessly to other WAPs
Wireless networks give freedom of movement. They are therefore popular in homes, schools and any organisation that has a constantly changing number of connected nodes

Network Layering
Application layer - encodes/decodes the message in a form that is understood by the sender and the recipient
Transport layer - breaks down the message into small chunks (packets). Each packet is given a packet number and the total number of packets. The recipient uses this information to assemble the packets together in the correct order
Network layer - adds the sender's IP address and that of the recipient. The network then knows where to send the message, and where it came from
Data link layer - enables the transfer of packets between nodes on a network, and between one network and another

Subject: GCSE Computer Science	Topic: Network Security	Term: Autumn

Useful resources	https://members.gcsepod.com/shared/podcasts/title/13840/83811

KEY WORDS	DEFINITION
Social Engineering	Involves exploiting human weaknesses in order to gain entry to computer system. This can be done in a number of ways
Malware	Is software which can cause damage to a computer. A computer or system could become infected by a VIRUS, WORM or TROJAN
SQL Injection	Can be used to hack poorly coded websites. A hacker could use a database language called SQL to gain entry to a websites database
Shouldering	Looking over someone's shoulder when they enter data) or finding private information (like login details) on discarded documents
DoS	Attacks designed to "crash" a network or website. Criminals do this by bombarding a site with so much 'traffic' that it cannot function properly
Firewall	Can be either hardware or software – they are designed to intercept data packets before they are received from or sent to the internet
Physical Security	Includes methods such as use of CCTV, security guards, and locking doors
Brute Force Attack	Involves a hacker attempting to guess a user's password using trial-and-error. They may use a computer program to do this, since it could try millions of combinations very quickly
Phishing	Emails are sent by criminals and are designed to steal money or login details. Can contain links or attachments which should not be clicked on
User Access Levels	Network administrators can set different levels of user access. Some users may be able to install software, whist others may only be able to view files
Penetration Testing	A simulated cyber security attack, carried out by the company on itself for the benefit of said company. Penetration testing aims to identify the weaknesses within a system

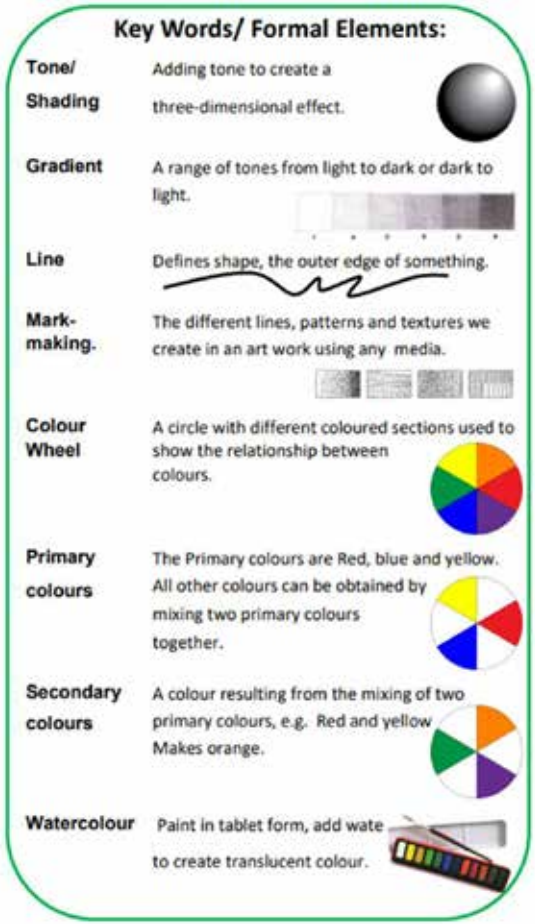
Types of Malware
A virus is a piece of malware that infects a computer, and then replicates itself to be passed onto another computer
A Trojan appears to be a piece of harmless software, often given away for free, that contains malicious code hidden inside. This only appears once the gifted software is installed. It was named after the Greek myth of the Trojan horse
Ransomware hijacks the data on a computer system by encrypting it and demanding that the owners pay money for it to be decrypted. Having up-to-date anti-virus software and educating users to not open suspicious attachments will help protect from ransomware
Spyware is a type of malware that collects the activity on a computer system and sends the data it collects to another person without the owner being aware
Adware is software that either causes pop-ups or windows that will not close. Generally, the pop-ups or windows display advertisements

Methods to detect and prevent threats
Factors of authentication → something a person is; something a person knows; something a person has
Biometric security makes use of unique physical characteristics and features to identify people when they are using a computer system
Keeping passwords safe is important, especially when the password allows access to sensitive or valuable information. Some password systems help to keep passwords safe by only asking for certain characters of a password instead of the whole thing
CAPTCHA forms challenge humans to prove that they are indeed human
By regularly updating the software on a computer, users are as protected as they can possibly be. Setting automatic updates means a computer system will attempt to install patches or fixes as soon as they are available by searching for them on a regular basis

Subject: GCSE Art & Design	Topic: Artist analysis and formal elements	Term: Autumn 1

Useful resources:	Use the youtube link to watch a video about the formal elements: https://www.youtube.com/watch?v=n3FRY0rUIr4

Formal elements



How to structure your writing

Introduction	What is the name of the artist and what is the piece you are looking at called? When was it made? What is the first thing you think about when you look at the work?
Description	What types of colours and shapes has the artist used? How would you describe the textures in this image? How do you think it was made? What techniques and media did the artist use? Is there anything unusual that you have noticed about this work?
Interpretation	What do you think the meaning of the work is? Does it remind you of anything? Does it remind you of other artists? If you were the artist, what would you have named this piece and why? Who was the audience for this piece?
Evaluation	What do you like the most about this art? How does it relate with what you have done in art lesson at school? Was this piece successful? Do you think the artist achieved their goal? Why or why not?

Use these words to help structure your written work and annotation

Firstly, to begin with, secondly, in contrast, on the other hand, however, alternatively, in comparison with, particularly, especially, in particular, most importantly, equally, identically, likewise, coupled with, together with, similarly, for example, such as, specifically, in particular, including, evidence of this, to illustrate this, to give an example.

Subject: GCSE Art & Design	Topic: Analysing your own work	Term: Autumn 2

Useful resources:	Use the YouTube link to watch a video about annotating your sketchbook and your own artwork: https://www.youtube.com/watch?v=ogUZkcEzL2I

How to structure your artist analysis

What? **What is it?**	Explain the piece of work • This is a first hand drawing that I made of a… • This is a series of photographs that I took of.. • This is a mind map of…. • This is a collection of visual research about… • This is some information that I gathered about…because… • This is a copy that I made of…. Because…	**Quality** **How good is it?**	What are you pleased with? What could you improve? • I am pleased with the way I… • One good element of this work is… • The best feature of this work is… • A particularly successful aspect of this work is… • I am not happy with… • One area that I could improve is… • The least successful area of this work is… • I wish that I had…
Why? **Why did you make it?**	Explain how this work helps your development • …to get ideas about… • …to show what I have learned about… • …to explore the idea of… • …to examine the shape/form/texture/pattern of… • …to analyse the style of… • …to try out the technique of… • …to practice… • …to develop my skills in…	**Learning** **What have you found out?** **What are your next steps?**	What have you found out? What are your next steps? • I improved my skills in… • I got better at working with… • I have a better understanding of the style of… • I feel more confident about… • Next I will try… • To follow this up, I will… • To build on this piece of work I hope to…
How? **How did you make it?**	Explain how you created it • I drew it/painted/constructed it with… • I worked from primary/secondary source • I gathered the images from the internet because…. • I found the information on a site called..		

Subject: PE	Topic: Badminton	Term: Autumn

Key skills	
Ready position	Balanced position, side on, racket up and ready, on toes.
Grip	Shake hands with the racket sideways on. Wrap fingers round the tape.
Serving	There are several types of serve – short/backhand, long, flick. A backhand serve should land close to the service line on your opponents side of the net. The racket head must start from below the waist.
Underarm clear (long serve)	This shot is played high to the back of your opponents court. Start sideways on and use a whip action with the wrist to create power.
Overhead clear	Played to the back of your opponents' court and is a defensive shot. Start sideways on, racket up and behind you, focus on making contact with the shuttle in front of you.
Drop shot	A shot played with finesse to land the shuttle as close as possible to the net on your opponent's side.
Net shot	A delicate shot in the game of badminton. This is used to the shuttle just drops over the other side of the net making it very difficult for your opponent to return the shot.
Smash	Is the most attacking of all the badminton shots. This should be aimed mid court and low with power on your opponents side of the court. This shot is very difficult to return.
Tactic	Hitting into space – moving partner around the court - shot selection – selecting the right shot for the right situation - targeting opponents weaknesses

Key Components of fitness required

- ***Agility*** *to be able to move around the court in different directions quickly.*
- ***Power*** *to perform shots with a high burst of energy.*
- ***Speed*** *to allow shots to be performed correctly and powerfully.*

Questions

1. Which component(s) of fitness do you think are most important for a Badminton player?

To answer this question you must:
a) Name a component of fitness
b) Explain what the component of fitness does and why it would be important
c) Give an example of when a player would use it in relation to Badminton.

2. Which method of training do you think is most important for a Badminton player?

To answer this question you must:
a) Name the method.
b) Explain what the method of training involves.
c) Give an example of why it would be use it in relation to Badminton.

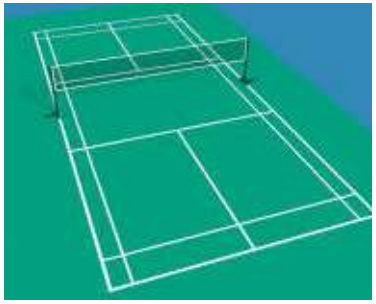
Subject: PE	Topic: Badminton	Term: Autumn

Key terminology

- Grip
- Ready position
- Drop shot
- Rally
- Serve –backhand/short, long, flick
- Overarm clear
- Underarm clear
- Smash

Rules of Badminton

- The game is played up to 21 points. If the score reaches 20-20, the winner is the player or team with a two point advantage
- If the score goes up to 29-29, the winner is the first person to reach 30 points.
- The service must be made diagonally across court.
- The server must serve the shuttlecock with the head of the racket below waist height.
- A shuttle landing on the line is in.
- If a shuttle hits the net either on service or during a rally, play continues.
- A player may not make contact with the net with either the racket or their body.
- The shuttle must be contacted on the player's own side of the net.
- One touch of the shuttle on your own side

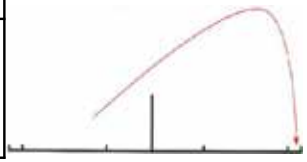


Grips

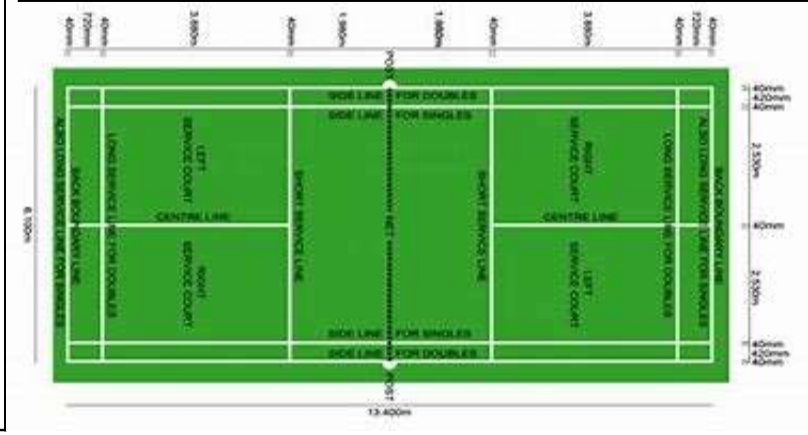
Servings

Low serve	The <u>Low Serve</u> is a way to start a game of badminton. This shot needs to cross the oppositions service line and can be used to Outwit an Opponent by varying the depth of the shot.
High serve	The <u>High Serve</u> is an alternative to the low serve. This choice of serve can be used to Outwit an Opponent by pushing them to the back of the court and following this up with a drop shot.

Low Serve



High Serve



Task: Draw a badminton court and label it correctly with the lines that are in/out for both singles and doubles.

Subject: PE	Topic: Basketball	Term: Autumn

Key Terminology

Dribbling
Chest pass
Set shot
Lay up
Pivot
Attacking
Defending
Free throw
Release
Jump shot
Back board
Slam dunk

Key Skills

Dribbling	Head up, spread fingers and fingertips, waist height.
Chest Pass	W grip, step, chest to chest, follow through, short distance.
Bounce Pass	W grip, step, chest to chest, follow through, bounce before player, short distance.
Pivoting	Footwork and jump stop: Landing on alternative feet- first foot to land is the static pivoting foot. Landing on simultaneous feet- either foot can become static pivoting foot/can be used at the end of a dribble or when receiving a pass.
On the move	Release ball before third step. Set shot: Knees bent, dominant foot slightly in front of other, strong hand at bottom, supporting hand on side, and elbow at 90 degrees.
Defending	Man to man- knees bent, back straight, head up, arms out, watch opponent's belly-button.
Attacking	Dribble into space, screen defenders, dribble out wide and quick inward passes, drive towards ball to receive pass losing defender, overload zone defence.

Shooting: B.E.E.F

Double dribble

Double dribble. occurs when a player ends his/her dribble by catching or causing the ball to come to rest in one or both hands and then dribbles it again with one hand or when a player touches it twice before the ball hits the ground.

Subject: PE	Topic: Basketball	Term: Autumn

Basic Rules

- Played with two teams of five
- Score by shooting through a hoop
- A side line ball is taken from the opposite team who touched it last
- Outside of the three point arc a basket is scores 3pts and inside scores 2pts
- Once the offense has brought the ball across the mid-court line, they cannot go back across the line during possession
- Personal fouls include hitting, pushing and holding
- Fouling a shooter results in one, two or three free throws, worth 1pt each, depending on where and how they were fouled
- Players cannot travel with the ball or double dribble
- Players cannot hold the ball for longer than 5 seconds

Stage one	Dribble to the side of net. When a few metres away from the basket, hold the ball with both hands on the shooting hands side of the body. Place the non-shooting hand on the side of the ball, and shooting hand on top of the ball.
Stage two	The last step before the lay-up jump should ensure that take off foot is opposite to the shooting hand (left foot/right hand). Flex the knee at takeoff.
Stage three	Whilst jumping, extend the shooting knee and raise the ball up. Bring the ball between the shoulder and ear. Direct the wrist and fingers straight at the basket and release the ball at the highest point. Complete the follow through with the arm up and palm facing down, and hold until the ball has reached the basket.

Stretch and Challenge task

Stretch and Challenge Task: Research and draw a basketball court in your homework book and label it correctly with the lines that are the 3-point line and the free throw line.

Learn about the different positions and write them down.

1.
2.
3.
4.
5.

Questions

<u>Questions:</u>

1. Which component(s) of fitness do you think are most important for a Basketball player?

<u>To answer this question you must:</u>

a) Name a component of fitness
b) Explain what the component of fitness does and why it would be important
c) Give an example of when a player would use it in relation to Basketball.

2. Which method of training do you think is most important for a Basketball player?

<u>To answer this question you must:</u>

a) Name the method.
b) Explain what the method of training involves.
c) Give an example of why it would be use it in relation to Basketball.

Subject: PE	Topic: Handball	Term: Autumn

Techniques

Dribbling:

- Touch the ball with your fingertips, not your palm
- Bend your knees and get in a low stance
- Push down firmly onto the ball and release
- Use your wrist to control the bounce of the ball and power within the bounce
- Keep your head up and look for team mates, space and opposition players
- Move on the balls of your feet Use your agility, dribbling skills and speed to get past defenders.

Shooting:

1. Receive the ball on the move
2. Attack open space using your three steps
3. Raise the throwing arm backwards, the ball should be above your head and elbow above your shoulder
4. Transfer your weight onto your front foot
5. Aim at your target, and follow through your throwing arm and release the ball

Catching:

- Create a W with your hands
- Fingers spread wide and elbows bent
- Weight on the front foot and knees slightly bent

Throwing:

- Weight always on front foot
- The ball is gripped in your fingers and thumb, never your palm
- The arm is raised, with the throwing elbow above the shoulder
- Throw forward your arm and release the ball
- Remember to aim at your partner's W

Jump shot technique

1. Follow the first three steps from the technique above
2. When attacking the open space, jump past the 6M line through the space into the D
3. Before landing throw forward the throwing arm and release ball

Questions

Questions:

1. Which component(s) of fitness do you think are most important for a Handball player?

To answer this question you must:

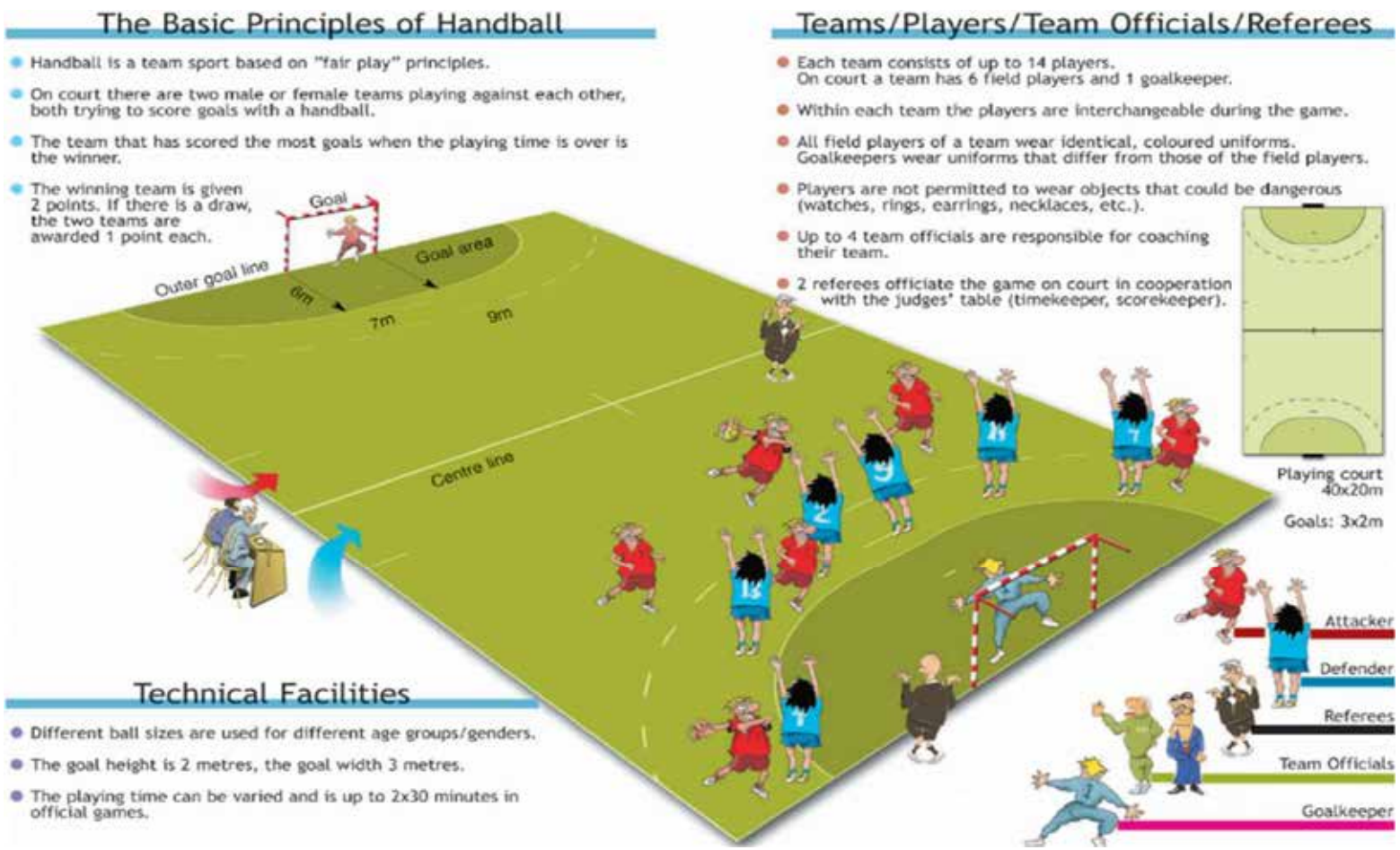
a) Name a component of fitness
b) Explain what the component of fitness does and why it would be important
c) Give an example of when a player would use it in relation to Handball

2. Which method of training do you think is most important for a handball player?

To answer this question you must:

a) Name the method.
b) Explain what the method of training involves.
c) Give an example of why it would be use it in relation to Handball.

Subject: PE	Topic: Handball	Term: Autumn

Key Terminology	Handball Court Rules and Regulations
Block Shot Jump shot Defence Attack Passing Dribbling Centre line Goal line Official Goal keeper Referee Attacker Defender Court Crease/Zone Rolling substitutes Outer field player Fouls Free-throws Penalty throws Throw-ins Corners Goal throws Shoot out	

Subject: PE	Topic: Netball	Term: Autumn

Key terms

- Centre pass
- Co-ordination
- Agility
- Penalty pass
- Positions
- Create the space
- Outwitting opponents
- Contact
- Over a third

Key skills

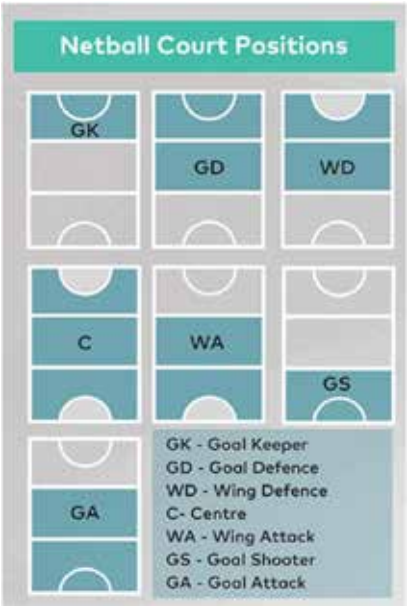
- Bounce pass
- Chest pass
- Overhead pass
- Shoulder pass
- Footwork
- Attacking
- Defending
- Dodging
- Shooting

Teams

- The netball court is split into thirds.
- Each player has their own starting position
- Each player has their own area that they are allowed on court.
- Teams consist of 7 players on court at any one time.
- Substitutes can be made at ¼ or ½ time.
- Each player plays a different position and has a different role on court.

Positions

GK- Goal Keeper (Defends GS on the opposite team)
GD- Goal Defence (Defends GA on the opposite team)
WD- Wing Defense (Defends WA on the opposite team)
C- Centre (Defends C on the opposite team)
WA- Wing Attack (Defends WD on the opposite team)
GA- Goal Attack (Defends GD on the opposite team)
GS- Goal Shooter (Defends GK on the opposite team)



Questions

1) *Identify* a component of fitness used by netball players and explain how this would be used in a game situation.

2) *Analyse* a method of training that would be suitable for a netball players regular training program.

3) *Design* a specific warm up and cool down suitable for a netball player.

This shows the position on the court that each netball player must start at for every centre pass.



Subject: PE	Topic: Netball	Term: Autumn

Key terminology

Attacking team	The attacking team in netball terms refers to the ones who are in possession of the netball ball and the attackers are attempting to score a goal.
Back-line throw in	The netball expression 'back-line throw-in' refers to the procedure of returning the ball to the court from the back-line after it has gone out of play.
Center circle	The small netball center circle marks the spot in the center of the court where play begins and restarts following a goal.
Center court	The center court is the middle third of the court playing area.
Center pass	The netball center pass is the initial passing movement which begins and restarts play following a goal. So, the start of a netball match is called a center pass (not kick off).
Defending team	The defending team is the one without possession of the ball. They defend their goal area from the other team who is attempting to score a goal.
Free pass	A free pass is awarded to the opposing team for an incurred penalty.
Held Ball	The term 'held ball' refers to holding the ball for longer than you are allowed to.

Rules & regulations

<u>Match Play</u>

- The aim of a game is for the ball to be passed down the court between team players, to the GA or GS, who are able to take a shot.
- A goal is successfully scored if it goes through the net of the goal post.
- The winning team is the team who score the most goals in 1 full game.
- The game begins with a center pass and teams alternate this every time a goal is scored.
- The center pass must be received inside the center 3rd.
- If a rule is broken, the opposite team get possession of the ball.

<u>The Main Rules</u>

1. **No contact-** You can't touch a player or the ball.
2. **Footwork**- Can't travel with the ball.
3. **Over a third** – The ball has to travel in each 3rd.
4. **Obstruction-** You need to be 1m away when defending.

Netball shooting

1. Stand in a balanced position facing the goal
2. Ball held high above head (away from defenders arms)
3. Ball sits on one hand (fingers) with other hand supporting
4. Bend your knees and elbows keeping your hands high and focus on the goal. Keep you shoulders still
5. Extend knees and elbows and flick the ball off your fingers – push the ball high to allow it to fall into the net
6. End the shot with arms high and hands following the ball

Subject: GCSE PE	Topic: Component 2: Health, fitness & well-being	Term: Autumn 1

Useful resources:	GCSE Pod- use the QR codes on both pages (they are different) Edexcel GCSE PE Edexcel GCSE Physical Education (2016) | Pearson qualifications

Physical, emotional & social Health, fitness & well-being

The benefits of physical activity are categorised as follows, however, they can overlap in certain categories:

- **Emotional** - to do with the mind, our psychological health *e.g. feeling good, increasing self-esteem/confidence, relieving stress/tension, an emotional challenge or aesthetic appreciation.*
- **Physical** - to do with the body, our physical health *e.g. the ability to withstand or recover from illness, improving cardiovascular fitness, muscular strength, muscular endurance and body composition.*
- **Social** - to do with the way that we interact with others, our social health *e.g. co-operation, developing friendships, mixing socially and gaining a good attitude to competing.*

Reasons for taking part in physical activity	*Category*
✓ Lose excess weight	Physical
✓ Improves health and fitness	Physical
✓ Needing a physical challenge	Physical
✓ Meet friends or new people	Social
✓ Learn how to co-operate with others	Social
✓ Stops you from getting in trouble	Social
✓ Increases confidence/self-esteem	Emotional
✓ Develop an aesthetic appreciation of the sport	Emotional
✓ Relieves stress and helps you to relax	Emotional
✓ Makes you feel good	Emotional

Key words	Definition
Well-being	The state of being comfortable, healthy or happy.
Health	A state of complete emotional, physical and social well-being and not merely the absence of disease or infirmity.
Sedentary	Where there is little, irregular or no physical activity.

Energy use, diet, nutrition & hydration

There are 7 elements that make up a balanced diet:

- **Carbohydrates –** *give us energy and are simple into 2 types; complex and simple.*
- **Fats –** *provide energy and the daily intake should be around 30% of our total diet.*
- **Proteins –** *help to build muscle and repair damaged tissue, they are particularly important to strength athletes.*
- **Vitamins –** *are essential for good vision & skin, blood clotting and healthy bones & teeth.*
- **Minerals-** *2 key minerals required for the body are calcium for strong bones and iron to form red blood cells.*
- **Water –** *accounts for half of your body weight and transports nutrients, waste and hormones around the body.*
- **Fibre –** *aids the functioning of the digestive system allowing removal of waste products. There are 2 types; soluble and insoluble.*

Macronutrients are the types of food that you need in large amounts in your diet: carbohydrates, fats and proteins.
Micronutrients are the parts of your food that you need for normal growth but in small amounts such as vitamins and minerals.

Subject: GCSE PE	Topic: Component 2: Health, fitness & well-being	Term: Autumn 1
Useful resources:	GCSE Pod- use the QR codes on both pages (they are different) Edexcel GCSE PE Edexcel GCSE Physical Education (2016) | Pearson qualifications	

Lifestyle choices

There are lots of things that we have to do on a daily basis but there are somethings that we choose to do, these are our lifestyle choices. Making good choices in each of these areas about how we live and behave will have an impact on our health and help to ensure happiness and good well-being.

- Diet – *the number of calories consumed should be the same and the number of calories burnt through the metabolic process and physical activity.*
- Smoking – *it is highly addictive due to the ingredient nicotine which is a stimulant that raises alertness. Smoking causes damage to the respiratory system and increases the risk of cancer.*
- Drinking alcohol – *alcohol is a depressant which slows down your reactions and alters the way that you see, hear and respond to things.*
- Recreational drugs – *these are split into 2 categories; 1-legal drugs accepted in society such as caffeine, nicotine and ethanol, 2-forms not accepted in society, heroin, cocaine, cannabis or ecstasy.*
- Physical activity – *the recommended guidelines for the amount of physical activity completed per day is 60 minutes.*
- Amount of sleep – *exercise helps you to sleep better and lets your body recover. The recommended amount of sleep per night is between 8-10 hours.*
- Amount of time spent working – *some people spend a lot of time working in a sedentary career and need to find the balance within their lifestyle.*
- Amount of time resting – *rest is an important aspect of training as it allows your body time to recover and helps to build muscle.*








The consequences of a sedentary lifestyles

A sedentary lifestyle is a lifestyle seriously lacking in physical activity meaning that they do little exercise, training or taking part in sporting activities. Having a sedentary lifestyle presents many risks and consequences including long term health risks such as obesity and depression. Others include;

- Becoming **overweight, overfat or obese**, these words do not mean the same thing
- **High blood pressure** due to an increase in cholesterol associated with increased weight
- **Coronary heart disease** due to high blood pressure and cholesterol
- **Reduced life expectancy** due to coronary heart disease
- **Osteoporosis** which is a health condition where the bones of the skeleton become brittle and are more likely to break
- **Loss of muscle tone** due to lack of use of the muscles, previous training effects are lost if the muscles are not regularly used
- **Poor posture** due to loss of muscle tone
- Negative impact on **fitness components** such as cardiovascular fitness and muscular endurance.

Subject: BTEC Sport	Topic: Unit 1- Fitness for Sport & Exercise	Term: Autumn 1
Useful resources:	Scan the QR code and watch the video on components of physical fitness. Which component is missing?	

Components of physical fitness

Aerobic Endurance	Muscular Endurance	Muscular Strength	Speed	Flexibility	Body Composition
'The ability of the cardiorespiratory system to work efficiently, supplying nutrients and oxygen to working muscles during sustained physical activity'	'The ability of the muscular system to work efficiently, where a muscle can continue contracting over a period of time against a light to moderate fixed resistance load'	'The maximum force (in kg or N) that can be generated by a muscle or muscle group'	'distance divided by the time taken. Speed is measured in metres per second (m/s). The faster an athlete runs over a given distance, the greater their speed	'Having an adequate range of motion in all joints of the body; the ability to move a joint fluidly through its complete range of movement'	'Definition: the relative ratio of fat mass to fat-free mass (vital organs, muscle, bone) in the body'
Explanation	**Explanation**	**Explanation**	**Explanation**	**Explanation**	**Explanation**
The cardiovascular and respiratory systems work together to deliver oxygen and remove waste products such as carbon dioxide. Without aerobic endurance they would tire easily which would affect their overall time and position in the race	Performers need a prolonged additional oxygen delivery to the working muscles. good muscular endurance is needed be able to maintain a high standard of performance throughout the race/match.	Strength is needed to create a large force this can help performers such as rugby player to bust through tackles to score a try. it can also help support your weight in gymnastics or lift heavier weights in events that require it.	Speed is needed in the legs when sprinting to get the fastest time possible There are three basic types of speed: **Accelerative speed** (sprints up to 30 m) **Pure speed** (sprints up to 60 m) **Speed endurance** (sprints with short recovery period in-between)	They need good flexibility to be able to get into position without getting injured a gymnast and a diver may need good flexibility to perform complex movements whilst a goal keeper needs it to stretch to save a shot.	Sports that need power and speed such as sprinters will need muscle to provide power. Marathon runners need as little weight as possible so they do not tire. Shot putters will benefit from extra weight to throw the shot further
Who?	**Who?**	**Who?**	**Who?**	**Who?**	**Who?**
• Games players • Marathon runner • Long distance rowers	• Cyclist (legs) • Boxing (punching) • Swimmer (arms & legs)	• Weight lifters • Rugby players • Gymnasts	• Long jump (accelerative) • Sprinters (pure) • Rugby (speed endurance)	• Gymnasts • Goal keepers • Divers	• Marathon runner • Sprinters • Shot putters

Subject: BTEC Sport	Topic: Unit 1- Fitness for Sport & Exercise	Term: Autumn 1
Useful resources:	Click on the QR code to watch the video on the components of skill related fitness.	

Components of skill related fitness

Agility	Balance	Coordination	Power	Reaction Time
'The ability of a sports performer to quickly and precisely move or change direction without losing balance or time'	'The ability to maintain centre of mass over a base of support' (static or dynamic)	'The smooth flow of movement needed to perform a motor task efficiently and accurately	'Is the ability to do strength performances quickly' Power = Strength x Speed	'The time taken for a sports performer to respond to a stimulus and the initiation of their response'
Explanation	**Explanation**	**Explanation**	**Explanation**	**Explanation**
Agility is needed to sidestep an opponent in rugby. You need to confuse the opponent by going one way then the other. Agility is needed in tennis to get from one side of the court to the other to return a shot	Performers need balance so they do not fall over. For example, in gymnastics when performing a balance (static) or travelling across the beam (dynamic). Balance is needed when throwing the hammer so you do not step out the circle	Performs need coordination when they are using two body parts at the same time. It can be used when aiming, or striking/hitting a ball	Power is needed when throwing the shot-put both speed and strength are needed to throw the shot further. Power is needed in the legs when shooting in football to make the ball travel faster. Power is needed in the legs to jump higher	Sprinters need good reaction time to get a good start. A rugby player needs good reaction time to gather or loose ball. Badminton players need to react where the shuttle is to return a shot
Who?	**Who?**	**Who?**	**Who?**	**Who?**
• Rugby (sidestep) • Tennis • Netball (marking)	• Gymnastics (static) • Hammer throw (dynamic) • Skiing (dynamic)	• Archery • Football • Tennis	• Shot-put • Rugby • High jump	• Sprinters • Badminton • Rugby players

Subject: BTEC Sport	Topic: Unit 1- Fitness for Sport & Exercise	Term: Autumn 1
Useful resources:	BTEC Firsts Sport (2018) | Pearson qualifications	

Exercise intensity and training thresholds

Heart Rate = The number of times your heart beats per minute it is measured in beats per minute (bpm)

Calculating Training Zones

Maximum Heart rate = 220 - age

Aerobic training zone = 60 – 85% of max HR

This is recommended for cardiovascular and health and fitness

Anaerobic training zone = This is the zone if you are training for explosive high intensity activities

Worked example

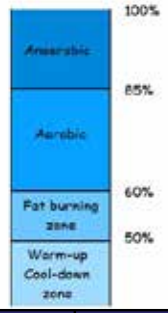
John is 15 years old

His maximum heart rate = 220 – age = 205 bpm

Aerobic training zone = 60 - 85 %

60% = 60 x 204 ÷ 100 = 123 bpm

80% = 80 x 204 ÷ 100 = 174 bpm



The Borg (1970) (6–20) Rating of Perceived Exertion (RPE):

- The Borg scale is a scale can be used as a measure of exercise intensity, this highlights how the performer perceives how hard they are working.
- The scale goes from 6 to 20 where 6 is no exertion and 20 which is maximal exertion
- It can be used to estimate heart rate and therefore monitor if the performer is in the correct training zone and at the right intensity.
- If a performer is working at perceived exertion of 12 to 14 on the scale it would mean they are working at moderate intensity which would mean they are working in the aerobic training zone

Perceived exertion	Description
6	No exertion
7	
8	
9	
10	
11	Light
12	
13	Somewhat hard
14	
15	Hard
16	
17	Very hard
18	
19	
20	Maximal exertion

RPE X 10 = Heart Rate (bpm)

The basic principles of training (FITT)

Frequency	How often you train (should be gradually increased) • Week 1 = train once per week • Week 2 = train twice per week • Week 3 = train three times per week
Intensity	How hard you train (should be gradually increased) • Week 1 = 1 set of 5 repetitions of a 5 kg weight • Week 2 = 2 sets of 5 repetitions of a 5 kg weight • Week 3 = 2 sets of 5 repetitions of a 8 kg weight
Time	How long you train (should be gradually increased) • Week 1 = 20 - minute session • Week 2 = 25 - minute session • Week 3 = 30 – minute session
Type	This relates to specificity • The type of training should match the activity/fitness • A marathon runner could use continuous training • A sprinter could use interval training

Subject: BTEC Sport	Topic: Unit 1- Fitness for Sport & Exercise	Term: Autumn 1
Useful resources:	BTEC Firsts Sport (2018) | Pearson qualifications	

Additional principles of training

Principles	Explanation	Application
Progressive Overload	In order to progress, training needs to be demanding enough to cause the body to adapt, improving performance	Week 1 = run 10 minutes Week 2 = run 15 minutes Week 3 = run 20 minutes
Specificity	Training should be specific to the individual's sport, or physical/skill-related fitness goals to be developed	A sprinter should train for speed A rower should train using a rowing machine
Individual differences/needs	The programme should be designed to meet individual training goals and needs	I am overweight and would like to train to lose weight I would like to improve my aerobic endurance
Adaptation	How the body reacts to training loads by increasing its ability to cope with those loads. Adaptation occurs during the recovery period after the training session is completed	I have been weight training for six weeks. My muscular strength has increased and my muscles are bigger due to the adaptations from weight training
Reversibility	If training stops, or the intensity of training is not sufficient to cause adaptation, training effects are reversed	Reversibility can be caused by lack of training, a holiday or injury
Variation	It is important to vary the training regime to avoid boredom and maintain enjoyment	A rugby player may use a variety of training methods such as Circuit training, weight training and interval training
Rest and recovery	Rest and recovery are required so that the body can recover from the training and to allow adaptation to occur	I have trained Monday and Tuesday I will have a rest day on Wednesday

Subject: BTEC Sport	Topic: Unit 1- Fitness for Sport & Exercise	Term: Autumn 2
Useful resources:	BTEC Firsts Sport (2018) | Pearson qualifications	

Exploring different fitness training methods

Flexibility training

Static stretching 	Flexibility can be improved by stretching the muscles, stretching the muscles increases the range of movement at a joint, this can improve performance in many sports. To increase the range of movement at a joint a stretch should be held between 20 and 30 seconds. There are two types of static flexibility training **passive** (on your own) and **active** (with a person or object)
Ballistic stretching 	Ballistic stretching is where the performer makes fast, jerky movements through the complete range of motion, usually in the form of bobbing or bouncing. Ballistic stretching is specific to the movement pattern of the sport/activity to be performed. It needs to be undertaken with care as the technique can cause muscle soreness and strains
Proprioceptive neuromuscular facilitation (PNF) stretching: 	This technique is used to develop mobility, strength and flexibility. The technique may be performed with the help of a partner or alternatively by using an immovable object (as resistance to inhibit movement). PNF stretches can be used in rehabilitation programmes. The technique inhibits the stretch reflex which occurs when a muscle Is stretched to its full capability, so that an even greater stretch and range of movement can occur.

Speed training

Hallow sprints:
hollow sprints are a series of sprints separated by a 'hollow' period of jogging or walking. Good for team sports such as rugby, football, netball, hockey. You can vary your speed which can mimic the sport

Start	15m	5m	10m	5m	5m	5m	2-minute rest
	Sprint	Jog	Sprint	Jog	Sprint	Jog	

Acceleration Sprints:

This is where the pace is gradually increased from a standing or rolling start to jogging, then to striding, and then to a maximum sprint. Different drills can be used, such as resistance drills and hill sprints. Rest intervals of jogging or walking are used in between each repetition. This reduces the risk of injury

Start	50m	50m	50m	2-minute rest
	Walk	Stride	Sprint	

Interval training:
Interval training can be used to improve speed it requires a work period followed by a period of rest. Unlike training for aerobic endurance work intervals are short and performed at a high intensity.

Distance	Repetitions	sets	rest	Type of rest
60m	5	3	30 secs	Walking

Intensity of training sessions: can be increased by using the FITT principle. E.g Increase training sessions, increase distance run, increase resistance, increase stations/circuits, increase time spent training or decrease recovery time

Subject: BTEC Sport	Topic: Unit 1- Fitness for Sport & Exercise	Term: Autumn 2
Useful resources:	BTEC Firsts Sport (2018) | Pearson qualifications	

Exploring different fitness training methods

Continuous Training	Fartlek Training	Circuit Training	Interval Training	Plyometric Training	Free Weight Training
This is training at a steady pace and moderate intensity for a minimum period of 30 minutes	This is where the intensity of training is varied by running at different speeds or over different terrain. The training is continuous with no rest period	This is where different stations/exercises are used to develop aerobic endurance. The station order/order of exercises is important to ensure different muscle groups are used to avoid fatigue	This is where the individual performs a work period followed by a rest or recovery period. Typical work time can vary from training for 30 seconds to five minutes; recovery periods can be complete rest, walking or light jogging.	Plyometric exercises need maximal force as the muscle lengthens (eccentric action) before an immediate maximal force as the muscle shortens (concentric action). Types of exercises include lunging, bounding, barrier hopping & jumping	Form of interval training which involves reps and sets. The weight provides the resistance. Can be done using free or fixed weights. It improves strength, power and muscular endurance
Advantages	Advantages	Advantages	Advantages	Advantages	Advantages
No equipment or facilities Has many health benefits (CHD) Can Good for beginners	No equipment or facilities Change of pace can be interesting Can be done on own	Stations generate interest Can be skill or fitness Can easily be adapted	Can be used to improve health and fitness (aerobic & anaerobic) No equipment needed	Develops power quickly No equipment	Can target specific body parts Easily adapted to performers
Disadvantages	Disadvantages	Disadvantages	Disadvantages	Disadvantages	Disadvantages
Boring No change of pace Can cause impact injuries	High intensity can be avoided A safe route may be hard to find	Equipment can be costly Can be time consuming to set up	Can be repetitive and boring Injury due to high intensity	Can cause injury due to high intensity	Can cause injury with bad technique a spotter needed with free weights Can be expensive
Sports	Sports	Sports	Sports	Sports	Sports
Aerobic endurance sports such as long distance running, cycling and rowing	Aerobic endurance sports but specific to games players such as football, and netball.	Can be adapted to benefit any sport or fitness requirements of the performer	Usually used for speed. E.g. 100m but can be adapted to aerobic endurance events	Good for sports that require power such as high jump, basketball and rugby	Good for sports that require strength such as weightlifters, rugby players and boxers

ASTREA ACADEMY
SHEFFIELD
SAPIENTIA DUCET AD ASTRA

Astrea Academy Sheffield
Andover Street
Sheffield
S3 9BE

Tel: 0114 5539110
Email: info@astreasheffield.org