WOOTTON PARK

FOUNDATION FOR GROWTH

'Ipsum quod faciendum est diutius'

Knowledge Maps

Year 9

Term 2

Subject: Maths – (Higher)	Term: 2	Topic: Units 2&3

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'Ipsum quod faciendum est diutius durant'

Overview

In this term, learners will be studying up to two units which will include the topics of Algebra and interpreting and representing data.

Key skills:

Algebra

Prior knowledge check
Algebraic indices
Expanding and factorising
Equations
Formulae
Linear sequences
Non-linear sequences
More expanding and factorising
Problem-solving

Interpreting and representing data

Prior knowledge check
Statistical diagrams 1
Time series
Scatter graphs
Line of best fit
Averages and range
Statistical diagrams 2
Problem-solving: Pollution particulates

Key Terms:

Unit 2:

Expression
Sequence
Simplify
Formula
Nth Term
Like-Terms
Arithmetic
Expand
Geometric
Factorise
Quadratic

Unit 3:

Bivariate data
Stem and leaf
Time-series
Scatter
Frequency polygon
Outlier
Modal
Scatter graph
Interpolation
Correlation
Extrapolation

Unit 2:

Key point 7

An **expression** contains letter and/or number terms but no equal signs, e.g. $2ab$, $2ab + 3a^2b$, $2ab - 7$

An **equation** has an equals sign, letter terms and numbers. You can solve it to find the value of the letter, e.g. $2x - 4 = 9x + 1$

An **identity** is true for all values of the letters, e.g. $\frac{4x}{2} \equiv 2x$, $x(x + y) \equiv x^2 + xy$

A **formula** has an equals sign and letters to represent different quantities, e.g. $A = \pi r^2$
The letters are **variables** as their values can vary.

Key point 5

Unless a question asks for a decimal answer, give non-integer solutions to an equation as exact fractions.

Example 1

Show algebraically that the product of any two consecutive integers is divisible by 2.

One of these two numbers must be even, so it can be written as 2m for some whole number, m.

If the other number is n then their product is $2m \times n = 2mn$. 2mn has a factor of 2 so it is divisible by 2.

Numbers 1, 2, 3, 4, 5, … are odd, even, odd, even, odd, etc. so a pair of consecutive numbers must contain one odd and one even. If a number is even it is in the 2 times table.

Key point 8

The **subject** of a formula is the letter on its own, on one side of the equals sign.

Key point 19

To square a single bracket, multiply it by itself, then expand and simplify.

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

Key point 4

To **expand** a bracket, multiply each term inside the brackets by the term outside

Key point 16

The second differences of a quadratic sequence, $u_n = an^2 + bn + c$, are constant and equal to $2a$.

Example 4

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

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

Work out the second differences.

So $a = 10 \div 2 = 5$

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

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

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

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

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

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

Key point 1

$x^0 = 1$ and $x^{-m} = \frac{1}{x^m}$

Subject: Maths –(Higher)	Term: 2	Topic: Units 2&3

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Websites and further reading

- Pearson Active Learn: http://pearsonactivelearn.com
- Maths Watch: http://mathswatch.co.uk/
- BBC Bitesize: http://www.bbc.co.uk/education/subjects/zqhs34j
- Numeracy and Foundation level practice questions and answers: https://corbettmaths.com/5-a-day/gcse1/
- Maths quiz: http://www.educationquizzes.com/ks3/maths/
- KS3 online tests: http://www.romsey.hants.sch.uk/maths/ks3onlinetests.htm

Unit 3:

Key point 1

A **back-to-back stem and leaf diagram** compares two sets of results.

Example 1

The annual salaries of employees working in an ICT company are displayed in the back-to-back stem and leaf diagram.

Key Male: 8 | 1 represents a salary of £18 000 Female: 1 | 9 represents a salary of £19 000

Male					Female			
			8	1	9	9		
9	5	2	0	2	1	2	6	7
8	7	3	0	3	0	4	4	
				4	5	6		
				5	4	8		

Compare the distribution of salaries of the male and female employees.

Male range: 38 000 – 18 000 = £20 000

Female range: 58 000 – 19 000 = £39 000

There are 9 males, so median male salary is: $\frac{9+1}{2}$ = 5th value = £29 000

There are 13 females so median female salary is: $\frac{13+1}{2}$ = 7th value = £30 000

Female employees' salaries have a larger range but the median salaries of men and women are similar.

Write a sentence comparing ranges and medians.

Key point 3

To draw a frequency polygon, plot the frequency against the midpoints for each group.

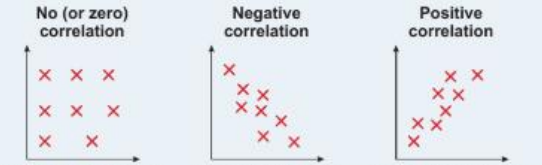
Key point 8

Using a line of best fit to predict data values within the range of the data given is called **interpolation** and is usually reasonably accurate.

Using a line of best fit to predict data values outside the range of the data given is called **extrapolation** and many not be accurate.

Key point 6

A scatter graph shows a relationship or correlation between variables.



No linear relationship between x and y.

Points lie close to a downward-sloping straight line. As x increases y decreases.

Points lie close to an upward-sloping straight line. As x increases y increases.

Example 4

The table shows the times, T, taken for 100 people to queue for a rollercoaster at a theme park.

a Estimate the mean waiting time.

b Explain why the mean is only an estimate.

The third column gives an estimate of the waiting time in each class.

a

Time, T (mins)	Frequency, f	Class midpoint, x	xf
$0 \leq T < 20$	14	10	$10 \times 14 = 140$
$20 \leq T < 40$	55	30	$30 \times 55 = 1650$
$40 \leq T < 60$	31	50	$50 \times 31 = 1550$
Total	100		3340

The fourth column gives an estimate of the total waiting time in each class.

Mean = $\frac{\text{sum of waiting times}}{\text{total number of people}} = \frac{3340}{100}$

= 33.4 minutes

b The mean is an estimate because we don't know the exact times taken.

Key point 2

To draw a **frequency polygon** you can join the midpoints of the tops of the bars in a frequency diagram with straight lines.

Key point 4

A **time series** graph is a line graph with time plotted on the horizontal axis.

Subject: English	Term: 2	Topic: English Literature Paper 1: Shakespeare (Macbeth)

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Plot Summary

Macbeth has remained one of William Shakespeare's most intense and often performed plays. The play follows the progress of the title character as he becomes increasingly powerful, using any means to get what he wants - even murder! He is encouraged by the ruthless and bloodthirsty ambition of his wife, Lady Macbeth. However, power comes at a price and by the end of the play, Macbeth's world falls apart around him, he is defeated and a new king, Malcolm, is declared.

More detailed plot summary: https://www.sparknotes.com/shakespeare/macbeth/summary/

Context

Macbeth was written by Shakespeare in approximately 1606. The early 17th century was a time of political upheaval, suspicion and superstition. A new king had just come to power and the future of the country seemed quite uncertain. Shakespeare's play reflects these changes.

More detailed social/historical context: https://www.sparknotes.com/shakespeare/macbeth/context/

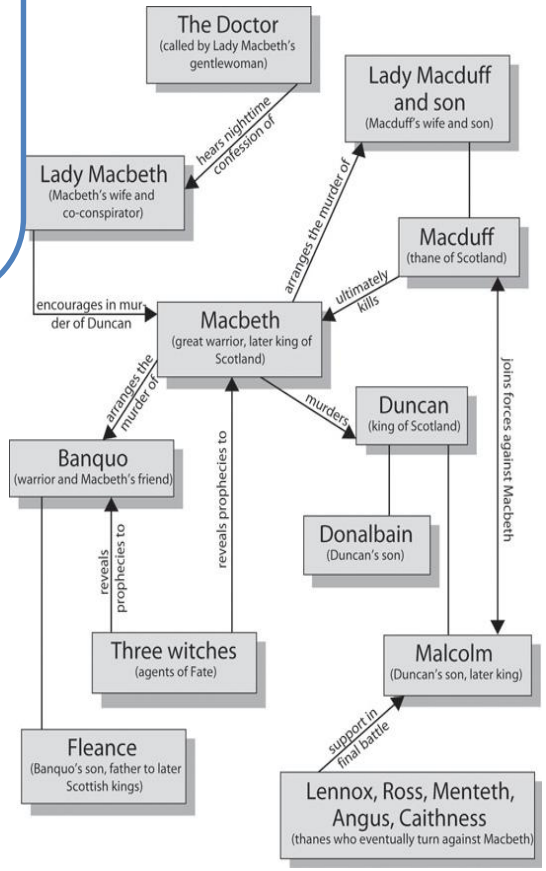
The play is one of Shakespeare's 'Tragedies'!

Key Themes

Themes are the overarching idea and issues presented by Shakespeare in the play. You might be asked a question such as: "How is the theme of love presented in the play?"

- Regicide
- Power
- Ambition
- Appearance and Reality
- The Supernatural
- Murder
- Corruption

More Themes and Ideas: https://www.sparknotes.com/shakespeare/macbeth/themes/?quickquiz_id=139



Subject: English	Term: 2	Topic: English Literature Paper 1: Shakespeare (Macbeth)

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'Ipsum quod faciendum est diutius durant'

Studying Shakespeare's Language: Key Terms

Shakespeare's language can be quite tricky to understand, especially when you start to analyze it. Her are a few important key terms you will need to use when studying Shakespeare's language.

Alliteration: A sequence of repeated sounds in a passage of language
Blank verse: unrhymed iambic pentameter: a line of five iambs
Dramatic irony: This occurs when the audience know more about what is happening that some of the characters themselves know
Hyperbole: A figure of speech that relies on exaggeration
Iamb: The most common metrical foot in English verse, a weak stress followed by a strong stress E.g. I am I am I am I am I am ('am' being the stressed syllable)
Iambic pentameter: A line of five iambic feet. The most common metrical pattern found in English verse
Metre: this is the pattern of stressed and unstressed syllables in a line of verse
Oxymoron: A figure of speech in which contrasting terms are brought together
E.g. 'sweet sorrow'
Poetic verse: A style of speech in Shakespeare's plays using rhyming couplets and a strong rhythmic pulse to the line
Prose: Any language that is not patterned by the regularity of some kind of metre
Pun: a play on words: two different meanings are drawn out of a single word, usually for comedy
Rhyming couplet: A pair of rhymed lines, of any metre
Simile: A figure of speech in which one thing is compared to another, indicated by 'like' or 'as'
Soliloquy: A dramatic convention which allows a character in a play to speak directly to the audience-as if thinking aloud about motives, feelings and decisions

Key Vocabulary:

Soliloquy
Supernatural
Protagonist/ Antagonist
Manipulative
Jacobean
Aside
Superstitious
Heinous
Pathetic Fallacy
Regicide

Key Quotations

'I fear thy nature; it is too full o' the milk of human kindness.' (Lady Macbeth)

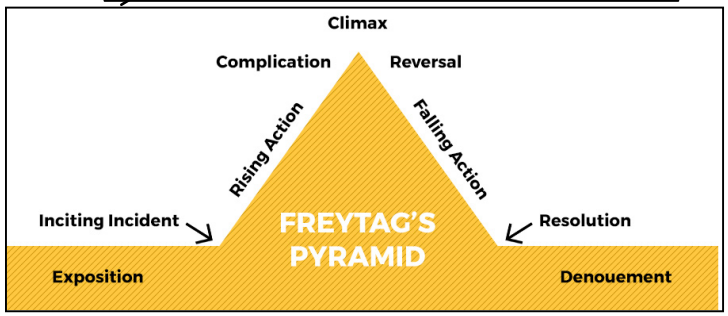
'When shall we three meet again? In thunder, lightning, or in rain?' (Witches)

'That we but teach bloody instructions which, being taught, return to plague th'inventor.' (Macbeth)

'All hail, Macbeth, thou shalt be King hereafter.' (Witches)

Narrative Structure

Freytag's Pyramid to the right is a simple way of remembering how Shakespeare structured his plays to engage the Elizabethan audience.



Subject: English (Year 9)	Term: 2	Topic: English Literature Paper 1: Shakespeare (Macbeth)

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'Ipsum quod faciendum est diutius durant'

How does this fit into the English Literature GCSE?

Paper 1: Shakespeare and the 19th-century novel

What's assessed

- Shakespeare
- The 19th-century novel

How it's assessed

- written exam: 1 hour 45 minutes
- 64 marks
- 40% of GCSE

Questions

Section A Shakespeare: students will answer one question on their play of choice. They will be required to write in detail about an extract from the play and then to write about the play as a whole.

Section B The 19th-century novel: students will answer one question on their novel of choice. They will be required to write in detail about an extract from the novel and then to write about the novel as a whole.

Assessment Objectives:

AO1: Read, understand and respond to texts. Students should be able to:
- maintain a critical style and develop an informed personal response
- use textual references, including quotations, to support and illustrate interpretations.

AO2: Analyse the language, form and structure used by a writer to create meanings and effects, using relevant subject terminology where appropriate.

AO3: Show understanding of the relationships between texts and the contexts in which they were written.

AO4: Use a range of vocabulary and sentence structures for clarity, purpose and effect, with accurate spelling and punctuation.

Use your PEACE Framework!
Point, Evidence, Analysis, Context, Evaluation

Example Question

At this point in the play Lady Macbeth is speaking. She has just received the news that King Duncan will be spending the night at her castle.

The raven himself is hoarse
That croaks the fatal entrance of Duncan
Under my battlements. Come, you spirits
That tend on mortal thoughts, unsex me here,
And fill me from the crown to the toe topfull
Of direst cruelty; make thick my blood,
Stop up th'access and passage to remorse
That no compunctious visitings of nature
Shake my fell purpose nor keep peace between
Th'effect and it. Come to my woman's breasts,
And take my milk for gall, you murd'ring ministers,
Wherever in your sightless substances
You wait on nature's mischief. Come, thick night,
And pall thee in the dunnest smoke of hell,
That my keen knife see not the wound it makes
Nor heaven peep through the blanket of the dark,
To cry 'Hold, hold!'

Starting with this speech, explain how far you think Shakespeare presents Lady Macbeth as a powerful woman.

Write about:

- how Shakespeare presents Lady Macbeth in this speech
- how Shakespeare presents Lady Macbeth in the play as a whole.

[30 marks]
AO4 [4 marks]

Subject: Science	Term: 2	Topic: Year 9 Chemistry: Atoms, bonding and moles

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'Ipsum quod faciendum est diutius durant'

I already know from KS3…	I will learn
A simple model of the atom, representing atoms as hard, solid spheres of differing sizes and masses.	That atoms are made up of differing numbers of three different sub-atomic particles
The differences between atoms, elements and compounds	To explain how atoms bond to each other in elements and compounds
How to use chemical symbols and formulae to represent elements and compounds	To explain the formula of elements and compounds, knowing the structure of the atoms and the type of bonding involved
How to represent chemical reactions using formulae and using chemical equations	To carry out calculations using reacting masses to predict balanced symbol equations for reactions
How patterns in reactions can be predicted with reference to the periodic table	To use atomic structure to explain patterns in reactivity in the periodic table
The properties of metals and non-metals	To explain the difference between metals and non-metals in terms of their atomic structures and bonding
The conservation of mass in chemical reactions	To carry out calculations using balanced symbol equations to predict the amounts of reactants and products in reactions
How to use the particle model to describe changes of state	How to describe changes of state and chemical reactions in terms of energy transfers

Required practical's:

2. Carrying out a titration

C4.7

Term 2 Chemistry Key Words

Year 9 (Atoms, Bonding and moles)
Alkali metals Universal indicator Halogens Displacement Reactivity

Subject: Science	Term: 2	Topic: Year 9 Chemistry: Atoms, bonding and moles

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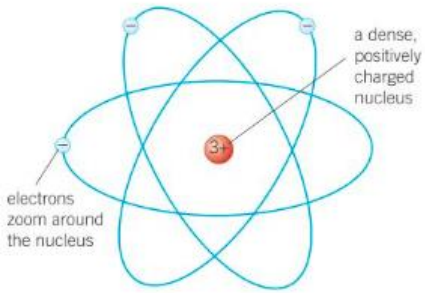
'Ipsum quod faciendum est diutius durant'

C1.5 History of the atom

John Dalton in the 1800's suggested that substances were made up of atoms that were small hard spheres. He thought each chemical elements had its own atoms that differed from others. He didn't think they could be divided or split.

He also suggested that atoms in chemical reactions re-arranged themselves to combine in new ways.

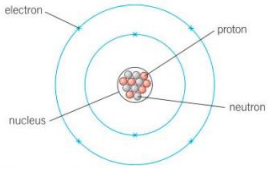


At the end of 1800's J.J. Thomson discovered the **electron**. This is a small negatively charged particle which is very light.

Geiger and Marsden did an experiment with radioactive particles and suggested the atom had a **nucleus** containing **protons** (small positively charged particle.

C1.6 Structure of the atom

Type of sub-atomic particle	Relative charge	Relative mass
Proton	+1	1
Neutron	0	1
Electron	-1	Very small



Atomic number – tells us the number of protons in each atom of an element

Mass number – tells us the number of protons + neutrons in the nucleus of an atom

Number of neutrons = mass number – atomic number

C1.7 Ions, atoms and isotopes

An **ion** is an atom that has gained or lost electrons to make is positively charged. For example, if Hydrogen loses it's a electron it becomes a positive ion, H^+.

mass number	12	23
atomic number	6	11
	C (carbon)	Na (sodium)

Isotopes are atoms of the same element that have the same atomic number but a different mass number. For example Carbon-12 ($^{12}_{6}C$) and Carbon-13 ($^{13}_{6}C$).

Sometimes by having extra neutrons a nucleus becomes unstable and therefore radioactive.

C1.8 Electronic structures

Electrons are arranged around the nucleus in **shells,** rather like the layers of an onion.

Electron shell diagrams have to be filled up in a certain way:

- The first shell can hold up to two electrons
- The second shell can hold up to eight electrons
- Once there are eight electrons in the this energy level, the fourth begins to fill up

Sometimes drawing it can take too long so you can write down the electron structure. Example Sodium: 2, 8, 1

When you write electronic structures for elements, any atoms that have the same number of electrons on the outside shell then they are in the same group. Sodium: 2, 8, 1 means that sodium is in Group 1.

Subject: Science	Term: 2	Topic: Chemistry: Atoms, bonding and moles

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'Ipsum quod faciendum est diutius durant'

C2.1 Development of the Periodic Table

1808 – John Dalton – Arranged the elements in order of their atomic weights.
1864 – John Newlands – arranged the known elements in order of mass but noticed the properties of every *eighth* element seemed similar. He produced the law of octaves.
1869 – Dmitri Medeleev – placed them in order of atomic weights. Then in periods so that properties could be seen. He left gaps for elements that had not yet been discovered with properties that matched Mendeleev's predictions.

C2.3 Group 1 – the alkali metals

Alkali metals are very reactive and are stored in water to stop them reacting with air. As you go down the group the reactivity increases. The group 1 metals also have a very low density and so they float. They are soft and can be cut. Once they are cut they are shiny until they react with oxygen:

e.g. Lithium + Oxygen → Lithium Oxide

They all have similar properties as they all have 1 electron in their outermost shell. When they react they lose this electron to form positive (1+) ions to form ionic compounds.

Reaction with water - when they react with water they make alkaline solutions and hydrogen gas:

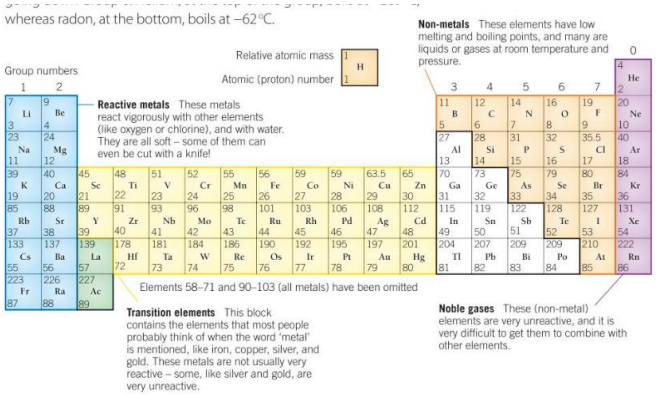
e.g. Potassium + Water → Potassium Hydroxide + Hydrogen

C2.2 Electronic structures and the periodic table

The chemical elements are placed in order of their atomic (proton) number in the in the periodic table.
Not only does it line them up in groups and periods, it also gives us an important summary of their electronic structures. Elements in the same groups have similar chemical properties because they have the same number of electrons in the highest occupied energy level (outer shell).
The group number in the periodic table tells you the number of electrons in the outermost (highest occupied energy level) of an atom. E.g. Group 2 elements have 2 electrons in their outermost shell.

Metals, non-metals, and electronic structures – main difference? Metals conduct electricity but non-metals don't, they are insulators. An exception would be Carbon. Metals have higher b.p. and m.p. They are ductile and malleable, non-metals are brittle.
Elements in Group 5, 6 and 7 can gain electrons to form negative ions.
Elements in Group 1, 2 and 3 can lose electrons to form positive ions.

Group 0 – the noble gases – atoms in group 0 have 8 electrons in their outermost shell, making them very stable. They are monatomic (single-atom) gases. They do not react easily.



Subject: Science	Term: 2	Topic: Year 9 Chemistry: Atoms, bonding and moles

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'Ipsum quod faciendum est diutius durant'

C2.4 Group 7 – The halogens

This is a very toxic group of non-metals that have coloured vapours. They have low melting and boiling points, they are also poor conductors of heat and electricity. The reactivity increases as you move down the group.
All halogens exist as molecules made up of pairs, these are called diatomic molecules that are covalently bonded.

Reactions of halogens - halogens have seven electrons in their outermost shell so they need to gain one more to be stable. When they react with non-metals they gain an extra electron by sharing a pair of electrons with another atom.
When they react with metals, they gain an electron from the metal to form a stable ionic compounds.

Displacement reactions – where a more reactive halogen takes the place of less reactive halogen in a compound.

e.g. Chlorine + Potassium Bromide → Potassium chloride + Bromine

C2.6 The Transition elements

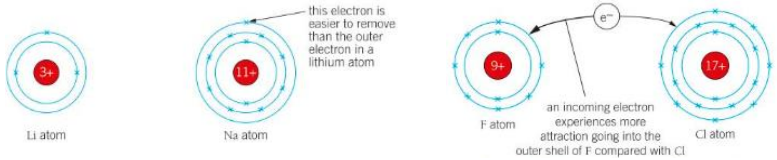
These are the metals positioned in a large block between Group 2 and Group 3.

C2.5 Explaining trends

Group 1 elements get *more* reactive going down the group.
Group 7 elements get *less* reactive going down the group. But why?
As you go down any group you add and electron shell, this means that the atoms become larger going down any group. This has two effects:

- Larger atoms lose electrons more easily going down a group
- Larger atoms gain electrons less easily going down a group.

This happens because the outer electrons are further away from the attractive force of the nucleus. The inner shells of electrons 'screen' or 'shield' the outer electrons.



Physical properties

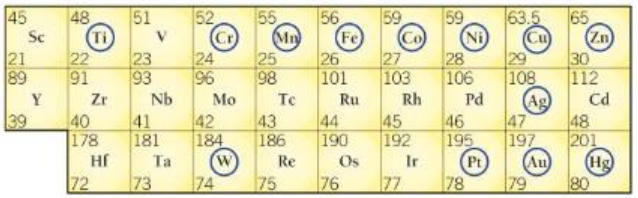
Properties of typical metals:

- Good conductors of electricity and thermal energy
- Hard and strong
- High density
- High melting points

Chemical properties

They are much less reactive than the metals in Group 1. They do not readily react with oxygen, chlorine, or water like the alkali metals.
Some examples of reactions:

e.g. copper + oxygen → copper oxide



Compounds of transition metals

Many transition elements form coloured compounds. These include:

- Copper (II) sulphate which is blue
- Nickel (II) carbonate is pale green
- Chromium (III) oxide is dark green
- Manganese (II) chloride is pale pink

Irc

Subject: Science	Term: 2	Topic: Year 9 Biology: Cells and Organisation

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'Ipsum quod faciendum est diutius durant'

I already know from KS3…	I will learn
What cells look like under a light microscope	What we can see under the electron microscope and hot to calculate magnification
The similarities and differences between plant and animal cells	The similarities and differences between prokaryotic and eukaryotic cells and order of magnitude
The role of diffusion in the movement of materials in and between cells	The roles of osmosis and active transport in the movement of materials in and between cells
Reproduction in animals and plants	The type of cell division that forms the gametes and the way normal body cells grow and divide
The importance of the digestive system	The way the structure of enzymes is related to their function
The basic structure and function of the human gas exchange system	Surface area : volume ratios and the adaptations of the alveoli of the lungs for effective gas exchange
The mechanism of breathing	The importance of ventilating the lungs and the gills of fish to maintain steep concentration gradients
The role of the leaf stomata in gas exchange in plants	How evaporation and transpiration are controlled in plants

Required practical's:

1. Looking at cells
   B1.2
3. Investigating osmosis in plant cells
   B1.8
4. Food tests
   B3.3
5. The effect of pH on the rate of reaction of amylase
   B3.6

Term 2 Biology Key Words

Year 9 (Cells and Organisation)
Magnification
Organelles
Eukaryote
Prokaryote
Specialisation
Diffusion
Osmosis
Dilute
Concentrated
Active transport
Differentiate
Cloning
Embryo

Subject: Science	Term: 2	Topic: Year 9 Biology: Cells and Organisation

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'Ipsum quod faciendum est diutius durant'

Using units

1 kilometre (km) = 1000 metres (m)

1 m = 100 centimetres (cm)

1 cm = 10 millimetres (mm)

1 mm = 1000 micrometres (µm)

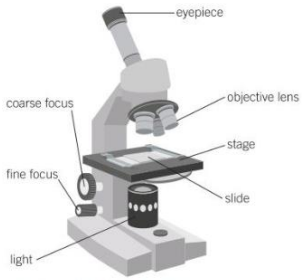
1 µm = 1000 nanometres (nm) – so a nanometre is 0.000 000 001 metres (or written in standard form as 1×10^{-9} m).

B1.1 The World of the Microscope

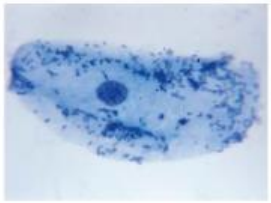
We can use a microscope and an image to calculate the real-life size of an object. To do this:

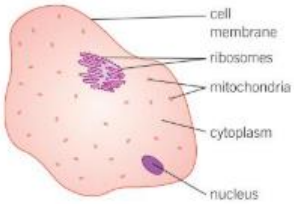
$$Magnification = \frac{size\ of\ image}{size\ of\ real\ object}$$

Resolution is the ability to distinguish between two separate points and it is the *resolving power* of a microscope that affects how much detail it can show.



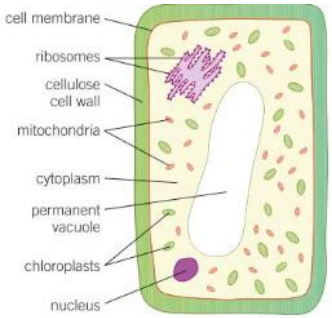
B1.2 Animal and plant cells





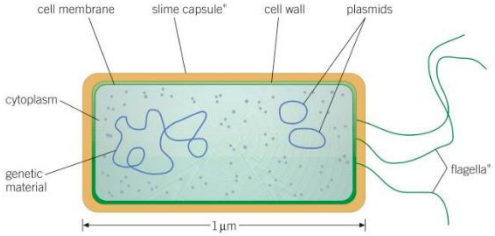
Nucleus – contains the DNA and controls the cell
Cytoplasm – liquid gel where chemical reactions take place
Cell membrane – controls what comes in and out of the cell (like hormones and urea)
Mitochondria – where aerobic respiration takes place to release energy. They are very small: 1-2 µm in length and 0.7 µm in diameter
Ribosomes – where protein synthesis takes place, making all the proteins

Chloroplasts – are found in all green parts of a plant. They contain chlorophyll which absorbs light so the plant can make food by photosynthesis
Permanent vacuole – filled with cell sap to keep the cell rigid.



B1.3 Eukaryotic and prokaryotic cells

Eukaryotic cells are cells like animal and plant cells. They have a cell membrane, cytoplasm and genetic material (DNA) in the nucleus.
Prokaryotic cells are much, much smaller than eukaryotic cells. Bacteria are single celled living organisms and are prokaryotic cells. In prokaryotic cells the DNA is *not enclosed* in a nucleus. The bacterial chromosome is a single DNA loop found free in the cytoplasm. Prokaryotes may also contain extra small rings of DNA called plasmids. Plasmids code for very specific features such as antibiotic resistance.



*not always present

Figure 1 *Bacteria come in a variety of shapes, but they all have the same basic structure*

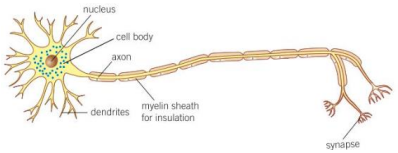
Subject: Science	Term: 2	Topic: Year 9 Biology: Cells and Organisation

WOOTTON PARK
'Ipsum quod faciendum est diutius durant'

B1.4 Specialisation in animal cells

Cells are specialised to carry out specific jobs. As an organism develops, cells differentiate to form different types of cell.

Nerve cells



Nerve cells carry electrical impulses around the body of an animal. The adaptations are:

- Lots of dendrites to make connections
- An axon to carry the impulse that is very long
- Nerve endings (synapses) pass the impulses to another cell or a nerve cells and a muscle using transmitter chemicals.

Muscle cells

Muscle cells are specialised to contract and relax.

- Special proteins that slide over each other to contract
- Contain lots of mitochondria
- Can store glycogen that can be broken down in respiration by the mitochondria

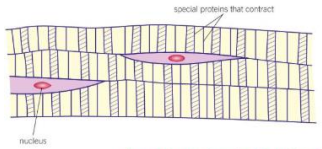


Figure 2 *A striated muscle cell is specialised to contract and relax*

Sperm cells

Sperm cells are required to fertilise egg cells. They contain the DNA of the male parent.

- A long tail to help the sperm move through the water or the female reproductive system
- Full of mitochondria, which transfer energy for the tail to work
- Acrosome stores digestive enzymes for breaking down the outer layers of the egg
- Large nucleus to contain the DNA

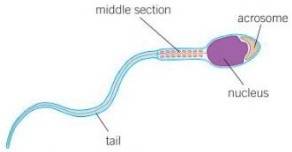


Figure 3 *A sperm cell*

B1.5 Specialisation in plant cells

Plants need specialised cells to again carry out particular jobs.

Root hair cells

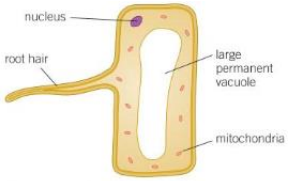


Figure 1 *A root hair cell*

Root hair cells grow beneath the soil to takin in water.

- Increase the surface area available for water to move into the cell
- Large permanent vacuole to speed up the movement of water
- Lots of mitochondria to transfer energy for active transport

Photosynthetic cells

These are needed for photosynthesis:

- Contain chloroplast with chlorophyll in
- Positioned in continuous layers to absorb light
- Large, permanent vacuole to keep the cell rigid

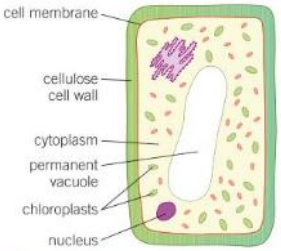


Figure 2 *A photosynthetic plant cell*

Xylem cells

Structures that carry water and mineral ion from the roots to the leaves and shoots.

- Alive when they are first formed, spirals build up inside the cell walls. The cells die to form hollow tubes that carry water
- Spirals make the cells very strong and help them withstand the pressure of moving water.
- Spirals also support the plant stem

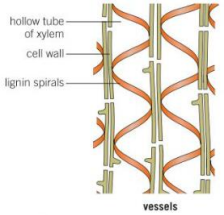


Figure 3 *The adaptations of xylem cells*

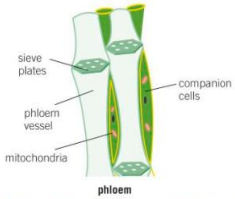


Figure 4 *The adaptations of phloem cells*

Phloem cells

Form tubes to move dissolved food up and down the stem

- Cell walls between cells form a sieve to allow water to move freely
- Mitochondria in companion cells transfer the energy to move dissolved food up and down the plant

Subject: Science	Term: 2	Topic: Year 9 Biology: Cells and Organisation

WOOTTON PARK
'Ipsum quod faciendum est diutius durant'

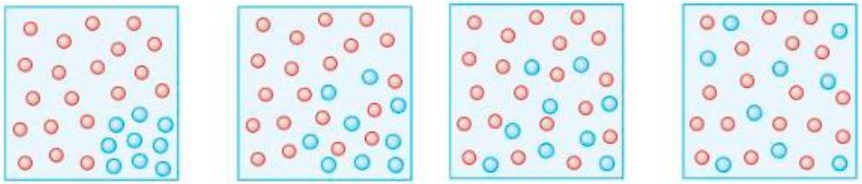
B1.6 Diffusion

Diffusion is the movement of particles from a region of high concentration to low concentration.

If there is a big difference in concentration then diffusion happens faster, if the difference is small then the rate of diffusion is slower.

Net movement = particles moving in – particles moving out

Temperature can also affect the rate of diffusion. The hotter it is the faster the rate of diffusion.



Diffusion is required in living things for several reasons. Diffusion occurs in cells across the cell membrane, substances that need to diffuse are substances such as; glucose, oxygen, carbon dioxide and waste products like urea.

B1.7 Osmosis

Osmosis is the diffusion of water through a partially permeable membrane from a dilute solution to a concentrated solution down a concentration gradient.

- **Dilute** – contains more water particles than sugar, for example.
- **Concentrated** – contains a larger number of sugar particles and a lower number of water particles, for example.

Isotonic – concentration of solutes in the solution outside the cell is the same as inside the cell

Hypertonic - concentration of solutes in the solution outside the cell is the higher than inside the cell

Hypotonic - concentration of solutes in the solution outside the cell is the lower than inside the cell

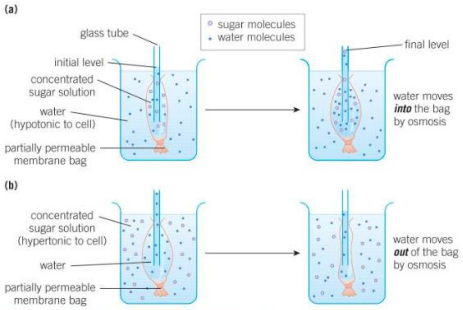
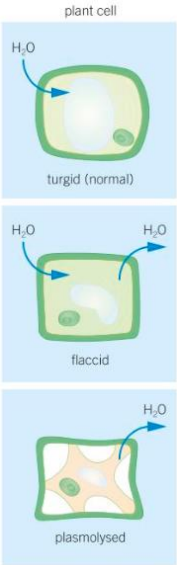


Figure 1 *A model of osmosis in a cell. In (a) the model cell is in a hypotonic solution. In (b) the model cell is in a hypertonic solution*

B1.8 Osmosis in plants

Plants rely of osmosis to support their stems and leaves. Water gets into the cells via osmosis and into the vacuoles of each cell. The pressure builds up until no more water can get in. This pressure is known as **turgor**. Turgor pressure makes the cells hard and rigid. If as much water is entering the cell as there is leaving the cell it will become **flaccid** and the plant isn't as supported.

If more water is lost through osmosis than there is coming in the cell becomes **plasmolysed**.



B1.9 Active transport

Active transport is the movement of substances from a dilute solution to a more concentrated solution against a concentration gradient, requiring energy from respiration.

Active transport is needed in cells when ions from soil, for example, are needed in plants.

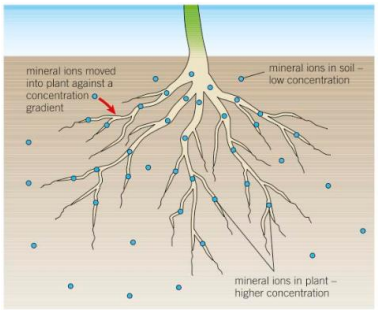


Figure 2 *Plants use active transport to move mineral ions from the soil into the roots against a concentration gradient*

Subject: Science	Term: 2	Topic: Year 9 Biology: Cells and Organisation

WOOTTON PARK

'Ipsum quod faciendum est diutius durant'

B1.10 Exchanging materials

When exchanging materials the surface area to volume ratio is very important. As organisms get bigger and more complex their surface area to volume ratio gets smaller. This makes it difficult to exchange materials.

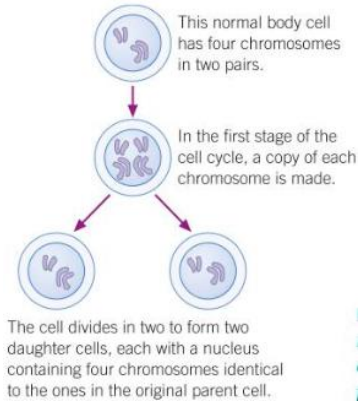
However, organisms can adapt to aid in exchanging materials. They can increase the effectiveness of an exchange surface by having a thin membrane, efficient blood supply and by being well ventilated.

B2.1 Cell division

Each cell has a nucleus and that contains chromosomes. These make up you!

A gene is a small packet of information that contains sections of DNA. There are 46 chromosomes in every nucleus, and therefore 23 pairs.

Cell division, needed to make new cells, called **mitosis** can produces identical cells.



B2.2 Growth and differentiation

When a foetus is developing cells divide and **differentiate**. This means they change and specialise for their job. The original cells, before the differentiation, are called the **stem cells**.

B2.3 Stem cells

An egg and a sperm cell fuse to form a **zygote**. That divides and becomes an **embryo**.

Stem cells are being used in many scientific and medical regions to develop cures or remedies for illness. Research is being completed to try to solve paralysis and diabetes. Doctors have also transplanted embryonic stem cells in to the eyes of people going blind to reduce degeneration.

Stem cells in plants can be used to make clones making plant growth much faster and economical .

B2.4 Stem cell dilemmas

There are many benefits to using stem cells for medicinal purposes but there are also disadvantages.

- **Problems with embryonic stem cells**

Many embryonic stem cells come from aborted embryos. Some people are concerned with the use of a potential human being used as a source of cells. Some people feel, an embryo cannot give permission, therefore violating human rights. Other issues include that therapy from using embryonic is slow, difficult and expensive.

- **The future of stem cell research**

Scientist have found the blood from an umbilical cord from a new born baby contains stem cells. The cells could help overcome ethical issues. Scientists have also found wats of growing adult stem cells which can treat heat disease and grow new organs.

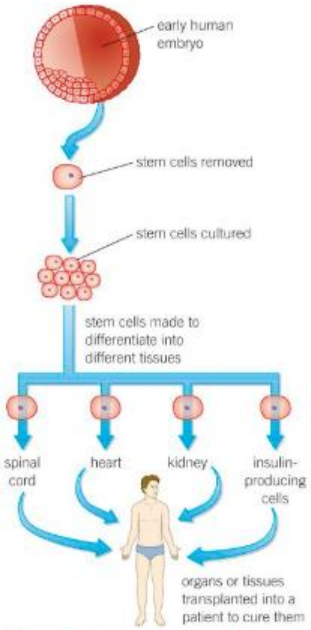


Figure 2 *This shows one way in which scientists hope embryonic stem cells might be formed into adult cells and used as human treatments in the future*

Subject: Religious Studies Year 9	Term: 1 & 2	Topic: Religion, Human Rights and Social Justice

WOOTTON PARK

Key concept 1: Equality and Human Rights.

What is equality?

'The state of being equal, especially in status, rights, or opportunities' To not be discriminated against due to race, gender or ability.

What are Human rights?

The Declaration of Human Rights set out to create a list of the rights that human should all have. This was created in 1948 however it was not made law. EG: The Right to Life, The right to speech freely

Key quotes/references to learn:

- "All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood."

  (The Universal Declaration of Human Rights - UDHR).
- "Let justice roll on like a river, righteousness like a never-failing stream!" (Amos 5:24)
- Jesus said: "Love your neighbour as you love yourself." (Mark 12:31)
- "Women should remain silent in the churches. They are not allowed to speak … for it is disgraceful for a woman to speak in the church." (Paul in 1 Corinthians 14:34-35)

Key concept 2: Religion and Wealth.

Key terms:

Relative poverty relates to what a particular society considers to be poor, eg someone in the UK might be considered to be relatively poor if they live on less than the average UK income.

Absolute poverty is when someone does not have access to basic human needs such as water, clothing, education and shelter. According to **UNICEF**, 22,000 children die each day due to poverty.

Key questions:

Is it wrong to be rich?

How should wealth be used?

Do religious believers have a duty to help the poor?

Websites and further reading:

https://www.bbc.com/education/examspecs/zy7spbk

http://www.bbc.co.uk/schools/gcsebitesize/rs/prejudice/christianityrev1.shtml

https://www.bbc.com/education/guides/zb3c7ty/revision/1

http://www.bbc.co.uk/schools/gcsebitesize/history/tch_wjec/usa19292000/2gainequalrights3.shtml

Key vocabulary to define and learn:

Equality Human Rights United Nations Inequality Discrimination Gender
Stereotypes Sexism Racism Disability homosexual
Ageism Homophobic Wealth Poverty Equal Opportunities
Campaign Fair Future

Subject: Geography Year 9	Term: 1	Topic: Geographical Skills

WOOTTON PARK

'Ipsum quod faciendum est diutius durant'

Key terms – knowing key locations

Continent: A continuous expanses of land grouping together countries. EG – Europe

Countries: A nation with its own government, occupying a particular territory.

Equator: a line which is not real drawn around our planet, the **equator** is halfway between the North Pole and the South Pole.

Latitude: The **latitude** of the Earth gives the distance north or south of the equator.

Longitude: a way to say where a place is on the Earth. It is measured starting from an imaginary north-south line called the Prime Meridian which travels north to south.

Key concept: Statistical skills and Map Skills

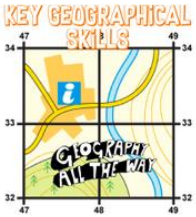
Map Skills:
-Compass directions

-Grid references (4 and 6 figure)

-Contour lines

-Distances and scale

-Landform recognition



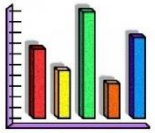
Statistics:
-Averages – mean, medium, mode, range – standard deviation

-Graph creation – line, bar, pie charts, climate graphs, histograms

-Interpreting data– choropleth maps, isoline maps, tables

Key concepts: Fieldwork enquiry

Stages to a field work enquiry:
- -Enquiry question
- -Route of enquiry
- -Methodology
- -Risk assessments
- - Collecting Data
- -Recording Data
- -Presenting Data
- -Analysing Data
- -Enquiry conclusions
- -Enquiry evaluations



Websites and further reading:

http://www.bbc.co.uk/schools/gcsebitesize/geography/geographical_skills/

http://www.aqa.org.uk/subjects/geography/gcse/geography-8035/subject-content/geographical-skills

http://www.bbc.co.uk/bitesize/ks3/geography/geographical_enquiry/geographical_skills/revision/1/

https://www.ordnancesurvey.co.uk/resources/mapzone-resources.html

Key vocabulary to define and learn:

Direction, Equator, Country, Continent, Global, GIS, Local, National, Key, grid, Atlas, Scale, Map, Data presentation, aerial, latitude, longitude, OS maps, Symbols, Statistics, Choropleth map, Climate graphs, Data, Fieldwork, Enquiry, Methodology, Risk assessment, Data analysis, Conclusions, Evaluations

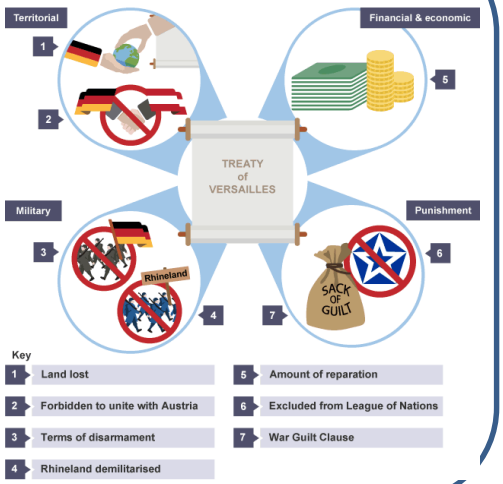
Subject: History Year 9	Term: 2	Topic: World War Two

WOOTTON PARK

Key concept 1: How did WW1 end and why was there a second war?

The Treaty of Versailles
In January 1919 delegates from 32 countries met in Paris to make peace after World War One - it was hoped that this peace would last, as the recent conflict was deemed to be the 'war to end all wars'.

The Big Three
Lloyd George, Clemenceau, Wilson – all wanted something different out of the armistice.



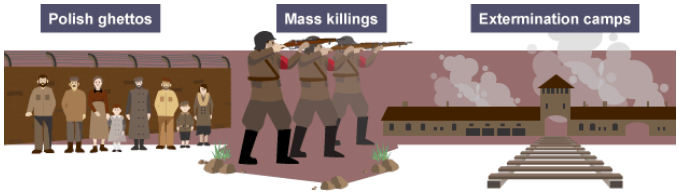
Key concept 2: The rise of Hitler

- Hitler was able to come to power because of a combination of things, The Great Depression, the rise of extremism and political failings in the old system of Germany.
- Hitler took advantage of the turning public opinion by using his own appeal, the SA and propaganda.
- Hitler became Chancellor in 1933 and quickly began establishing a Dictatorship.

Key concept 3: Life in Nazi Germany

The Nazis' racial philosophy taught that Aryans were the master race and other races were 'untermensch' (sub-human). Many Nazi scientists at this time practiced eugenics, the idea that people with disabilities or social problems were degenerates whose genes needed to be eliminated from the human bloodline.

1935 - The Nuremberg Laws stripped Jews of German citizenship and took away their civil rights. The escalation of racial persecution lead to the Final Solution.



Websites and further reading:

https://www.bbc.com/bitesize/guides/ztj4hv4/revision/1

https://www.bbc.com/bitesize/guides/zwmdfrd/revision/1

https://www.youtube.com/watch?v=Br-QxsOJ-Jg&t=0s&index=60&list=PLcvEcrsF_9zKQydhTXPW3srYbTpLG-Y7G

Key vocabulary to define and learn:

Aryan, Treaty, Dictatorship, Civil Rights, Armistice, Final Solution, Extremism, Propaganda, Eugenics, Holocaust, Discrimination, Racial Persecution, Compromise, Nuremberg Laws, Citizenship, Public Opinion, Degenerates, Great Depression, Big Three, Democracy

Subject: Spanish	Terms: 1 & 2	Topic: Viva AQA **GCSE**; Módulo 1: Theme 2 – De vacaciones – On holidays

WOOTTON PARK

Key Content 1 – Actividades *(activities)*

Understanding the present tense with activities

Free time activities. Understanding the subject of the verb

Understanding frequency, time indicators and when/if clauses

Reviewing Y8 content

Key Content 2 – Preferencias *(preferences)*

Using other parts of the verb to give your own and others' opinions

Comprehension of authentic texts

Understanding complex statements and preferences

Adding justification to opinions

Key Content 3 – Una visita *(a visit)*

Describing a past trip
Saying what you did and when
Using the past tense
Adding complex opinion structures

Key Content 4 – ¿Cómo era? *(How was it?/ What was it like?)*

Use the imperfect tense and understand when to use the two forms of the past
Describing accommodation and facilities/location
Key verbs in the preterite and the imperfect
Types of accommodation & adding complex description
Using Reading startegies to work out meaning

Key Content 5 – Reservaciones *(reservations)*

Using language to ask for things

Taking part in a conversation saying what you want

Giving personal details and preferences

Booking a hotel room, ordering tickets

Conducting an effective dialogue/role-play

Activities

Creating a free time storyboard/comic

Writing a holiday review for a magazine

Doing a survey of holiday preferences

Acting out reserving a holiday/telephone conversation

Websites and further reading:

Search on www.quizlet.com for 'Viva GCSE, M1' or 'vacaciones'
Use the first module in your textbook and on www.pearsonactivelearn.com
Use www.spanishrevision.co.uk and practise the preterite tense and holidays tasks
Use www.languagesonline.org and complete grammar tasks

Key Content 6 – ¡Qué desastre! *(What a disaster!)*

Describing a set of bad experiences in the
Using positive and negative together
Using connectives appropriately
Using 2/3+ tenses correctly

Key Vocabulary & Skills

Over the first two terms we will look at part of Theme 2 from the GCSE. We will start the GCSE course. Some of the vocab and structures will be familiar from Y8. This is Module 1 in the orange VIVA AQA GCSE Book. **You have access to F & H levels online.**

We will review: Present tense regular verbs; Preterite (past) tense; Opinions; Frequency

We will learn: More complex opinion structures; The imperfect tense (used to be); How to use tenses together; How to use language in spoken conversation in a real-life situation.

We will apply GCSE skills of: Writing in more than one tense; Narrating events & adding description; Doing role-play

AQA GCSE Module 1 Vocabulary Week 1-3 [YEAR 9 TERM 2]

¿Qué tal lo pasaste?	***How was it?***	¡Qué desastre!	*What a disaster!*
Lo pasé fenomenal / fatal	*I had a great / awful time*	¿Qué tiempo hizo?	*What was the weather like?*
Lo pasé bien / mal	*I had a good / bad time*	Hizo buen / mal tiempo.	*It was good / bad weather.*
En mi opinión / Creo que…	*In my opinion / I think that…*	Hizo calor / frío.	*It was hot / cold.*
Fue inolvidable / interesante / flipante / horroroso	*It was unforgettable / interesting / awesome / awful*	Hizo sol / viento.	*It was sunny / windy.*
¡Qué aburrido / miedo / guay!	*How boring / scary / cool!*	Llovió / Nevó.	*It rained / snowed.*
		excepto el martes, cuando…	*except for Tuesday, when…*

¿Dónde te alojaste?	***Where did you stay?***	grande	*big*
Me alojé / Me quedé…	*I stayed…*	lujoso/a	*luxurious*
en un albergue juvenil / un hotel	*in a youth hostel / a hotel*	moderno/a	*modern*
en un parador	*in a state-run luxury hotel*	pequeño/a	*small*
en un camping / una pensión	*on a campsite / in a guest house*	ruidoso/a	*noisy*
Estaba…	*It was…*	tranquilo/a	*quiet*
cerca de la playa	*near the beach*	Tenía…	*It had…*
en el centro de la ciudad	*in the city centre*	Había…	*There was/were…*
en el campo	*in the country*	No tenía ni… ni…	*It had neither… nor…*
¿Cómo era el hotel?	*What was the hotel like?*	Además, no tenía…	*Furthermore, it didn't have…*
Era…	*It was…*	(un) bar	*a bar*
un poco / bastante…	*a little bit / quite…*	(un) gimnasio	*a gym*
muy / demasiado…	*very / too…*	(un) restaurante	*a restaurant*
antiguo/a	*old*	(una) cafetería	*a café*
animado/a	*lively*	(una) discoteca	*a disco*
barato/a	*cheap*	(una) piscina climatizada	*a heated pool*
caro/a	*expensive*	(una) sauna	*a sauna*
cómodo/a	*comfortable*	mucho espacio	*lots of space*

AQA GCSE THEME 2

AQA GCSE Module 1 Vocabulary Week 4-6 [YEAR 9 TERM 2]

AQA GCSE THEME 2

Quisiera reservar…	***I would like to book…***	Hay un suplemento para perros.	*There's a supplement for dogs.*
¿Hay…	*Is/Are there…*	Quisiera reservar…	*I would like to book…*
aire acondicionado?	*air conditioning?*	una habitación individual / doble	*a single / double room*
aparcamiento?	*parking?*	con / sin balcón	*with / without balcony*
wifi gratis?	*free wifi?*	con baño / ducha	*with a bath / shower*
(una) tienda de recuerdos?	*a gift shop?*	con vistas al mar	*with sea view*
¿Cuánto cuesta una habitación…?	*How much does a… room cost?*	con cama de matrimonio	*with double bed*
Son… euros por noche.	*It's… euros per night.*	con desayuno	*with breakfast*
¿A qué hora se sirve el desayuno?	*What time is breakfast served?*	con media pensión	*with half board*
¿Cuándo está abierto/a el/la…?	*When is the… open?*	con pensión completa	*with full board*
¿Hasta qué hora está abierto/a el/la…?	*What time is the… open until?*	¿Para cuántas noches?	*For how many nights?*
		Para… noches	*For… nights*
¿Se admiten mascotas?	*Are pets allowed?*	del… al… de…	*from the… to the… of…*

Quiero quejarme	***I want to complain***		
Quiero…	*I want…*	Hay ratas en la cama.	*There are rats in the bed.*
hablar con el director.	*to speak to the manager.*	No hay…	*There is no…*
cambiar de habitación.	*to change room.*	Necesito…	*I need…*
un descuento.	*a discount.*	papel higiénico	*toilet paper*
El aire acondicionado…	*The air conditioning…*	jabón / champú	*soap / shampoo*
El ascensor…	*The lift…*	toallas / (un) secador	*towels / a hairdryer*
La ducha…	*The shower…*	¿Cuál es el problema?	*What's the problem?*
La habitación…	*The room…*	¿Qué habitación es?	*Which room is it?*
La luz…	*The light…*	¿Cómo se llama usted?	*What are you called? (polite)*
no funciona.	*doesn't work.*	¿Cómo se escribe?	*How do you spell that?*
está sucio/a.	*is dirty.*	¿Puede repetir, por favor?	*Can you repeat, please?*

Mis vacaciones desastrosas	***My disastrous holiday***		
Por lo general	*In general*	cogimos el teleférico	*we took the cable car*
Por un lado… por otro lado…	*On one hand… on the other hand…*	decidimos acampar	*we decided to camp*
Sin embargo	*However*	fuimos de excursión	*we went on an excursion*
Por eso	*Therefore / So*	Tuve / Tuvimos…	*I had / We had…*
El primer / último día…	*(On) the first / last day…*	un retraso / una avería.	*a delay / a breakdown.*
Al día siguiente…	*On the following day…*	Tuve / Tuvimos que…	*I had to / We had to…*
alquilé una bicicleta	*I hired a bicycle*	ir a la comisaría.	*go to the police station.*
conocí a mucha gente	*I met lots of people*	llamar a un mecánico.	*call a mechanic.*
fui a una fiesta	*I went to a festival / party*	Perdí / Perdimos…	*I lost / We lost…*
perdí mis gafas de sol	*I lost my sunglasses*	el equipaje / la cartera / las llaves.	*the luggage / the wallet / the keys.*
visité el pueblo	*I visited the town / village*	El paisaje era precioso.	*The landscape was beautiful.*

Subject: Computer Science	Term: 2	Topic: Computers in society

WOOTTON PARK
'Ipsum quod faciendum est diutius durant'

Key topic 2.1: Hardware

2.1.1 CPU performance, cores, clock speed, cache size, processor type
2.1.2 Motherboards, data buses and address busses, bridges
2.1.3 Memory – volatile and non volatile: RAM / ROM

Key topic 2.2: Software

2.2.1 Types of software; Firmware, operating systems and applications
2.2.2 Computer modelling in the UK - examples
2.2.3 Software:
- Bespoke custom made software
- Off the shelf software

2.2.4 Proprietary, free and open source software
2.2.5 Fetch, decode and execute cycle

Websites and further reading

CPU performance: https://www.bbc.com/bitesize/guides/zmb9mp3/revision/2

Buses: https://turbofuture.com/computers/buses

ROM/RAM: http://www.teach-ict.com/gcse_new/computer%20systems/memory/miniweb/index.htm

App.senecalearning.com
- Types of memory, flash memory, virtual memory
- Types of system software

Fetch, decode and execute cycle: http://www.teach-ict.com/gcse_computing/ocr/212_computing_hardware/cpu/miniweb/pg3.php

Key vocabulary to define and learn:

Cache, Processor, Motherboard, Busses, Volatile, Non-volatile, Bespoke, RAM, ROM

Subject: Art- Illustration	Term: 2	Topic: GCSE Project

WOOTTON PARK

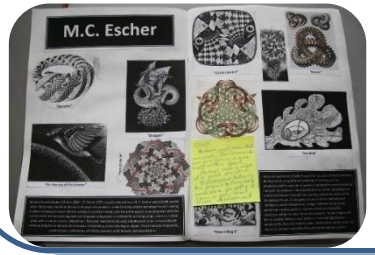
This term you will work on a illustration project designing a mystical creature. Through this project you will look at the GCSE specifications in Art. You will begin to understand each of the assessment objectives and how these might be achieved. Your class work and home learning will combine with your assessment point to give an understanding of the expectations of knowledge, understanding, concept, experimentation and skills required in GCSE Art and Design

Websites and further reading: https://www.bbc.com/bitesize/guides/zpcndxs/revision/1
https://www.aqa.org.uk/subjects/art-and-design/gcse/art-and-design-8201-8206/scheme-of-assessment

Key question 1: What is AO1?

Exam Board Definition: Develop ideas through investigations, demonstrating critical understanding of sources.

Using this statement and the examples below what do you think AO1 is about?



Key question 2: What is AO2?

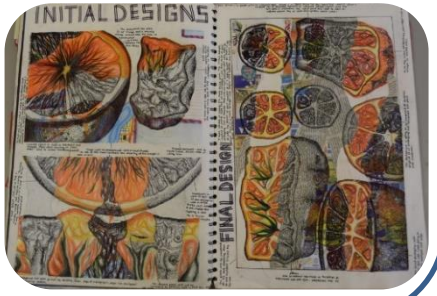
Exam Board Definition: Refine work by exploring ideas, selecting and experimenting with appropriate media, materials, techniques and processes.

Using this statement and the examples below what do you think AO2 is about?

Key question 3: What is AO3?

Exam Board Definition: Record ideas, observations and insights relevant to intentions as work progresses.

Using this statement and the examples below what do you think AO3 is about?



Key question 4: What is AO4?

Exam Board Definition: Present a personal and meaningful response that realises intentions and demonstrates understanding of visual language.

Using this statement and the examples below what do you think AO4 is about?