BRISTOL METROPOLITAN ACADEMY

Knowledge Organisers 2021-22

Year 9 – Term 5

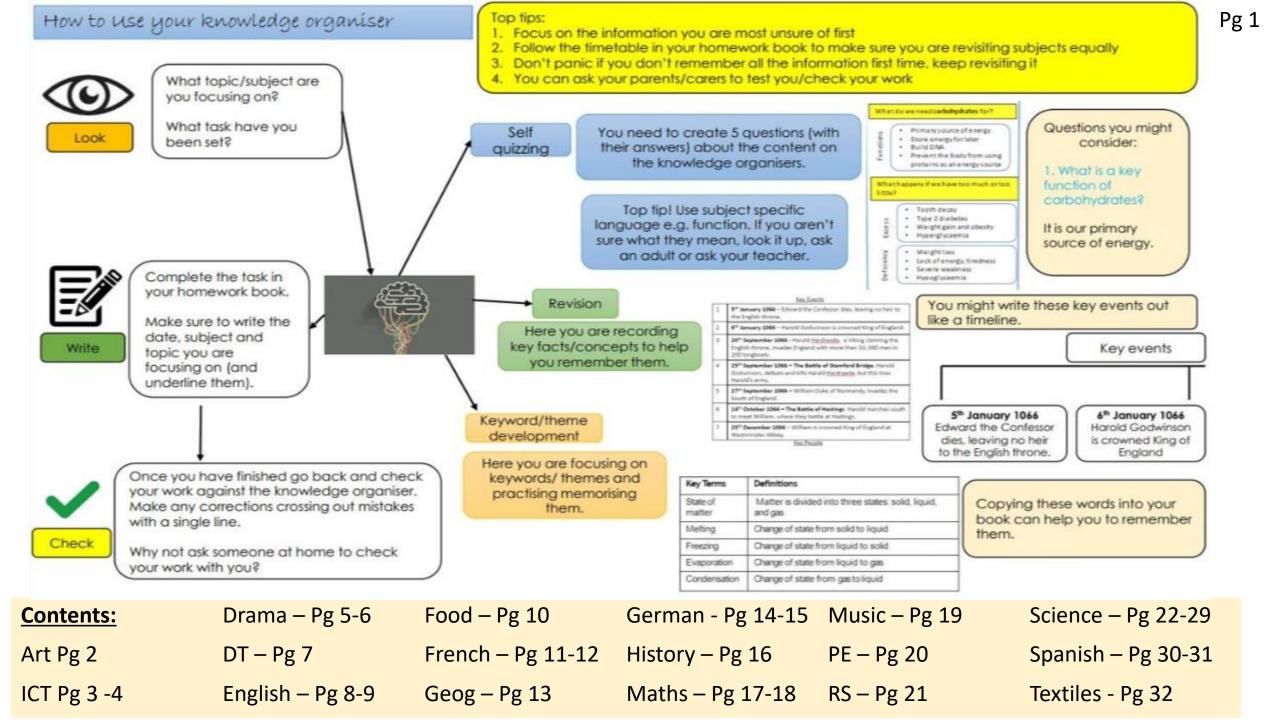|	
25th April 2022	Week A
2nd May 2022	Week B
9th May 2022	Week A
16th May 2022	Week B
23rd May 2022	Week A

Complete your homework on the night stated e.g. if it is a Monday week A you will complete DT and English homework.

	Week A	Week B
Monday	English/DT	Science/MFL
Tuesday	Maths/Drama	ICT/PE
Wednesday	Science	English
Thursday	RS/Music	Geography/Art
Friday	History	Maths

How to Use your knowledge organiser

Look

What topic/subject are you focusing on?

What task have you been set?

Write

Complete the task in your homework book.

Make sure to write the date, subject and topic you are focusing on (and underline them).

Check

Once you have finished go back and check your work against the knowledge organiser. Make any corrections crossing out mistakes with a single line.

Why not ask someone at home to check your work with you?

Self quizzing

You need to create 5 questions (with their answers) about the content on the knowledge organisers.

Top tip! Use subject specific language e.g. function. If you aren't sure what they mean, look it up, ask an adult or ask your teacher.

Revision

Here you are recording key facts/concepts to help you remember them.

Keyword/theme development

Here you are focusing on keywords/ themes and practising memorising them.

What do we need **carbohydrates** for?

Functions:
- Primary source of energy
- Store energy for later
- Build DNA
- Prevent the body from using proteins as an energy source

What happens if we have too much or too little?

Excess:
- Tooth decay
- Type 2 diabetes
- Weight gain and obesity
- Hyperglycaemia

Deficiency:
- Weight loss
- Lack of energy, tiredness
- Severe weakness
- Hypoglycaemia

Questions you might consider:

1. What is a key function of carbohydrates?

It is our primary source of energy.

You might write these key events out like a timeline.

Key events

5th January 1066 Edward the Confessor dies, leaving no heir to the English throne.

6th January 1066 Harold Godwinson is crowned King of England

Key Terms	Definitions
State of matter	Matter is divided into three states: solid, liquid, and gas
Melting	Change of state from solid to liquid
Freezing	Change of state from liquid to solid
Evaporation	Change of state from liquid to gas
Condensation	Change of state from gas to liquid

Copying these words into your book can help you to remember them.

Contents:

Art

Year 9 Present Project
Term 5

Signs Of The Times

In this SOW we will investigate:
• Architecture, and how it can be used to create artwork
• Famous architecture of the past, present and future, in our city, country and around the world
• A diverse range of artists, craftspeople & designers and explore these artists and the concepts within their work.
• Explore and experiment with a range of materials, techniques and processes to create a final outcome consisting of mixed media collage and drawing of a street scene
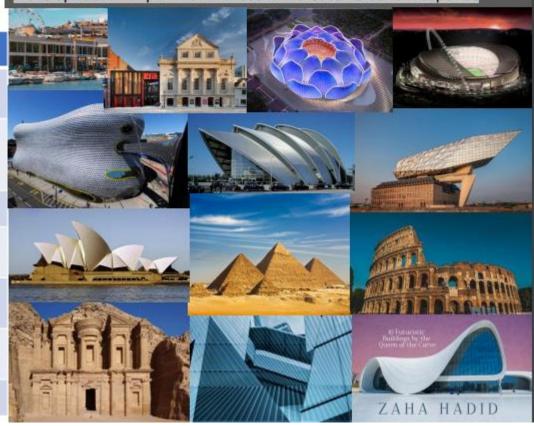
What GCSEs do I need to be an architect?
A lot of people ask the question "What GSCSs do I need to be an architect?" The truth is, entry requirements are different for each degree course.
You usually need a portfolio of your drawings and photographs.
Universities are not too prescriptive about what A-levels you need, but often look for a mixture of arts/humanities and maths/science subjects. A-levels in **maths** and subjects like **art** or **and design** will help.

WHAT DO ARCHITECTS DO?
Architects use their technical and creative skill to design structures that suit the requirements of their clients
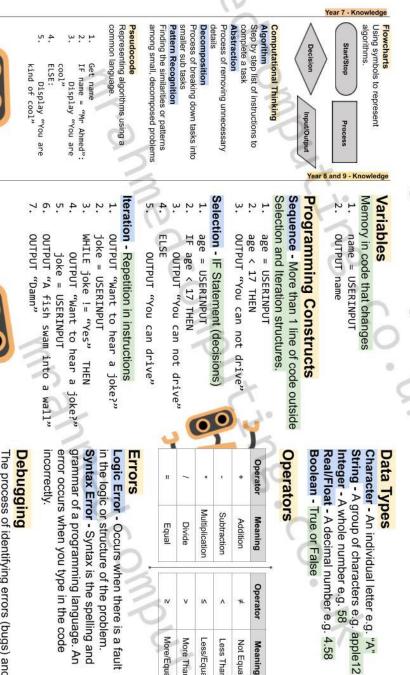As an architect, you'll design new buildings or extensions or alterations to existing structures and advise on the restoration and conservation of old properties. You may work on individual buildings or on large redevelopment schemes, and your responsibility can extend to the design of the surrounding landscape and spaces. Working closely with clients and users, you'll make sure that projected designs match requirements and are functional, safe and economical, and in some cases highly innovative. You'll usually control a project from start to finish and work with a number of construction professionals, including surveyors and engineers.

Develop Ideas – Experiment – Record – Create Personal Response

Key word	Definition
Photomontage	Cutting, gluing, rearranging and overlapping two or more photographs into a new image.
Lino print	**A form of block printing that involves carving a pattern or design into a linoleum, rubber or vinyl surface** that can then be printed from.
Focal point	The centre of interest or activity.
Engineering	The branch of science and technology concerned with the design, building, and use of engines, machines, and structures.
Mixed media	A term used to **describe artworks composed from a combination of different media or materials**
Collage	A piece of art made by sticking various different materials such as photographs and pieces of paper or fabric on to a backing.
Architecture	The art or practice of designing and constructing buildings.

ZAHA HADID

Year 9 - Programming

Flowcharts
Using symbols to represent algorithms.

- Start/Stop
- Decision
- Input/Output
- Process

Computational Thinking

Algorithm
Step by step list of instructions to complete a task

Abstraction
Process of removing unnecessary details

Decomposition
Process of breaking down tasks into smaller sub tasks

Pattern Recognition
Finding the similarities or patterns among small, decomposed problems

Pseudocode
Representing algorithms using a common language.

```
1.   Get name
2.   IF  name = "Mr Ahmed":
3.       Display "You are
     cool!"
4.   ELSE:
5.       Display "You are
     kind of cool"
```

Variables
Memory in code that changes

```
1.   name = USERINPUT
2.   OUTPUT name
```

Programming Constructs

Sequence - More than 1 line of code outside Selection and Iteration structures.

```
1.   age = USERINPUT
2.   age < 17 THEN
3.   OUTPUT "You can not drive"
```

Selection - IF Statement (decisions)

```
1.   age = USERINPUT
2.   IF age < 17 THEN
3.       OUTPUT "You can not drive"
4.   ELSE
5.       OUTPUT "You can drive"
```

Iteration - Repetition in instructions

```
1.   OUTPUT "Want to hear a joke?"
2.   joke = USERINPUT
3.   WHILE joke != "yes" THEN
4.       OUTPUT "Want to hear a joke?"
5.       joke = USERINPUT
6.   OUTPUT "A fish swam into a wall"
7.   OUTPUT "Damn"
```

Errors

Logic Error - Occurs when there is a fault in the logic or structure of the problem.

Syntax Error - Syntax is the spelling and grammar of a programming language. An error occurs when you type in the code incorrectly.

Debugging
The process of identifying errors (bugs) and fixing them

Data Types

Character - An individual letter e.g. "A"
String - A group of characters e.g. apple12
Integer - A whole number e.g. 58
Real/Float - A decimal number e.g. 4.58
Boolean - True or False

Operators

Operator	Meaning
+	Addition
-	Subtraction
*	Multiplication
/	Divide
=	Equal

Operator	Meaning
≠	Not Equal
<	Less Than
≤	Less/Equal
>	More Than
≥	More/Equal

Year 9 - Networks

Strong Passwords
Prevents unauthorised access to a computer system. A strong password contains: *Uppercase letters, Lowercase letters, Numbers, Symbols, 8 or more characters*

Saving Files
It is important to regularly save files/work so that you do not lose your work.

How to save a file?
1. Save in your documents
2. Save with a relevant file name
3. Saved in an appropriate folder structure
4. Save the file in a folder that is relevant to the topic

Save and Save As
- "Save" updates a file
- "Save As" creates another version of the file

Networks
Computers connected together that share data and resources.

Cloud Storage
Cloud computing is storage that you can access through the Internet

Networks
- Files can be accessed from anywhere
+ You have unlimited storage space and can store for free
+ Allows you to create more local storage
+ Good form of a backup storage
- Does not require expensive hardware
- You need internet access
- Has the potential to get hacked
- Data could be seen by a third party
- Can be expensive long term

Networks Types
Two or more computers connected together that share data and resources

LAN (Local Area Network)
Network in a small geographical area
Example: Small Office, School

WAN (Wide Area Network)
Network in a large geographical area
Example:The Internet

WPAN (Personal Area Network)
Network centred around a single user
Example: Bluetooth Headset, Hotspot

Advantages of Networks:
+ Sharing files is easier
+ Share hardware (printers)
+ Updates are central
+ User accounts can be stored centrally
- Set up could be expensive
- Vulnerable to hacking
- Need specific hardware
- Might need a network manager

Disadvantages of Network:

Wired and Wireless

Wired Networks
Computers connected together using wires.
+ Fast connection
+ More secure than wireless
- Wires are trip hazards
- Difficult to connect new devices

Wireless Networks
Computers connected together using wireless connections (Wi-Fi).
+ Freedom to move around
- Less secure
- Connection can be interrupted by walls and other electronic devices

Bluetooth
Short range wireless connection
+ Very common connection type **and** Low power usage
- Low bandwidth **and** Short range

Cyber Security
Malware - Any hostile or intrusive softwares
Hacking - People that gain unauthorised access to a computer
Prevention - Passwords, Antivirus, Firewall, Encryption

Year 9 - Computer Systems

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Year 789 - Data Representation

Number Bases
Denary
Base 10 Numbers - 23, 5

Binary
Base 2 Numbers -
01010101

Binary Arithmetic
Rules of Addition
0 + 0 = 0
0 + 1 = 1
1 + 0 = 1
1 + 1 = 0 Carry 1
1 + 1 + 1 = 1 Carry 1

OVERFLOW ERROR
When and extra bit is created to represent a number

Storage Units
The more bits of Binary you use, the higher the file size.

Bit		
Byte	↓	x8
Kilobyte	↓	x1000
Megabyte	↓	x1000
Gigabyte	↓	x1000
Terabyte	↓	x1000

128	64	32	16	8	4	2	1	
0	0	0	0	1	0	1	0	= 10
0	0	1	1	1	1	1	0	= 62
1	0	0	0	1	1	1	1	= 143
1	1	1	1	1	1	1	1	= 255

2Mb to Bits
2Mb = 10000000 Bits

ASCII and Unicode
ASCII
7 bit ASCII used to represent 128 characters in binary.
Only enough for English language.

Unicode
Created to extend binary values for other languages using 16 bit numbers. This allows for 65,536 characters to be encoded.

Representing Images
Pixel - Small dot on of colour on an image
Resolution - Amount of pixels on an image
Colour/Bit Depth - Amount of bits in each pixel (amounts of colours available)

Factors that affect the quality and file size:
Increasing resolution and colour depth means the quality will improve. It also means the file size will increase.

Working out file size:
File size (bits) = Resolution x Bit Depth

ASCII TABLE

Costume

A. Material	B. Colour	C. Condition	D. Fit / style	E. Fashion / purpose
Cotton	Bright colours	Pressed and ironed	Practical	Apron
Cashmere	Dark colours	Clean / pristine	Comfortable	Cardigan, jumper
Wool	Dull / worn colour	Dirty	Formal	Skirt, trousers, dress
Silk	Mix-match	Worn	Tight and fitting	Top, T-shirt, blouse, shirt, vest top
Felt	Matching	Distressed	Short sleeve	
Polyester	Colours for labour work	Rips and holes	Long sleeve	Trainers / daps
Denim	Colours that show wealth and status	Dropped stitches	Flowing (unrestricting)	Pencil skirt and blouse
Velvet		Hems dropping	Baggy and loose	Flowing dress
Tweed		Shiny	Tight and fitting	Blazer / jacket
		Patch work	Revealing (above knees / cleavage)	Short heels / high heels
		Fraying edges	Long / short	Shiny shoes
		Scuffed		Untucked

Year 9 Drama — Costume

F. Headwear	G. Hair	H. Footwear	I. Accessories	J. Jewellery	K. Makeup
Cap / Truck	Messy and dishevelled	Shoes with soles falling off	Gold buttons	Rings	Eyeshadow
Flat cap	Un-styled	Brogues	Embroidered emblem	Watch	Mascara
Headband	Styled	High heels / stilettos	Trim	Locket	Foundation
Clips	Groomed	Shoes with holes	Badge	Brooch	Blusher
Hairband	Parting	Short heels / kitten heels	Scarf	Pearl necklace	Lipstick / gloss
Hat (describe)	Gelled	Shiny leather shoes buffered	Gloves	Pearl earrings	Minimal coverage
	Messy bun	Patent shoes (fake)		Gold studs	Full coverage
	Slick back hair and tight bun	Dirty trainers / converse / daps / plimsoles		Diamonds	Brown to create mud marks
		Unlaced shoes / trainers		Fake gold and silver	Black to create bruising
		Shoes that don't fit		Fake stones (ie diamonds)	Oil to create sweaty look

Costume

- I am designing a costume for (character)......
- X is (social class).... in the time era of (decade) ....
- X's hair would be...   Column G   (describe)
- X makeup would be   Column K   (describe how markings would be created))
- X would wear..   Column E&C   (list the items she would wear in column E)
- The fit / style would be... Column D   (describe each item)
- The materials would be... Column A&C   (describe materials for each item)
- The colours would be...   Column B   (describe colours for each item)
- X footwear would be...   Column H&C   (describe)
- X accessories would be... Column I&C   (describe)
- X jewellery would be...   Column J&C   (describe)

Keywords to use when designing sound — Sound
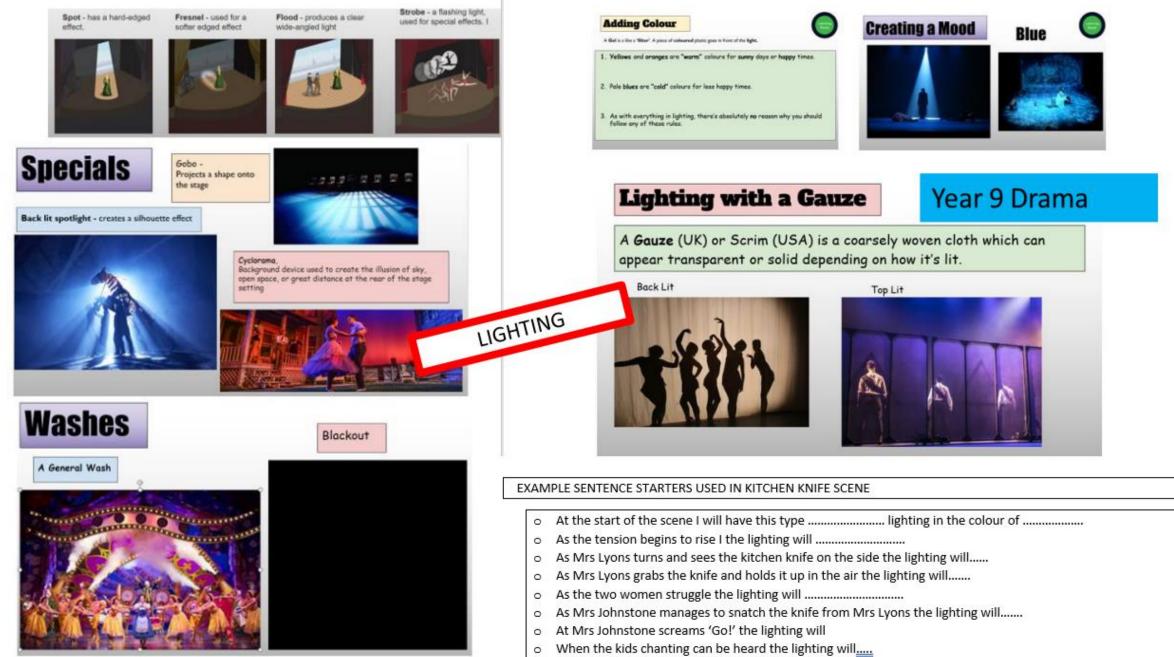
- Diegetic (can be heard by actors)
- Non -diegetic (cannot be heard by actors)
- Underscore (to accompany the action) this can be live or pre-recorded
- Instruments (strings, woodwind, brass, percussion, keyboards)
- Live music, synthesized music, recorded music, instrumental music
- Atmosphere, mood (i.e. tense, calm, dramatic, cheerful)
- ambience, dramatic, tense, so
- Rhythm, pace
- Sound effect (live, pre-recorded)
- Volume, amplified
- Music era (what year is the scene set in? What music was current at that time)

EXAMPLE SENTENCE STARTERS FOR THE BUS SCENE — Sound

- As the sound designer of this extract I want to create an atmosphere that starts........ then turns into a .... atmosphere
- A piece of 1970's music like .... could be played at the start when everyone gets on the bus to create a .... atmosphere
- As the bus pulls away the sound effect I will play is ......
- When Sammy starts arguing with the conductor I will play......
- When Sammy pulls out the knife the mood will change to ....
- When the knife is pulled, the non-diegetic sound (cannot be heard by actors) of the underscore music will include these instruments.......
- The volume of the .... will be amplified when ....
- The pace and rhythm of the music will be ....
- I will also have a pulsating heart beat non-diegetic sound effect playing when ....
- The diegetic sound of the ringing bus bell (can be heard by actors) .... would be played when ....
- When the bus stops I would have the diegetic sound effect of .... playing

Spot - has a hard-edged effect.

Fresnel - used for a softer edged effect

Flood - produces a clear wide-angled light

Strobe - a flashing light, used for special effects. I

Specials

Gobo - Projects a shape onto the stage

Back lit spotlight - creates a silhouette effect

Cyclorama, Background device used to create the illusion of sky, open space, or great distance at the rear of the stage setting

Washes

A General Wash

Blackout

10

LIGHTING

Adding Colour

A Gel is a like a 'filter'. A piece of coloured plastic goes in front of the light.

1. Yellows and oranges are "warm" colours for sunny days or happy times.

2. Pale blues are "cold" colours for less happy times.

3. As with everything in lighting, there's absolutely no reason why you should follow any of these rules.

Creating a Mood Blue

Lighting with a Gauze

Year 9 Drama

A **Gauze** (UK) or Scrim (USA) is a coarsely woven cloth which can appear transparent or solid depending on how it's lit.

Back Lit

Top Lit

EXAMPLE SENTENCE STARTERS USED IN KITCHEN KNIFE SCENE

- At the start of the scene I will have this type .... lighting in the colour of ....
- As the tension begins to rise I the lighting will ....
- As Mrs Lyons turns and sees the kitchen knife on the side the lighting will......
- As Mrs Lyons grabs the knife and holds it up in the air the lighting will.......
- As the two women struggle the lighting will ....
- As Mrs Johnstone manages to snatch the knife from Mrs Lyons the lighting will.......
- At Mrs Johnstone screams 'Go!' the lighting will
- When the kids chanting can be heard the lighting will.....

Year 9 D&T – Term 1 – Pewter Project

Select one symbol from the selection above.

Create a logo for a product/company of your choice using your chosen symbol.

You can achieve this by modifying your chosen symbol by applying a range of composition techniques to develop its shape, form, and visual appeal. Be as creative as possible.

Logo design principles

1. Simple - needs to be easily identifiable at a glance.
2. Memorable – should be easily recalled after just one look.
3. Original – Create a unique design that cannot be confused with another.
4. Timeless - should be modern yet timeless and should avoid trends.
5. Versatile - can be used in a variety of sizes and colours.
6. Appropriate - should be appropriate for the intended audience.

Keywords

Malleable – able to be hammered or pressed into shape without breaking
Innovative- new and original
Analysis - detailed examination of the something
Annotation- analysis added to a text or diagram
Alloy - a metal made by combining two or more metallic elements

What is Pewter?

Pewter is a malleable metal alloy consisting of tin, antimony, copper, bismuth, and sometimes silver. Modern pewter consists of are 94% tin.

Pewter has a low melting point (around 170–230 °C) making it ideal for melting on a chip forge and brazing hearth and casting.

2D Design Basic Tools

SELECT – Use this tool to select different to highlight objects.

LINE – This tool creates straight lines. Click to start the line, extend out and click to finish.

CIRCLE – This tool creates circle shapes. Click to start the circle, extend to the size needed and click to finish.

PATH – This tool creates curved lines through continual clicks.

RECTANGLE – This tool can be used to create both rectangular and square shapes.

ABC **TEXT** – Use this tool to insert text onto your designs. The font, size and direction of the text can be changed.

DEL **DELETE PART** – Use this tool to delete separate lines and objects.

DEL ANY **DELETE ANY** – Use this tool to delete whole lines and objects.

CAD/CAM

CAD stands for Computer Aided Design.
It involves designing products on a computer, rather than using a pencil and paper.
CAD packages include 2D drawing software (e.g. Adobe® Illustrator®, CorelDRAW®, TechSoft 2D Design® and ArtCAM®) and 3D modelling software (e.g. SolidWorks®).
CAD helps designers model and change their designs quickly. It's easy to experiment with alternative colours and forms and you can often spot problems before making anything.
In 3D programs, you can view the product from all angles.
CAM stands for Computer Aided Manufacture.
It's the process of manufacturing products with the help of computers.
CAD software works out the coordinates of each point on the drawing. These are called x,y,z coordinates — x is the left/right position, y is forwards/backwards and z is up/down.
The point where x, y and z meet is (0,0,0) — the datum.
CAM machines are computer numerically controlled (CNC) — they can follow the x,y,z coordinates and move the tools to cut out or build up your design.
For example, some milling machines are CAM machines. They remove material from a larger piece of material to shape and create a product.
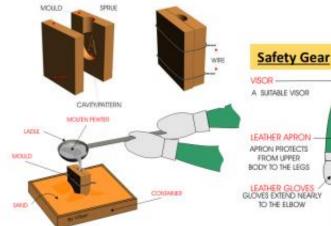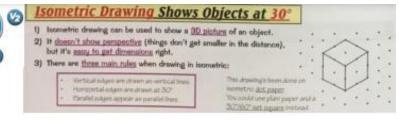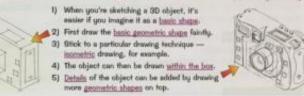
Isometric Drawing Shows Objects at 30°

1) Isometric drawing can be used to show a 3D picture of an object.
2) It doesn't show perspective (things don't get smaller in the distance), but it's easy to get dimensions right.
3) There are three main rules when drawing in isometric:
   - Vertical edges are drawn as vertical lines
   - Horizontal edges are drawn at 30°
   - Parallel edges appear as parallel lines

   This drawing's been done on isometric dot paper. You could use plain paper and a 30°/60° set square instead.

Crating Can Be Used to Draw 3D Shapes

Crating is where you start by drawing a box — the 'crate' — and gradually add bits on and take bits off till you get the right shape. For example, you can remove sections from a cuboid to make any other 3D shape.

1) When you're sketching a 3D object, it's easier if you imagine it as a basic shape.
2) First draw the basic geometric shape faintly.
3) Stick to a particular drawing technique — isometric drawing, for example.
4) The object can then be drawn within the box.
5) Details of the object can be added by drawing more geometric shapes on top.

Jewellers Clamp

Wire Wool

Needle Files

Metalworking Vice

Polishing Machine

Silicon Carbide Paper

MOULD / SPRUE / WIRE / CAVITY/PATTERN / MOLTEN PEWTER / LADLE / MOULD / SAND / CONTAINER

Safety Gear

VISOR — A SUITABLE VISOR

LEATHER APRON — APRON PROTECTS FROM UPPER BODY TO THE LEGS

LEATHER GLOVES — GLOVES EXTEND NEARLY TO THE ELBOW

Evaluation

Designers evaluate their finished products or prototypes in order to test whether they work well and if the design can be corrected or improved. Whatever you have designed it is important to evaluate your work constantly during the project.
Evaluation can take a variety of forms:

- General discussion with other pupils, staff and others.
- Questionnaires / surveys carried out at any time during the project.
- Your personal views, what you think of existing designs.
- Most important of all - what do you think of your designs, prototypes and finished products ?
- Can you think of any other ways of evaluating your work ?
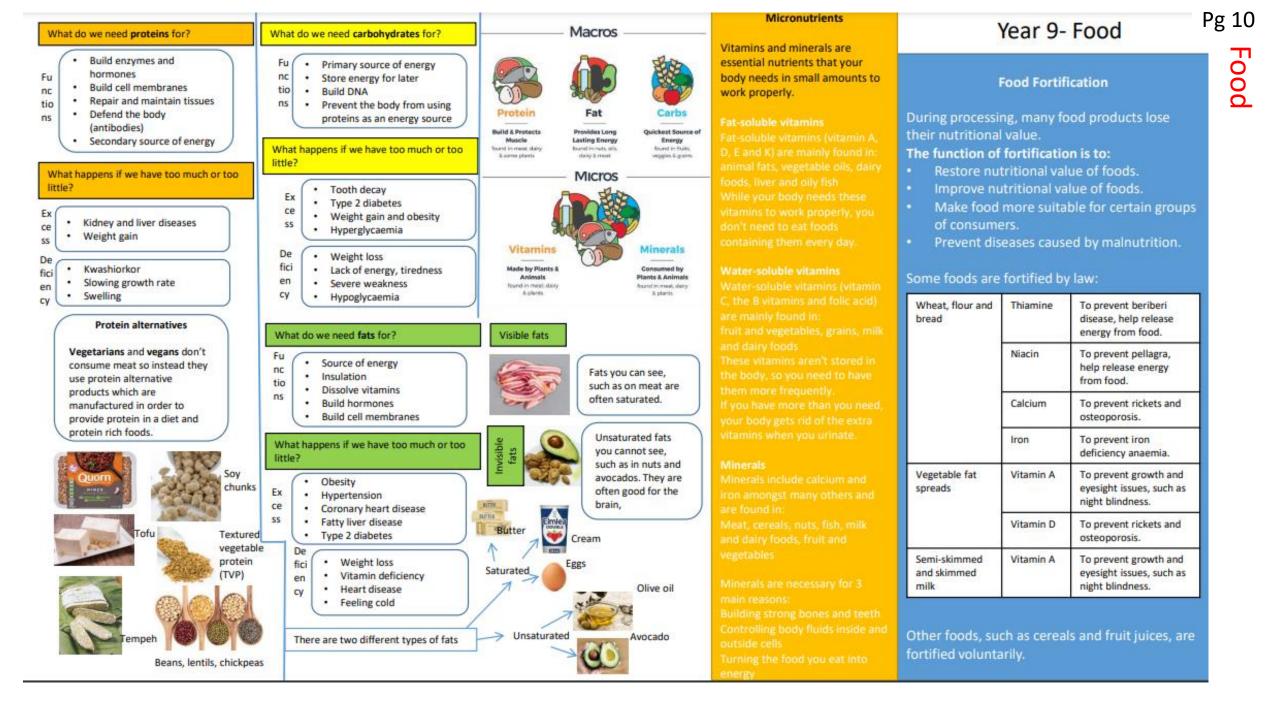
The Merchant of Venice Knowledge Organiser

Very Brief Plot Summary

Act I: Bassanio asks Antonio for a loan of 3,000 ducats. Antonio has to borrow from Shylock and the bond is a pound of flesh. Portia complains to Nerissa about the way her father has insisted she find a husband – by choosing one of three caskets – and mocks the suitors so far.

Act II: The Prince of Morocco arrives and chooses the gold casket and so fails to win Portia's hand. Jessica steals money and jewels and escapes from Shylock with Lorenzo. Shylock is enraged. We find that some of Antonio's ships have been lost. The Prince of Arragon arrives and chooses the silver casket so he does not marry Portia either.

Act III: More of Antonio's ships have been lost. Shylock says he will have his pound of flesh. Bassanio arrives to woo Portia. He chooses the lead casket and is able to marry her – the two declare their love. Nerissa and Gratiano reveal their love also. Portia and Nerissa give each man a ring. Bassanio hears that Antonio is ruined and leaves to help his friend. Antonio is in prison and Shylock will show no mercy. Portia and Nerissa say they are retiring to a convent but secretly go to Venice to help Antonio.

Act IV: Antonio is on trial. Bassanio begs Shylock to be merciful, but he will not rescind his bond. Bassanio offers 6,000 ducats to no avail. Balthasar, who is really Portia dressed as a man, arrives at court to help Antonio. Bassanio offers ten times the debt or his own life but Shylock will not yield. Balthasar/Portia insists that Venetian law must be followed. Antonio and Bassanio say goodbye. Shylock is about to cut Antonio when Balthasar/Portia reminds him that the bond mentioned no blood and he must not spill a drop. Now Shylock says he'll take the money but Portia insists he have his bond. Shylock drops the case. He is then punished for attempting to take the life of a citizen of Venice. The Duke is merciful and gives Shylock a fine. Bassanio wants to give Balthasar/Portia a token of appreciation. Portia asks for his ring and gets it. Nerissa also gets Gratiano's ring.

Act V: Portia and Nerissa arrive home just before their husbands. Bassanio, Antonio and Gratiano arrive and give the good news. Portia and Nerissa 'find out' that the men have given their rings away and pretend to be cross. Eventually, the two women give their husbands back their rings and all is revealed. Antonio hears that some of his ships are safely home. Lorenzo hears he will inherit Shylock's fortune.

Main Characters

Antonio: A very good friend of Bassanio, Antonio is shown as kind – he borrows money to help Bassanio and is prepared to lose his life for it – but also unkind as he is anti-Semitic.

Bassanio: A Venetian nobleman who often borrows from his friend Antonio. He is in love with Portia and proves worthy of her love when he passes the casket test.

Portia: A rich and clever noblewoman from Belmont who must choose a husband with three caskets. She loves Bassanio and he passes the casket test. Portia dresses as a man and saves Antonio from Shylock.

Shylock: A money lender and a Jew who is very angry about his treatment at the hand of the Christians of Venice, particularly Antonio. He lends Antonio money with a bond of a pound of flesh. Shylock is eloquent and defends his own humanity yet seems merciless and cruel.

Context

Usury: In modern times usury means lending money for excessive interest. In Shakespearean times usury meant any kind of money-lending. Money-lending was considered to be a disreputable trade, mainly because Christians believed the Bible forbade it. However, in reality, most merchants of the time borrowed money to speculate on new investments.

Anti-Semitism: When the Merchant of Venice was staged, most of the audience would never have knowingly met a Jewish person. Jews had been expelled from the country 300 years before and so the few that were in England practised their religion in secret. Elizabethans therefore were often hugely anti-Semitic, believing stories and outlandish rumours that said Jewish men were child killers, womanisers and had a strange and fetid smell.

Key Quotations

"In Belmont is a lady richly left,
And she is fair..." Bassanio: Act 1, Scene 1

"Try what my credit can in Venice do" Antonio: Act 1, Scene 1

"I may neither choose who I would nor refuse who I dislike; so is the will of a living daughter curb'd by the will of a dead father." Portia: Act 1, Scene 2

"If I can catch him once upon the hip,
I will feed fat the ancient grudge I bear him." Shylock: Act 1, Scene 3

"...let the forfeit
Be nominated for an equal pound
Of your fair flesh, to be cut off..." Shylock: Act 1, Scene 3

"Mislike me not for my complexion..." Pr. of Morocco: Act 2, Scene 1

"Alack, what heinous sin is it in me
To be ashamed to be my father's child?" Jessica: Act 2, Scene 3

"Beshrew me but I love her heartily..." Lorenzo: Act 2, Scene 6

"But here an angel in a golden bed
Lies all within. Deliver me the key;" Pr. of Morocco: Act 2, Scene 7

"My daughter, O my ducats, O my daughter!" Shylock: Act 2, Scene 8

"I am a Jew. Hath not a Jew eyes? Hath not a Jew hands, organs, dimensions, senses, affections, passions?" Shylock: Act 3, Scene 1

"I would my daughter were dead at my foot, and the jewels in her ear" Shylock: Act 3, Scene 1

"Pay him six thousand, and deface the bond." Portia: Act 3, Scene 2

"First go with me to church and call me wife,
And then away to Venice to your friend!" Portia: Act 3, Scene 2

"I'll have my bond. Speak not against my bond." Shylock: Act 3, Scene 3

"My Lord Bassanio, let him have the ring." Antonio: Act 4, Scene 1

"The quality of mercy is not strained.
It droppeth as the gentle rain from heaven
Upon the place beneath." Portia (as Balthazar): Act 4, Scene 1

"I am not well; send the deed after me
And I will sign it." Shylock: Act 4, Scene 1

"I'll die for 't but some woman had the ring!" Portia, Act 5, Scene 1

English

Main Characters

Nerissa: Portia's lady in waiting and friend. Nerissa marries Gratiano and accompanies Portia to Venice disguised as a male clerk.

Gratiano: A friend of Bassanio's who is very critical of Shylock during the trial. Falls in love with and marries Nerissa.

Jessica: Shylock's daughter who falls in love with Christian Lorenzo. She is ashamed to be Shylock's daughter, elopes with Lorenzo and becomes a Christian.

Context

Marriage: Marriage was less a love match and more an arrangement between families. Both men and women rarely chose their own marriage partner. This was especially true of noble families.

Themes

Love
- Friendship
- Familial love
- Romantic love

Prejudice
- Jews/Christians
- Mixed relationships
- Shylock: 'If you prick us, do we not bleed?'

Money
- Mistrust of money lenders
- Support for merchants
- Bassanio profligate with money
- Portia very wealthy
- Jessica stole riches
- Risks with money

Women in society
- Women were not free to marry who they chose – even if their father had died!
- Women are strong and make their own decisions in the play.
- However, they can only influence events by either doing it in secret (Jessica) or disguising themselves as men (Portia and Nerissa).

Mercy and justice
- Shylock is expected to be merciful but isn't.
- Antonio is merciful.
- Portia: 'The quality of mercy is not strained'
- Is justice done by the end of the play?

Symbols and Motifs

The pound of flesh
- Jews were portrayed as bloodthirsty murderers at this time and so Shylock's demand for a pound of flesh would epitomise the way Jews were regarded.
- Shylock has also just lost his own 'flesh and blood' – Jessica. So the pound of flesh could represent his revenge on Christians generally.

Rings
- Portia gives Bassanio a ring to represent love and commitment.
- Nerissa gives Gratiano a ring which represents the same.
- The turquoise ring that Jessica stole from Shylock represents his memories and love for his wife who has died.

The three caskets:
- For Portia, these represent the control her father exerts on her even from beyond the grave.
- For her father, they may have represented his love for his daughter in making sure she marries well.
- The gold casket: appearances can be deceptive
- Silver: being a fool
- Lead: modesty and good judgement

Key Vocabulary

anti-Semitism
Judaism
usury
merchant
risk
revenge
pound of flesh
Venice
Rialto
bond
interest
prejudice
Christianity
mercy
justice
patriarchy

Language and Techniques

symbolism
allegory
foreshadowing
iambic pentameter
metaphor
simile
allusion
dramatic irony
hyperbole
personification
repetition
deus ex machina

Key Shakespearean Words

argosy	lading
presage	rail
beholden to	wrest
baned	surfeit
cozen	foppery
prattle	usance
gratis	chaff
visage	ducat
wive	currish
forfeiture	shrive

Year 9- Food

What do we need **proteins** for?

Functions
- Build enzymes and hormones
- Build cell membranes
- Repair and maintain tissues
- Defend the body (antibodies)
- Secondary source of energy

What happens if we have too much or too little?

Excess
- Kidney and liver diseases
- Weight gain

Deficiency
- Kwashiorkor
- Slowing growth rate
- Swelling

Protein alternatives

Vegetarians and **vegans** don't consume meat so instead they use protein alternative products which are manufactured in order to provide protein in a diet and protein rich foods.

Quorn
Soy chunks
Tofu
Textured vegetable protein (TVP)
Tempeh
Beans, lentils, chickpeas

What do we need **carbohydrates** for?

Functions
- Primary source of energy
- Store energy for later
- Build DNA
- Prevent the body from using proteins as an energy source

What happens if we have too much or too little?

Excess
- Tooth decay
- Type 2 diabetes
- Weight gain and obesity
- Hyperglycaemia

Deficiency
- Weight loss
- Lack of energy, tiredness
- Severe weakness
- Hypoglycaemia

What do we need **fats** for?

Functions
- Source of energy
- Insulation
- Dissolve vitamins
- Build hormones
- Build cell membranes

What happens if we have too much or too little?

Excess
- Obesity
- Hypertension
- Coronary heart disease
- Fatty liver disease
- Type 2 diabetes

Deficiency
- Weight loss
- Vitamin deficiency
- Heart disease
- Feeling cold

There are two different types of fats

Macros

Protein — Build & Protects Muscle. Found in meat, dairy & some plants
Fat — Provides Long Lasting Energy. Found in nuts, oils, dairy & meat
Carbs — Quickest Source of Energy. Found in fruits, veggies & grains

Micros

Vitamins — Made by Plants & Animals. Found in meat, dairy & plants
Minerals — Consumed by Plants & Animals. Found in meat, dairy & plants

Visible fats

Fats you can see, such as on meat are often saturated.

Invisible fats

Unsaturated fats you cannot see, such as in nuts and avocados. They are often good for the brain,

Butter — Saturated
Cream
Eggs
Olive oil — Unsaturated
Avocado

Micronutrients

Vitamins and minerals are essential nutrients that your body needs in small amounts to work properly.

Fat-soluble vitamins

Fat-soluble vitamins (vitamin A, D, E and K) are mainly found in: animal fats, vegetable oils, dairy foods, liver and oily fish
While your body needs these vitamins to work properly, you don't need to eat foods containing them every day.

Water-soluble vitamins

Water-soluble vitamins (vitamin C, the B vitamins and folic acid) are mainly found in: fruit and vegetables, grains, milk and dairy foods
These vitamins aren't stored in the body, so you need to have them more frequently.
If you have more than you need, your body gets rid of the extra vitamins when you urinate.

Minerals

Minerals include calcium and iron amongst many others and are found in:
Meat, cereals, nuts, fish, milk and dairy foods, fruit and vegetables

Minerals are necessary for 3 main reasons:
Building strong bones and teeth
Controlling body fluids inside and outside cells
Turning the food you eat into energy

Food Fortification

During processing, many food products lose their nutritional value.

The function of fortification is to:
- Restore nutritional value of foods.
- Improve nutritional value of foods.
- Make food more suitable for certain groups of consumers.
- Prevent diseases caused by malnutrition.

Some foods are fortified by law:

Food	Nutrient	Reason
Wheat, flour and bread	Thiamine	To prevent beriberi disease, help release energy from food.
	Niacin	To prevent pellagra, help release energy from food.
	Calcium	To prevent rickets and osteoporosis.
	Iron	To prevent iron deficiency anaemia.
Vegetable fat spreads	Vitamin A	To prevent growth and eyesight issues, such as night blindness.
	Vitamin D	To prevent rickets and osteoporosis.
Semi-skimmed and skimmed milk	Vitamin A	To prevent growth and eyesight issues, such as night blindness.

Other foods, such as cereals and fruit juices, are fortified voluntarily.

9.11 My school – vocab. list

Quelle est ta matière préférée?
L'anglais
L'espagnol
Le français
Le théâtre
Le dessin
Le sport (L'EPS)
L'informatique
La musique
La technologie
La géographie
L'histoire
L'éducation religieuse
L'éducation civique
Les mathématiques
Les sciences
L'histoire/géo

Qu'est-ce que tu en penses?
C'est
Intéressant (e)
Pratique
Utile
Inutile
Facile
Difficile
Ennuyeux (se)
Passionnant (e)
Creatif (ve)
Important (e)
Trop
Très
Assez

What is your favourite subject?
English
Spanish
French
Drama
Art
PE
Computer Science
Music
Technology
Geography
History
RE
PSHE
Maths
Science
Humanities

What do you think?
It is
Interesting
Practical
Useful
Useless
Easy
Difficult
Boring
Exciting
Creative
Important
Too
Very
Quite

Comment est ton uniforme scolaire?
Je porte
Une veste/ un blazer
Un pull
Une chemise
Un t-shirt
Une cravate
Une jupe
Des chaussettes
Un pantalon
Des chaussures
Un collant

Moche
Beau/belle
(In)confortable
Cher
Pas cher
À la mode
Démodé

What is your school uniform like?
I wear..
Blazer
Jumper
Shirt
T-shirt
Tie
Skirt
Socks
Trousers
Shoes
Tights

Ugly
Pretty
(un) comfortable
Expensive
Cheap
Fashionable
Unfashionable

La journée scolaire
Je quitte la maison
Je vais au collège
Les cours commencent..
Les cours terminent.
Ça dure
La récréation
L'heure du déjeuner
Le matin
L'après-midi

The school day
I leave home
I go to school
Classes start...
Classes end...
It lasts...
Break
Lunch
In the morning
In the afternoon

Quelles sont les règles?
On ne doit pas
On ne peut pas
Il faut
Il est interdit de
Écouter en classe
Utiliser son portable en classe
Porter les bijoux
Porter le maquillage
Porter les baskets
Manquer les cours
Être à l'heure
Mâcher du chewing-gum
Faire ses devoirs

What are the rules?
You must(n't)
You can('t)
You have to
It is forbidden
To listen in class
To use your phone in class
To wear jewellery
To wear make up
To wear trainers
To miss lessons
To be on time
To chew gum
To do homework

Qu'est-ce que tu voudrais faire dans le futur?
Réussir mes examens
Recevoir des bonnes notes
Faire un apprentissage
Chercher du travail
Faire du bénévolat
Voyager le monde
Avoir des enfants
me marier
Apprendre à conduire

Médecin
Professeur
Avocat (e)
Mécanicien (ne)
Plombier (ière)
Pompier (ière)
Veterinaire
Coiffeur (euse)

What do you want to do in the future?
To pass my exams
To get good grades
To do an apprenticeship
To look for a job
To work as a volunteer
To travel the world
To have children
To get married
To learn how to drive

Doctor
Teacher
Lawyer
Mechanic
Plumber
Firefighter
Vet
Hairdresser

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9.11 My school
Knowledge Organiser

School – Subjects, uniform and time
Future plans & jobs

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The present tense	ER verb	IR verb	RE verb
Je (I)	-e	-is	-s
tu (you)	-es	-is	-s
Il/Elle/On (he/she/one)	e	-it	-
Nous (we)	-ons	-issons	-ons
Vous (you all)	-ez	-issez	- ez
Ils /Elles (they)	-ent	-issent	-ent

The future tense in French
You can talk about the future by using the **near future** tense.
Use part of the verb ALLER and the infinitive to say what you are **going** to do.

Ce soir, je vais jouer au tennis. This evening I am going to play tennis.
Demain, Paul va faire un gâteau. Tomorrow Paul is going to make a cake.

You can also use the following phrases with an infinitive to refer to the future.
Je veux= I want
Je voudrais = I would like
J'aimerais = I would like
J'espère = I hope

Adjectives describe nouns e.g., a **black** blazer.

In French, adjectives normally go after the words they are describing e.g., une chemise bleue (a blue shirt) and they must agree with the noun they are describing.

Adjectives must agree with the noun (or pronoun) they describe in gender and in number.

This means that if the noun an adjective describes is feminine, the adjective must be feminine e.g., une veste noire (a black blazer).

If that same noun is also plural, the adjective will be feminine **AND** plural as well e.g., les chaussettes noires (black socks).

Comparatives – to express more or less than
 ... est plus + adjective + que - is more...adjective...than
... est moins + adjective + que - is less...adjective... than
 ... est aussi + adjective + que – is as...adjective...as
For example:
L'anglais est plus intéressant que la géographie. (English is more interesting than Geography)
L'histoire est moins active que l'E.P.S. (History is less active than PE)
Le français est aussi difficile que les maths. (French is as difficult as maths).

Geography

1	3 strands of sustainability	Sustainability is made up of three key strands, economic a focus on cost and economic impacts, social impacts on people, environmental a focus on landscape and nature
2	BedZED	The Beddington Zero Energy Development an environmentally-friendly housing development in Wallington, a suburb of London.
3	European Green Capital	The European Green Capital Award was developed to promote and reward local authorities who improve the environment, and their high level of commitment to progress, to encourage cities to commit to further action, and to showcase and exchange of best practice among European cities.
4	Greenpeace	A movement of people who are passionate about defending the natural world from destruction. Our vision is a greener, healthier and more peaceful planet, one that can sustain life for generations to come.
5	Incineration	Involves burning waste at very high temperatures to eventually reduce the amount of waste and then produce electricity.
6	Landfill	Are hollows in the ground where rubbish is dumped.
7	Masdar City	Masdar City, Abu Dhabi, is one of the world's most sustainable urban communities, a low-carbon development made up of a rapidly growing clean-tech cluster, business free zone and residential neighbourhood with restaurants, shops and public green spaces.
8	MDGs	Millennium Development Goals - 8 goals that UN Member States have agreed to try to achieve by the year 2015. Replaced by SDGs.

9	Municipal waste	Waste collected by councils (or similar). Business waste eg from offices and schools would also be classed as this.
10	Net zero carbon	A target of completely negating the amount of greenhouse gases produced by human activity, to be achieved by reducing emissions and implementing methods of absorbing carbon dioxide from the atmosphere.
11	Recycling	The process of converting waste materials into new materials and objects
12	SDGs	Sustainable Development Goals – 17 goals defined by the United Nations in 2015. These goals call for action by all countries and aim to end poverty, fight inequality and injustice, and tackle climate change.
13	Sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs
14	Sustainable Housing	Housing which is energy efficient by itself, environmentally healthy, respectful for the natural environment, comfortable for family life, in other words to be sustainable designed, built of green or recycled materials, and this house should use alternative energy resources.
15	UN	United Nations - An intergovernmental organisation of 193 member states formed after WWII. Aims to secure international peace, eliminate poverty and protect human rights
16	UNDP	United Nations Development Programme - works in about 170 countries and territories, helping to eradicate poverty, reduce inequalities and exclusion, and build resilience. Works on the SDGS
17	Urban Development	A group of buildings, often houses built together
18	Waste	Items discarded as no longer useful, usually disposed of (thrown away)

9.11 My school
Knowledge Organiser

School – Subjects, uniform and time
Future plans & jobs

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infinitives	machen	können	RE verb
ich(I)	mache	kann	lerne
du (you)	machst	kannst	lernst
er/sie/man (he/she/one)	macht	kann	lernt
Wir (we)	machen	können	lernen
ihr (you all)	macht	könnt	lernt
Sie (you) /sie (they)	machen	können	lernen

The future tense in German

You can talk about the future by using the present tense + a future time phrase or use the future tense which is:-
Use part of the verb werden and the infinitive to say what you are going to do/will do

Heute abend spiele ich Tennis. This evening I am going to play tennis.
Morgen wird Paul Kuchen essen. Tomorrow Paul will eat cake.

You can also use the following phrases with an infinitive to refer to the future.
Ich will= I want
Ich möchte = I would like

Adjectives describe nouns e.g., a **black** blazer.

In German, adjectives go before the words they are describing e.g., eine blaue Krawatte (a blue tie) and they must agree with the noun they are describing.

Adjectives must agree with the noun (or pronoun) they describe in gender and in number.

This means that if the noun an adjective describes masculine, the adjective must be masculine e.g., einen schwarzen Blazer (a black blazer).

If the noun is plural, the adjective will be plural as well e.g., schwarze Socken (black socks).

Comparatives – to express more or less than
Add 'er' to the adjective, but in words of more than 1 syllable an umlaut is sometimes added too. You must also add **als = than**
klein = kleiner(smaller)   lang = länger
wichtig = wichtiger (more important)
Mathe ist interessanter als Deutsch
mehr = more/weniger = fewer/besser = better

German

9.11 My school – vocab. list

Was ist dein Lieblingsfach? / Favourtite Subject.

Was ist dein Lieblingsfach?	Favourtite Subject.
Englisch	English
Spanisch	Spanish
Französisch	French
Theater	Drama
Kunst	Art
Sport	PE
Informatik	Computer Science
Musik	Music
Technologie	Technology
Erdkunde	Geography
Geschichte	History
Religion	RE
Mathe/Mathematik	Maths
Naturwissenschaften	Science
Deutsch	German

Wie findest du? / What do think about?

Wie findest du?	What do think about?
Es ist	It is
interessant	Interesting
praktisch	Practical
nützlich	Useful
nutzlos	Useless
einfach	Easy
schwierig	Difficult
langweilig	Boring
spannend	Exciting
kreativ	Creative
wichtg	Important
zu	Too
sehr	Very
ziemlich	Quite

Beschreib deine Schuluniform / Describe your school uniform

Beschreib deine Schuluniform	Describe your school uniform
Ich trage	I wear..
eine Jacke/einen Blazer	Blazer
einen Pullover	Jumper
ein Hemd	Shirt
ein T-Shirt	T-shirt
eine Krawatte/einen Schlips	Tie
einen Rock	Skirt
Socken	Socks
eine Hose	Trousers
Schuhe	Shoes
Strumpfhose	Tights
hässlich	Ugly
schön	Pretty
(un)bequem	(un) comfortable
teuer	Expensive
billig	Cheap
modisch	Fashionable
altmodisch	Unfashionable

Der Schultag / The school day

Der Schultag	The school day
Ich verlasse die Schule	I leave home
Ich gehe zur Schule	I go to school
Die Stunden beginnen	Lessons start...
Die Schule ist...zu Ende	School ends...
Es dauert	It lasts...
Die Pause	Break
Die Mittagspause	Lunch break
Morgens	In the morning
Nachmittags	In the afternoon

Was sind die Schulregeln? / What are the rules?

Was sind die Schulregeln?	What are the rules?
Man darf(nicht)	You are allowed
Man kann (nicht)	You can('t)
Man muss	You have to
Es ist verboten	It is forbidden
Im Unterricht zuhören	To listen in class
Ein Handy im Klassenzimmer haben	To have a phone in class
Schmuck tragen	To wear jewellery
Make –up tragen	To wear make up
Sportschuhe tragen	To wear trainers
Unterricht verpassen	To miss lessons
pünktlich sein	To be on time
Kaugummi kauen	To chew gum
Hausaufgaben machen	To do homework

Was möchtest du in der Zukunft machen? / What do you want to do in the future?

Was möchtest du in der Zukunft machen?	What do you want to do in the future?
Prüfungen bestehen	To pass my exams
gute Noten haben	To get good grades
eine Lehre machen	To do an apprenticeship
einen Job suchen	To look for a job
freiwillig arbeiten	To work as a volunteer
reisen	To travel
Kinder haben	To have children
heiraten	To get married
fahren lernen	To learn how to drive
Arzt(-in)	Doctor
Lehrer (in)	Teacher
Rechtsanwalt (in)	Lawyer
Mechaniker (in)	Mechanic
Klempner	Plumber
Feuerwehrmann/frau	Firefighter
Tierarzt(in)	Vet
Friseur/Friseuse	Hairdresser

Context

1960's and 70's Britain is often regarded as a period of revolution and change. During this topic we are going to assess how much change occurs during this time period for LGBTQ+, women and Black people.

History – Year 9 Knowledge Organiser Term 5

MET

How much did life change for LGBTQ+, women and Black people during the 1960's and 70's?

Key Events

1	**1961** – The **Contraceptive pill** available for married women for the first time on the NHS.
2	**30th April – 17th September 1963** – **Bristol Bus Boycott** took place to challenge discrimination on Bristol's buses.
3	**1965** – **Race Relations Act** passed, first law to ban racial discrimination in public places and made it a criminal offence.
4	**1967** – **Sexual Offences Act** was passed which decriminalised private homosexual acts between men aged over 21.
5	**1967** – **Family Planning Act** passed, contraception available to all through the NHS.
6	**1968** – The first **St Pauls Carnival** took place in Bristol.
7	**7th June 1968** – 187 women sewing machinists at the Ford Motor Company plant in **Dagenham**, Essex, went on strike.
8	**9 August 1970** – Black Power activists march against police harassment of the Black community in Notting Hill, London.
9	**1 July 1972** - First **Pride march** took place in the UK, approximately 2000 protesters marched in **London**.

Public Attitudes

Government/Law

Factors that effect change

Media

Key Individuals/Groups

Key Terms

10	activism	Any action of campaigning to bring about change. Usually social or political change.
11	civil rights	The rights of citizens to political and social freedom and equality.
12	decriminalisation	To no longer to treat something as illegal or as a criminal offence.
13	equality	The state of being equal, especially in status, rights, or opportunities.
14	legalisation	To make something that was previously illegal allowed by law.
15	liberation	To set someone or something free. For example from oppression.
16	revolution	To overthrow a government or social order, in favour of a new system.
17	Second Wave Feminism	Feminists who sought to change social and sexual discrimination.

Key Skills

18	Change and continuity.	What changed and continued, stayed the same, for each group during the 60's and 70's? Why? How quickly did things change? To what extent did they change?

1968 - British Black Panthers BBP	1970 - Gay Liberation Front GLF	c.1960's – Women's Liberation Movement WLM	1978 - Organisation of Women of Asian and African Descent OWAAD	Darcus Howe *BBP*	Olive Morris *BBP*	Stella Dadzie *OWAAD*	Roy Hackett *Bristol Bus Boycott*	Paul Stephenson *Bristol Bus Boycott*	Aubrey Walter *GLF*	Bob Mellors *GLF*

What do I need to be able to do?

By the end of this unit you should be able to:
- Generate a sequence from term to term or position to term rules
- Recognise arithmetic sequences and find the nth term
- Recognise geometric sequences and other sequences that arise

Keywords

Sequence: items or numbers put in a pre-decided order
Term: a single number or variable
Position: the place something is located
Linear: the difference between terms increases or decreases (+ or −) by a constant value each time
Non-linear: the difference between terms increases or decreases in different amounts, or by x or ÷
Difference: the gap between two terms
Arithmetic: a sequence where the difference between the terms is constant
Geometric: a sequence where each term is found by multiplying the previous one by a fixed non zero number

Linear and Non Linear Sequences

Linear Sequences – increase by addition or subtraction and the same amount each time

Non-linear Sequences – do not increase by a constant amount – quadratic, geometric and Fibonacci
- Do not plot as straight lines when modelled graphically
- The differences between terms can be found by addition, subtraction, multiplication or division

Fibonacci Sequence – look out for this type of sequence

0   1   2   3   5   8 ….

Each term is the sum of the previous two terms

Sequences from algebraic rules

3n + 7 → This is substitution!

This will be linear – note the single power of n. The values increase at a constant rate

3n² + 7

This is not linear as there is a power for n

2n – 5 → Substitute the number of the term you are looking for in place of n

Checking for a term in a sequence

Is 201 in the sequence 3n – 4?

Algebraic rule → 3n – 4 = 201 ← Term to check

Form an equation

3n – 4 = 201

Solving this will find the position of the term in the sequence.
ONLY an integer solution can be in the sequence.

eg
1st term = 2 (1) – 5 = – 3
2nd term = 2 (2) – 5 = – 1
100th term = 2 (100) – 5 = 195

Sequence in a table and graphically

Position: the place in the sequence

1   2   3

3   5   7

Term: the number or variable (the number of squares in each image)

In a table

Position	1	2	3
Term	3	5	7

+2 +2 +2

"The term in position 3 has 7 squares"

Graphically

Because the terms increase by the same addition each time this is **linear** – as seen in the graph

Value of term

Position

Misconceptions and comparisons

Complex algebraic rules

2n²

2 times whatever n squared is

eg
1st term = 2 x 1² = 2
2nd term = 2 x 2² = 8
100th term = 2 x 100² = 20000

(2n)²

2 times n then square the answer

eg
1st term = (2 x 1)² = 4
2nd term = (2 x 2)² = 16
100th term = (2 x 100)² = 40000

n (n + 5)

eg
1st term = 1(1 + 5) = 6
2nd term = 2 (2 + 5) = 14
100th term = 100 (100 + 5) = 10500

You don't need to expand the expression

H Finding the algebraic rule

This is the 4 times table

4n ⟶ 4, 8, 12, 16, 20….

4n ⟶ 7, 11, 15, 19, 22

This has the same constant difference – but is 3 more than the original sequence

4n + 3

This is the constant difference between the terms in the sequence

4n + 3

This is the comparison (difference) between the original and new sequence

Compound Measures

Topic/Skill	Definition/Tips	Example
Metric System	A system of measures based on: - the metre for length - the kilogram for mass - the second for time **Length: mm, cm, m, km** **Mass: mg, g, kg** **Volume: ml, cl, l**	*1 kilometres = 1000 metres* *1 metre = 100 centimetres* *1 centimetre = 10 millimetres* *1 kilogram = 1000 grams*
Imperial System	A system of weights and measures originally developed in England, usually based on human quantities **Length: inch, foot, yard, miles** **Mass: lb, ounce, stone** **Volume: pint, gallon**	*1lb = 16 ounces* *1 foot = 12 inches* *1 gallon = 8 pints*
Metric and Imperial Units	Use the unitary method to convert between metric and imperial units.	*5 miles ≈ 8 kilometres* *1 gallon ≈ 4.5 litres* *2.2 pounds ≈ 1 kilogram* *1 inch = 2.5 centimetres*
Speed, Distance, Time	Speed = Distance ÷ Time Distance = Speed x Time Time = Distance ÷ Speed	Speed = 4mph Time = 2 hours Find the Distance. $D = S \times T = 4 \times 2 = 8$ miles Remember the correct units.
Density, Mass, Volume	Density = Mass ÷ Volume Mass = Density x Volume Volume = Mass ÷ Density	Density = 8kg/m³ Mass = 2000g Find the Volume. $V = M \div D = 2 \div 8 = 0.25m^3$ Remember the correct units.
Pressure, Force, Area	Pressure = Force ÷ Area Force = Pressure x Area Area = Force ÷ Pressure	Pressure = 10 Pascals Area = 6cm² Find the Force $F = P \times A = 10 \times 6 = 60 N$ Remember the correct units.

YEAR 9 – REASONING WITH ALGEBRA... Straight Line Graphs

What do I need to be able to do?

By the end of this unit you should be able to:
- Compare gradients
- Compare intercepts
- Understand and use $y = mx + c$
- Find the equation of a line from a graph
- Interpret gradient and intercepts of real-life graphs

Keywords

Gradient: the steepness of a line

Intercept: where two lines cross. The y-intercept where the line meets the y-axis

Parallel: two lines that never meet with the same gradient

Co-ordinate: a set of values that show an exact position on a graph

Linear: linear graphs (straight line) – linear common difference by addition/ subtraction

Asymptote: a straight line that a graph will never meet

Reciprocal: a pair of numbers that multiply together to give 1

Perpendicular: two lines that meet at a right angle.

Compare Gradients

$y = mx + c$

The coefficient of x (the number in front of x) tells us the gradient of the line

The greater the gradient – the steeper the line

Parallel lines have the same gradient

Positive gradients

Negative gradients

Compare Intercepts

$y = mx + c$

The value of c is the point at which the line crosses the y-axis. Y intercept

The coordinate of a y intercept will always be at (0,c)

Lines with the same y-intercept cross in the same place

Lines parallel to the axes Ⓡ

Lines parallel to the y axis take the form x
- a and are vertical

Lines parallel to the x axis take the form y
- a and are horizontal

All the points on this line have a x coordinate of 10

All the points on this line have a y coordinate of -2

eg (3, -2) (7, -2) (-2, -2) all lay on this line because the y coordinate is -2

'a' can be ANY positive or negative value including 0

Plotting y = mx + c graphs Ⓡ

$y = 3x - 1$

3 x the x coordinate then – 1

x	-3	0	3
y	-10	-1	8

Draw a table to display this information

This represents a coordinate pair (-3, -10)

You only need two points to form a straight line

Plotting more points helps you decide if your calculations are correct (if they do make a straight line)

Remember to join the points to make a line

y = mx + c

$y = mx + c$

The coefficient of x (the number in front of x) tells us the gradient of the line

The value of c is the point at which the line crosses the y-axis. Y intercept

y and x are coordinates

The equation of a line can be rearranged. E.g
$y = c + mx$
$c = y - mx$

Identify which coefficient you are identifying or comparing

Real life graphs

A plumber charges a £25 callout fee and then £12.50 for every hour. Complete the table of values to show the cost of hiring the plumber.

Time (h)	0	1	2	3
Cost (£)	£25			£125

In real life graphs like this values will always be positive because they measure distances or objects which cannot be negative.

To represent direct proportion the graph must start at the origin

The y-intercept shows the minimum charge. The gradient represents the price per mile.

Direct Proportion graphs

A box of pens costs £2.30 Complete the table of values to show the cost of buying boxes of pens.

Boxes	0	1	2	3	8
Cost (£)	0	£2.30			

When you have 0 pens this has 0 cost. The gradient shows the

Find the equation from a graph

The Gradient
$\frac{6}{3} = 2$

The y-intercept (0,1)

$y = 2x + 1$

The direction of the line indicates a positive gradient

Positive gradients

Negative gradients

Year 9– Film Music– Knowledge Organiser

Key Terms 1–Film Music

Specially Composed Music	Some music is composed specially for a film. Much of this is broadly classical in style.
Borrowed Music	Some music used in film soundtracks was composed for other purposes but is adopted for use in a film because it fits the film-maker's intentions.
Cue Sheet	A detailed listing of musical cues matching the visual action of a film so that composers can time their music accurately to match the visual images.
Diagetic	Music that is part of the action: the characters in the film can hear it.
Non-Diagetic	Music that is not part of the action: the characters in the film cannot hear it. It is just for the audience.
Leitmotif	A short melody that is associated with a character or idea in a film. E.g, James Bond has his own leitmotif.
Sound-track	The word "soundtrack" can often mean a commercial recording of a collection of music and songs from a film sold individually as an audio CD.
Theme Song	Sometimes a song, usually a pop song, is used as a theme song for a film. This helps with marketing and publicity
Under Score	Where music is played at the same time as the action or dialogue.

Key Terms 2–Music Theory

Bass Clef	A musical symbol indicating to performers to perform the notes and a certain (low) pitch
Chord	A series of notes played together at the same time e.g. the James Bond Leitmotif
Concord	A chord where the notes sound 'comfortable' or 'happy' with each other e.g. chord of C major
Discord	A chord where the notes sound like they 'clash' together – often producing a 'tense' feel
Crescendo	Gradually getting louder
Pitch	Horror movie composers often use extremes of **high** and **low** pitch when creating musical soundtracks to create a feeling of 'tension' and 'suspense'
Repeat Marks	A musical symbol made up of two dots and two bar lines, telling the performer to go back to the beginning (or to the previous repeat marks) and repeat the music

John Williams   **Rachel Portman**   **Kathryn Bostic**

Key Terms 3–Music Technology

Syncing/ Sync Point	A precise moment where the timing of the music needs to fit with the action.
Timecode	A time synchronisation tool that every film maker must use to make sure that the visuals, dialogue and music are all in time.
MIDI (Musical Instrument Digital Interface)	MIDI connects devices that make and control sound — such as synthesizers, samplers, and computers — so that they can communicate with each other.
DAW (Digital Audio Workstation)	A comprehensive piece of software that allows your computer to record, edit, mix and produce music. Ableton live is a popular DAW.

You could listen to some music written by the three composers above whilst doing your homework

PE

Carbohydrates are used within energy production

Fats also assist in energy production but also insulate the body

Protein is used for muscle growth and repair
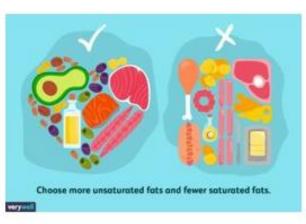
Fibre supports the digestive system

Vitamins are important for prevention of disease and functioning of our metabolism. Minerals are essential for health and chemical reactions in our body
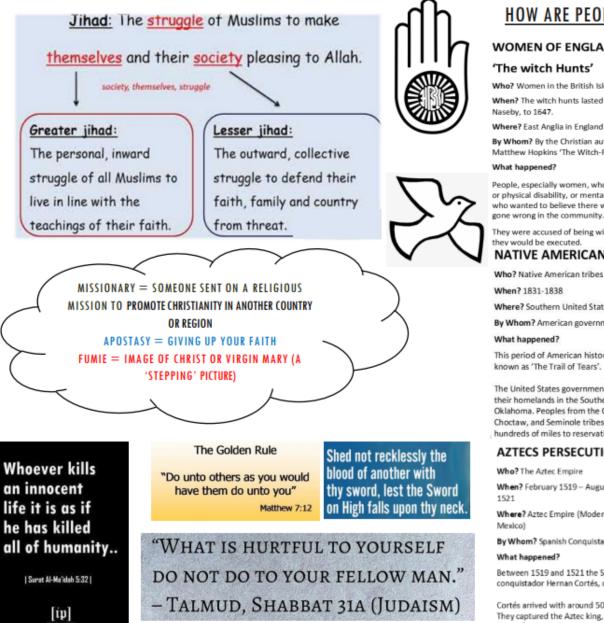
What happens when people disagree?

Key Word		Definition
Persecution		Cruel or unfair treatment, especially because of race or religious or political beliefs.
Schism		A tear or split. In religion it is when the religion splits into opposing groups.
Denomination or sect		A branch or group within a religion. For example, Sunni and Shia in Islam, or Catholic and Protestant in Christianity.
Islamophobia		The fear of, hatred of, or prejudice against the religion of Islam or Muslims in general.
Homophobia		Dislike of or prejudice against gay people.
Holocaust		Also known as the Shoah, between 1941 and 1945, this was the genocide of European Jews during World War II.

What's the difference between religion and politics?

Religion **Both** **Politics**

Religion = a system of faith and worship

Politics = the influence of governments or other groups that hold power.

Place these words on a venn diagram.		
Voting	Prayer	Crime and punishment
Beliefs	Worship	Government
God	leaders	Laws

Jihad: The struggle of Muslims to make themselves and their society pleasing to Allah.

society, themselves, struggle

Greater jihad: The personal, inward struggle of all Muslims to live in line with the teachings of their faith.

Lesser jihad: The outward, collective struggle to defend their faith, family and country from threat.

MISSIONARY = SOMEONE SENT ON A RELIGIOUS MISSION TO PROMOTE CHRISTIANITY IN ANOTHER COUNTRY OR REGION

APOSTASY = GIVING UP YOUR FAITH

FUMIE = IMAGE OF CHRIST OR VIRGIN MARY (A 'STEPPING' PICTURE)

Whoever kills an innocent life it is as if he has killed all of humanity..

| Surat Al-Ma'idah 5:32 |

[ip]
THE ISLAM POST

The Golden Rule
"Do unto others as you would have them do unto you"
Matthew 7:12

Shed not recklessly the blood of another with thy sword, lest the Sword on High falls upon thy neck.

"WHAT IS HURTFUL TO YOURSELF DO NOT DO TO YOUR FELLOW MAN."
– TALMUD, SHABBAT 31A (JUDAISM)

HOW ARE PEOPLE PERSECUTED?

WOMEN OF ENGLAND PERSECUTION

'The witch Hunts'

Who? Women in the British Isles

When? The witch hunts lasted from 1645, just after the Battle of Naseby, to 1647.

Where? East Anglia in England

By Whom? By the Christian authorities & a man called Matthew Hopkins 'The Witch-Finder General'

What happened?

People, especially women, who were different in any way, through age, or physical disability, or mental disability, were picked out by those who wanted to believe there was some specific reason why things had gone wrong in the community.

They were accused of being witches & were put on trial. If found guilty, they would be executed.

NATIVE AMERICAN PERSECUTION

Who? Native American tribes

When? 1831-1838

Where? Southern United States

By Whom? American government

What happened?

This period of American history is known as 'The Trail of Tears'.

The United States government forced Native Americans to move from their homelands in the Southern United States to Indian Territory in Oklahoma. Peoples from the Cherokee, Muscogee, Chickasaw, Choctaw, and Seminole tribes were marched at gunpoint across hundreds of miles to reservations.

AZTECS PERSECUTION

Who? The Aztec Empire

When? February 1519 – August 13, 1521

Where? Aztec Empire (Modern day Mexico)

By Whom? Spanish Conquistadores

What happened?
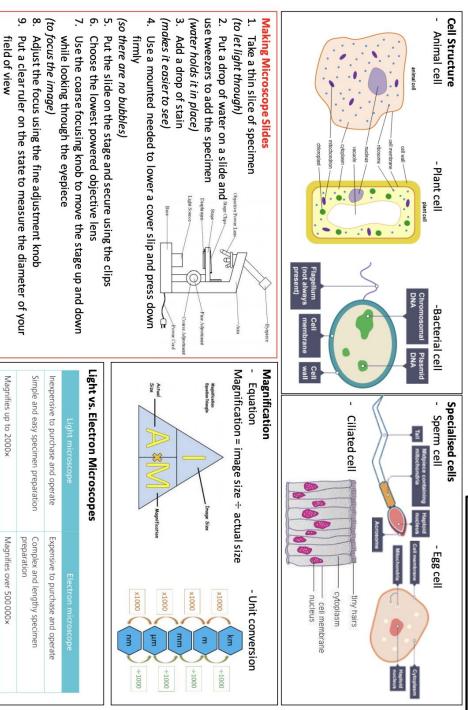
Between 1519 and 1521 the Spanish, under the leadership of conquistador Hernan Cortés, conquered the Aztec Empire.

Cortés arrived with around 500 men, 16 horses, and some cannon. They captured the Aztec king, Montezuma II, & killed him. Fighting began & a second Aztec king was killed. The Spanish conquistadores took the capital city Tenochtitlan (now Mexico City).

EDEXCEL 9-1 Combined Science | Biology Topic 1 – Key Concepts | Required Knowledge

Cell Structure

- Animal cell
- Plant cell

animal cell

- cell wall
- cell membrane
- cytoplasm
- ribosome
- nucleus
- vacuole
- mitochondrion
- chloroplast

plant cell

- Bacterial cell

Flagellum (not always present)

- Chromosomal DNA
- Cell membrane
- Plasmid DNA
- Cell wall

Specialised cells

- Sperm cell
- Egg cell
- Unit conversion
- Ciliated cell

Sperm cell: Tail, Midpiece containing mitochondria, Haploid nucleus, Acrosome

Egg cell: Cell membrane, Mitochondria, Haploid nucleus, Cytoplasm

Ciliated cell: tiny hairs, cell membrane, cytoplasm, nucleus

Magnification

- Equation
- Magnification = image size ÷ actual size

$$I = A \times M$$

Actual Size, Magnification, Image Size

Light vs. Electron Microscopes

Light microscope	Electron microscope
Inexpensive to purchase and operate	Expensive to purchase and operate
Simple and easy specimen preparation	Complex and lengthy specimen preparation
Magnifies up to 2000x	Magnifies over 500 000x
Specimens may be living or dead	Specimens are dead, and must be fixed in a plastic material

Unit conversion: nm, µm, mm, m, km (x1000, ÷1000)

Making Microscope Slides

1. Take a thin slice of specimen
   (to let light through)
2. Put a drop of water on a slide and use tweezers to add the specimen
   (water holds it in place)
3. Add a drop of stain
   (makes it easier to see)
4. Use a mounted needle to lower a cover slip and press down firmly
   (so there are no bubbles)
5. Put the slide on the stage and secure using the clips
6. Choose the lowest powered objective lens
7. Use the coarse focusing knob to move the stage up and down while looking through the eyepiece
   (to focus the image)
8. Adjust the focus using the fine adjustment knob
9. Put a clear ruler on the state to measure the diameter of your field of view
   (this will allow you to estimate the size of the specimen)
10. Repeat focusing with higher-powered objective lens if needed

Microscope labels: Objective Power Lens, Stage Clips, Diaphragm, Stage, Light Source, Fine Adjustment, Arm, Base, Power Cord, Coarse Adjustment, Eyepiece

EDEXCEL 9-1 Combined Science | Biology Topic 1 – Key Concepts | Required Knowledge

Enzyme Structure

Substrates, Enzyme, Enzyme-substrate complex, Enzyme, Product

As the enzyme experiences conditions where things are split apart or joined together. Enzymes only work with one substrate, they have a high specificity due to the shape of the active site. The substrate's shape has to match the active site's shape exactly. This is called the 'lock and key' model.

Enzymes speed up chemical reactions where things are split apart or joined together. Enzymes only work with one substrate, they have a high specificity due to the shape of the active site. The substrate's shape has to match the active site's shape exactly. This is called the 'lock and key' model.

Factors affecting enzymes

Ethanol production graph (Substrate concentration vs Ethanol production): Fixed amount of enzyme present, Saturation of enzyme with substrate

Rate of enzyme activity vs Temperature (°C) 0-45: Optimum temperature

Increasing enzyme activity vs pH 0-13: Optimum pH

As the enzyme experiences conditions away from the optimum the shape of the active site begins to change meaning the substrate can't fit as well and less reactions will occur.

As the enzyme experiences warmer conditions it (and the substrate) will move more quickly, there will be more collisions and more reactions. After the optimum the heat causes the shape of the active site to change in the same way as pH.

As more substrate is added the more collisions there will be with available enzymes and more reactions, up until a certain (saturation point), where all of the enzymes are already working at their maximum rate.

Specific digestive enzymes

Carbohydrase: Starch → Glucose

Protease: Protein → Amino acids

Lipase: Lipids → Fatty acids + glycerol

All of these digestive processes can happen in reverse = synthesis.

Transport

Diffusion
Movement of particles from high concentration to low concentration e.g. carbon dioxide into plant leaves

Osmosis
Movement of water particles across a partially permeable membrane from high water concentration to low water concentration e.g. water into plant roots

Active Transport
Movement of particles across a membrane from high concentration to lower concentration, using energy transferred during respiration e.g. nitrates into plant roots

EDEXCEL 9-1 Combined Science | Biology Topic 1 – Key Concepts | Required Knowledge

Investigating Enzymes

The enzyme amylase catalyses the break down of the starch into maltose (sugar). The enzyme is added to buffer solutions of different pHs. The time it takes for the enzyme to work is calculated by continuously sampling the mixture and adding it to iodine. Only when all of the starch has been broken down will the iodine stop changing colour. Calculation needed: Rate = 1 ÷ time taken.

1. Prepare sucrose solutions of 5 concentrations
2. Measure the mass of potato cylinders
3. Put one cylinder into a test tube of each solution
4. Leave for 40 mins
5. Pat dry and reweigh

Results
Calculate percentage change in mass.

Percentage change = final mass – initial mass × 100 / initial mass

mixture sampled every 10 seconds

amylase, starch and buffer solution

dropping pipette

drop of iodine solution

spotting tile

Investigating Osmosis

The point where the line crosses the x-axis means the concentration inside and outside of the potato cylinder were the same.

Change in mass (%) vs Concentration of sucrose in mol/dm³ graph (0.2, 0.4, 0.6, 0.8, 1.0, 1.2)

These cylinders gained mass, water conc. was higher than in cylinders, water was drawn in

These cylinders lost mass, water conc. was lower than in cylinders, water was drawn out

EDEXCEL 9-1 Biology| **Topic 1 – Key Concepts** | Required Knowledge

CPG Biology: pages 19-20

Testing for Biological Molecules
- Testing for reducing sugars eg. glucose
  - Add Benedict's reagent (blue) to the sample, heat in a water bath to 75°C,
  - Higher the concentration of sugars, the further along the scale the coloured precipitate formed will be
- Testing for starch
  - Iodine solution added to the sample
  - Colour change from orange/brown to blue/black is a positive result

- Testing for lipids
  - Shake the substance with ethanol for 1 minute,
  - Pour the solution into water
  - Lipids present will precipitate out and show up as a milky emulsion

- Testing for protein
  - Biuret test, add few drops of potassium hydroxide then add copper (II) sulfate
  - Protein present = purple
  - No protein present = stay blue

Food sample
Biuret reagent

Positive result   Negative result

or

Energy in food
- Calorimetry experiment

Burning food held on mounted needle
Thermometer
Water
food to be tested
coffee can
cork
water
glass rod
smaller metal can

- Use first equation to calculate the amount of energy in the food
  Energy (J) = mass of water (g) x temperature change of water (°C) x 4.2
- Use second calculation to get a value of energy per gram of food
  Energy per gram of food (J/g) = energy in food (J) ÷ mass of food burnt (g)
- Using a calorimeter reduce the energy transferred to the environment during this experiment

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EDEXCEL 9-1 Combined Science| **Biology Topic 2 – Cells and Control** | Required Knowledge

CPG F & H tier: pages 20-22. 26.

Growth (p21)
- Measure growth using percentage change
  Percentage change = $\frac{Change}{Original}$ × 100
- Measure growth measurements which divide a from a large group into 100 equal sections →
- Or using percentile charts

Weight (kg)
Growth chart for boys, aged 0-1 years
Age (months)
These numbers indicate what percentile each line on the chart represents.

E.g. a three-month-old who weighs 7 kg is just above 75th percentile — roughly 75% of three-month-olds are lighter and 25% are heavier.

Growth (p21)
- Type of cell division used for growth and repair

growth
animals
plants
division of stem cells
division of stem cells
cell elongation
cell differentiation
cell differentiation

Differentiation = formation of specialised cells

Stem Cells (p22)
What is a stem cell?
A single cell that can
replicate itself, or...
differentiates into many cell types.

- Embryonic stem cells found in embryos can differentiate into any specialised cell
- Adult stem cells are limited in the type of cell they can differentiate into
- Lots of potential uses
- Ethical issues
- Plant stem cells called meristem cells are found in shoots and roots and can differentiate into any cell type

Mitosis (p20)
- Type of cell division used for growth and repair

Interphase
Prophase
Metaphase
Anaphase
Telophase

Parent Cell
1
2
3
4
4
Daughter Cells

- Produces 2 genetically identical daughter cells from 1 parent cell

Interphase – cell makes extra sub-cellular parts. DNA replication occurs, chromosome copies stay attached.
Prophase – nucleus breaks down and spindle fibres appear. Chromosomes become visible
Metaphase – chromosomes use spindle fibres to line up along the middle of the cell.
Anaphase – chromosome copies are separated and move **apart** to each end of the cell using spindle fibres.
Telophase – a new nuclear membrane forms around each set of chromosomes.
Cytokinesis – new cell membrane forms to separate the 2 daughter cells.

IPMATC

Meiosis (p26)
- Type of cell division used to form gametes (sperm and egg cells)
- Produces 4 genetically different daughter cells from 1 parent cell
- The chromosomes are copied in the same way as mitosis
- Pairs of copied chromosomes line up along the middle of the cell
- The pairs separate
- The chromosomes line up along the middle of the cell again
- The copies within each pair then separate
- This leaves 4 haploid cells (half of the original number of chromosomes in this diagram 1 chromosome instead of 2)

EDEXCEL 9-1 Biology | Topic 2 – Cells and Control | Required Knowledge

CPG Biology: pages 27-30.

Reflexes (p29)
- An automatic response to a stimulus

- Direction of nerve impulse

1. The stimulus is detected by a receptor cell in the skin.
- Nerve impulse are carried along a neuron to the c nervous system.
2. A relay neuron carries the impulses from the sensory neuron to the motor neuron.
3. Nerve impulses are carried along a motor neuron to an effector.
4. — stimulus (pin)
5. The effector (muscle in foot) carries out a response to the stimulus (contracts).
- spinal cord

Synapses (p29)
A **synapse** is a junction between two neurones across which electrical signals must pass.

Neurotransmitter molecules diffuse from vesicles towards the neurotransmitter receptors, moving from an area of high concentration to low concentration.

- neurotransmitter
- neurotransmitter receptor
- synaptic cleft
- nerve impulse

Don't forget to try the revision questions for topics 1 & 2 on page 31!

EDEXCEL 9-1 Combined Science | Biology Topic 5 – Health, Disease and Development of Medicine

CPG F & H tier: pages 39-41 .

Health (p39)
"A state of complete physical, mental, and social well-being, not just the absence of disease or infirmity"

- health
- physical well-being
- mental well-being
- social well-being
- such as how you feel about yourself
- such as how well you get on with other people
- such as sleeping well and being free from disease

Pathogens (p39)
Organisms such as viruses, bacteria, fungi and protists (single celled organisms with a nucleus) which cause diseases

- bacteria
- virus
- fungi
- protist

STIs (p40)
- Infections spread through sexual contact (including sexual intercourse)
- Chlamydia: a bacterium, can cause infertility in men and women but doesn't always cause symptoms, spread reduced by using a condom and screening individuals so they can be treated, can also be passed to babies during birth
- HIV (human immunodeficiency virus): a virus, kills white blood cells, leads to AIDS where a person's immune system fails making them vulnerable to infections by other pathogens, spread reduced by using a condom, not sharing needles during drug use, screening and medication

Communicable diseases/Spreading pathogens (p39)
Diseases that can be spread between individuals.

Disease	Pathogen	Symptoms/ Effects	How it spreads
Cholera	A bacterium called Vibrio cholerae.	Diarrhoea.	Via contaminated water sources.
Tuberculosis	A bacterium called Mycobacterium tuberculosis.	Coughing and lung damage.	Through the air when infected individuals cough.
Malaria	A protist.	Damage to red blood cells and, in severe cases, to the liver.	Mosquitoes act as animal vectors (carriers) — they pass on the protist to humans but don't get the disease themselves.
Stomach ulcers	A bacterium called Helicobacter pylori.	Stomach pain, nausea and vomiting.	Oral transmission, e.g. swallowing contaminated water or food.
Ebola	Ebola virus.	Haemorrhagic fever (a fever with bleeding).	Via bodily fluids.
Chalara ash dieback	A fungus that infects ash trees.	Leaf loss and bark lesions (wounds).	Carried through the air by the wind. (It also spreads when diseased ash trees are moved between areas.)

How to reduce/prevent transmission
Making sure that people have access to clean water supplies.
Infected people should avoid crowded public spaces, practise good hygiene and sleep alone. Their homes should also be well-ventilated.
Use of mosquito nets and insect repellent to prevent mosquitoes carrying the pathogen from biting people.
Having clean water supplies and hygienic living conditions.
By isolating infected individuals and sterilising any areas where the virus may be present.
Removing young, infected ash trees and replanting with different species. Restricting the import or movement of ash trees.

Physical and Chemical Barriers (p41)

Chemical defences
Lysozyme enzyme in tears kills bacteria by digesting their cell walls.

Lysozyme enzyme is also present in saliva and mucus.

Hydrochloric acid in stomach kills pathogens in food and drink.

Physical barriers
Unbroken **skin** forms a protective barrier because it is too thick for most pathogens to get through.

Sticky **mucus** in the breathing passages and lungs traps pathogens. **Cilia** on the cells lining the lungs move in a wave-like motion, moving mucus and trapped pathogens out of lungs towards the back of the throat where it is swallowed.

- mucus traps pathogens
- cilia
- cilia move mucus away from lungs
- epithelial cells

Nervous System (p27)
- Central nervous system = brain and spinal cord
- Peripheral nervous system = all other neurons (nerve cells) around the body, including sensory motor and relay neurons

- Sensory neuron
- myelin sheath
- dendron
- nucleus
- cell body
- axon
- direction of impulse

- Motor neuron
- nucleus
- cell body
- axon
- direction of impulse
- Effector (muscle or gland)

Brain (p29)
- Cerebral hemispheres: largest part, centre of intelligence, memory, speech and consciousness. Left = right
- Cerebellum: controls muscle function, speech, thought, emotions, reading writing and learning
- Medulla oblongata: centre for controlling respiration, circulation and digestion
- Studied using CAT or PET scans.

Eye Structure (p30)

Structure	Function
Cornea	Refracts light - bends it as it enters the eye
Iris	Controls how much light enters the pupil
Lens	Focuses light onto the retina
Retina	Contains the light receptors
Optic nerve	Carries impulses between the eye and the brain

Eye Problems (p30)
- Long sighted: image forms behind retina. Corrected using convex lens to bring rays together and move image forwards
- Short sighted: image forms in front of retina. Corrected using concave lens to spread out rays and move image back
- Colour blindness: genetic condition with fault cones cells in the retina leading to difficulty differentiating colours. Not able to be corrected.
- Cataracts: a clouding of the lens. Corrected by replacing the lens.

- object
- Uncorrected
- image
- Corrected
- image
- lens

EDEXEL 9-1 Combined Science | Biology | Biology Topic 5 – Health, Disease and Development of Medicine

EDEXCEL 9-1 Biology | Topic 5 – Health, Disease and Development of Medicine | Required Knowledge

Immune System (p42)
- When pathogens make it past your immune system aims to destroy them
- White blood cells are a key part of this response

Antibiotics (p43)
- Antibiotics kill bacteria by stopping processes in their cells, they don't affect host organisms or viruses

Drug Testing (p43)
Preclinical testing
1. On human cells and tissues
2. On live animals (to test if it works and find out how toxic/harmful it is)
Clinical testing
3. On healthy volunteers (side-effects)
4. On people suffering from the disease (to see if it works)
- 2 groups used, 1 given a placebo, both blind so patient (and sometimes doctor) doesn't know if they have the medicine or placebo

Diet and Disease (p44)
- A diet with too many or too few nutrients can lead to malnutrition e.g. obesity
- It can lead to diseases e.g. scurvy caused by vitamin C deficiency

Measures of Obesity (p45)
- BMI values are compared to tables to give a classification e.g. underweight, normal, overweight, obese
- A higher ratio = more weight around the middle, and a greater risk of health problems (should be <1)

Alcohol and Disease (p44)
- A major risk factor for liver disease e.g. cirrhosis (scarring of the liver)
- Alcohol is broken down by enzymes in the liver and produces toxic products
- This damage can be permanent

Non-communicable diseases (p44)
- Cannot pass between people
- Risk is affected by genes, age, gender, environment and lifestyle

	Communicable	Non-communicable
rapid variation in number of cases over time	number of cases changes only gradually	
cases are often localised	cases may be more widely spread	
e.g. malaria, typhoid, cholera	e.g. cancer, diabetes, heart disease	

Smoking and Disease (p44)
- Smoking is a major risk factor for cardiovascular disease (CVD)
- Nicotine increases heart rate and blood pressure which damages arteries and leads to build up of fatty deposits.
- These reduce blood flow and increases risk of heart attack or stroke
- Also increases risk of blood clots forming in arteries

Immunity/Immunisation (p42)
- Once your body has been through the immune response the body has the ability to respond quickly to a second infection if the pathogen enters the body again
- Immunisation involves injecting dead or inactive pathogens into the body to allow memory lymphocytes to be made
- This means a fast secondary response can occur if infection with the live pathogen happens in the future

Amount of antibody in bloodstream in arbitrary units

Treatment of cardiovascular disease (CVD) (p46)
- Lifestyle changes e.g. weight loss and exercise
- Medicines e.g. statins to reduce cholesterol, anticoagulants to reduce blood clots and antihypertensives to reduce blood pressure
- Surgery e.g. stents (tubes) to keep arteries open or heart surgery to remove blocked sections

Virus Life Cycle Pathways (p56)
In the lysogenic cycle the virus inserts its DNA into the chromosomes of the host cell, it replicates with the rest of the host DNA when the cell divides, it stays dormant like this for a long time but can become active and make new viruses in the lytic cycle

1 Virus attaches to host cell.
2 Virus enters cell and injects its DNA or RNA into the cell.
3 The DNA or RNA and virus proteins are packaged together to make new viruses. These are released from the cell, which usually destroys the host cell.
4 Virus RNA or DNA copies itself and causes new virus proteins to be made, using the organelles in the host cell.

Plant diseases/defences (p57)
- Detecting plant diseases is done in 3 ways; observing visible symptoms, distribution analysis (looking at where diseased plants are found) and laboratory testing e.g. microscopes, antibodies, DNA, soil
- Plants have adaptations to protect themselves from attack by pathogens and pests (organisms which damage crop plants)
Physical barriers:
- bark and thick waxy cuticles make it difficult for pests to get through
- spikes and thorns stop pests eating plants
- cellulose cell walls have to be digested by enzymes
Chemical barriers:
- making poisons in their cells to deter pests which eat them
- making chemicals that kill pathogens which infect them
- Some of these chemicals can be used as medicines e.g. quinine to treat malaria, digoxin to treat heart disease and aspirin as a painkiller

Aseptic Technique (p63)
- Helps to prevent microbes from the air and surfaces contaminating bacterial cultures when they are being prepared
- Sterilising: this kills microbes on equipment and in agar, can be done by autoclaving (high pressure steam) or heating to a high temperature (e.g. passing equipment through a flame)
- Sealing: to prevent bacteria from the air entering bottles are sealed with screw top lids, petri dishes are sealed with tape

Monoclonal Antibodies (p60)
- A set of identical antibodies produced in large quantities from the same hybridoma cells

B lymphocyte from mouse
- advantage: makes particular antibodies continuously
- disadvantage: B lymphocytes don't divide
cancer cell
- advantage: divides continuously
- disadvantage: doesn't make antibodies
- hybridoma cell formed by fusing a B lymphocyte cell and a cancer cell
- the hybridoma cell divides and produces antibodies that are all the same

- You can make monoclonal antibodies that bind to anything you want e.g. an antigen found on the surface of one type of cell, this makes them useful as they can 'target' that cell

Core Practical: Investigating Antibiotics (p63)
1. A petri dish is prepared by pouring in hot agar jelly containing nutrients
2. A pipette and spreader are used to transfer bacteria to the agar
3. Paper discs soaked in different antimicrobials are placed on the bacteria
4. A control paper disc (not soaked in antimicrobial) is also placed on the agar
5. Bacteria area allowed to grow for 48 hours at room temperature
6. The area of the clear zones (area where growth of bacteria was inhibited) are calculated and compared

antibiotic A
antibiotic B
clear areas where bacteria have been killed by the antibiotic
bacteria growing on agar plate

The antimicrobial diffuses into the agar jelly and prevents the growth of non resistant bacteria. Resistant bacteria will still grow.

Diagnosis of disease
- Treatment of diseases – stick to specific cells e.g. cancer cells and deliver an attached drug

Pregnancy testing –

Using Monoclonal Antibodies (p60/61)
Pregnancy testing -
- Diagnosis of disease- stick to blood clots or cancer cells
- Treatment of diseases – stick to specific cells e.g. cancer cells and deliver an attached drug

$$BMI = \frac{weight \ (kg)}{(height \ (m))^2}$$

$$waist\text{-}to\text{-}hip \ ratio = \frac{waist \ circumference}{hip \ circumference}$$

EDEXCEL 9-1 Combined Science| Biology Topic 3 – Genetics| Required Knowledge

DNA (Pg 27)
- **DNA** is the genetic material contained in the **nucleus** of a cell.
- The entirety of the human DNA is called the **genome**.
- DNA is contained within the chromosomes inside the nucleus.
- It has a double helix shape.

Base pairs (Pg 27)
- Four base pairs:
  - A (adenine)
  - T (thymine)
  - C (cytosine)
  - G (guanine)
- Base pairs are bonded together with **hydrogen bonds**
- **A always bonds with T, C always bonds with G**
  - These are known as complimentary base pairs
- Each base is attached to a **sugar** and **phosphate** backbone. Together these are known as a **nucleotide**.

DNA is a **polymer** made of many **monomers**, called **nucleotides**, joined together.

Extracting DNA (Pg 27)
1. Mix washing up liquid **(breaks down cell membranes)** and salt **(clumps DNA together)**
2. Mash fruit **(breaks up cells)**
3. Filter **(separates solid lumps of fruit and the now dissolved DNA)**
4. Gently add ice-cold ethanol **(DNA is insoluble in ethanol, so precipitates out to be collected).**

Genes & Alleles (Pg 28)
- Genes are short lengths of DNA that code for s specific protein.
- This means they control certain features (e.g. eye colour)
- Alleles are different versions of the same gene (e.g. blue eye gene or brown eye gene.)
- You have two alleles for each gene, one from Mum and the other from Dad.
- Alleles can be dominant (use a capital letter) or recessive (use a lower-case letter)
  - Aa

Genetics keywords (Pg 28)

Key word	Definition
Gene	A section of DNA that codes for one thing.
Allele	A different version of the same gene.
Offspring	The 'children' of an organism.
Dominant	The stronger allele.
Recessive	The weaker allele.
Homozygous	Having 2 of the same allele.
Heterozygous	Having 2 different alleles.
Genotype	The different alleles that an organism has e.g. Rr
Phenotype	The characteristic the organism has. E.g. purple flowers

Genetic diagrams (Pg 28)
- Used to predict the possible outcomes of a cross depending on the parents genotypes.
- Two kinds

- Punnett squares are easier to use

EDEXCEL 9-1 Separate Science| Biology Topic 3 – Genetics| Required Knowledge

Probabilities (Pg 38)
- Possible outcomes are represented as probabilities.

RR = 1/4 = 25%
Rr = 2/4 = 50%
Rr = 1/4 = 25%

Sex determination (Pg 39)
- The sex of a child dependent on the 23rd pair of chromosomes (either X or Y)
  - XX = woman
  - XY = Man
- Use a Punnett square to show the probability of having a boy or girl.

XX = 2/4 = 50% chance girl
XY = 2/4 = 50% chance of boy

Variation (Pg 42)
- Differences in the same species is known as **variation**.
- Variation can be **inherited** from parents (e.g. eye colour)
- Variation can be **environmental** (e.g. a scar or tattoo)
- Variation can be a combination of **both** inheritance and environment. (e.g. weight)

Protein synthesis (Pg 35)
- Order of the bases in a gene codes for specific amino acids (three bases pairs – a triplet) codes for one amino acid)
- Amino acids in a specific order form a specific protein.

Studying variation (Pg 6)
- Data gathered can be either continuous (data can be any value in a range) or discontinuous (data can only take on a limited number of values)
- Plotted on bar graphs with differences in how each is plotted.

Pedigree charts (Pg 39)
- Used to track genetic disorders which can be passed from parent to child.
- Parents can be carrier of the gene that causes the disease but not suffer with the disease.

Mutation (Pg 42)
- Mutations are caused by changes to the original DNA code in an organism.
- Mutations can cause changes in phenotype if the code of certain genes is changed.
- These changes to specific genes bring about different alleles.
- Mostly mutation cause no change to phenotype at all.

Human Genome Project (Pg 43)
- Complete map of the human genome.
- Decoding the base pairs making up all the genes in our DNA.
- Took 13 years to complete.
- Advantages
  - Predicting and preventing inherited diseases (see if genes known to interact to cause like heart disease or cancer present – make changes to lifestyle accordingly)
  - Testing and treatment for inherited disorders (look to see if disease exists before baby is born)
  - Development of new drugs where known interactions between drugs and genes is known.
- Disadvantages
  - Stress/worry (if you possess a known disease gene)
  - Gene-ism (people pressured not to have a baby of they have a known gene)
  - Discrimination (people with known genes prevented from getting jobs or health insurance)

CPG Biology: pages 6, 38-39, 42-43.

EDEXCEL 9-1 Separate Science | Biology Topic 3 – Genetics | Required Knowledge

CPG Biology: pages 36-37, 40-41.

Transcription & translation (Pg 36)
- Proteins made in two stages

Transcription
- Uses mRNA to read the code on the DNA strand
- Base pair Uracil (U) instead of thymine (T)

1) RNA polymerase binds to a region of non-coding DNA in front of a gene.
2) The two DNA strands unzip and the RNA polymerase moves along one of the strands of the DNA.
3) It uses the coding DNA in the gene as a template to make the mRNA. Base pairing between the DNA and RNA ensures that the mRNA is complementary to the gene.
4) Once made, the mRNA molecule moves out of the nucleus and joins with a ribosome.

Translation
- mRNA binds to a ribosome (site of protein synthesis)
- Protein is then assembled

1) Amino acids are brought to the ribosome by another RNA molecule called transfer RNA (tRNA).
2) The order in which the amino acids are brought to the ribosome matches the order of the base triplets in mRNA. Base triplets in mRNA are also known as codons.
3) Part of the tRNA's structure is called an anticodon — it is complementary to the codon for the amino acid. The pairing of the codon and anticodon makes sure that the amino acids are brought to the ribosome in the correct order.
4) The amino acids are joined together by the ribosome. This makes a polypeptide (protein).

Gregor Mendel (Pg 37)
- Identified the presence of dominant and recessive genes through his work on peas

1) In one experiment, Mendel crossed two pea plants of different heights — a tall pea plant and a dwarf pea plant. The offspring produced were all tall pea plants.

2) He then bred two of these tall offspring together. He found that when the offspring from the first cross were crossed with each other, three tall offspring were produced for every one dwarf offspring overall. In other words, he produced a 3:1 ratio of tall : dwarf plants.

Sex-linked disorders (Pg 40)
- X and Y chromosomes are a different length (Y is shorter)
- Genes present on the longer part of the X chromosome automatically expressed in the phenotype of a boy as there is no corresponding gene to compete with it.
- Sex-linked disorders more likely to be seen in boys because of this.
- For example: colour-blindness

- No possible colour blind female offspring, 50% chance of colour blind if having a boy.

Key:
N = normal colour vision allele
n = faulty colour vision allele

Blood groups (Pg 41)
- Four blood groups (A, B, AB & O).
- Three possible alleles (I^O, I^A & I^B).
- I^A & I^B are codominant with each other, I^O is recessive
- Blood group AB caused by having I^{AB} genotype

Parents' phenotypes: Heterozygous Blood group A   Heterozygous Blood group B

Possible offspring

Group B   Group AB   Group A   Group O

EDEXCEL 9-1 Biology | Topic 4 – Natural Selection and Genetic Modification | Required Knowledge

CPG Biology: pages 45-50.

Natural Selection (p45)
1. Genetic variation exists in populations because of mutations
2. Selection pressures happen (competition, predation etc)
3. Some individuals are better adapted to the conditions
4. They are more likely to survive and reproduce – 'Survival of the fittest'
5. The alleles causing the variation are more likely to be passed on
6. Individuals less well adapted die

A population of mice has moved into a new area where the rocks are very dark. Due to natural selection, some mice are black, while others are tan.

Some mice are eaten by birds

Mice reproduce, giving next generation

Tan mice are more visible to predatory birds than black mice. Thus, tan mice are eaten at higher frequency than black mice. Only the surviving mice reach reproductive age and leave offspring.

Because black mice had a higher chance of leaving offspring than tan mice, the next generation contains a higher fraction of black mice than the previous generation.

Evidence for Evolution (p45/47/48)
- Fossils arranged in date order show gradual changes in organisms over time
- Key hominid (human-like) fossils:

- Over time the features of the fossils changed from more ape-like to more human-like; arms got shorter, legs got longer, feet became adapted for walking not climbing, brain got bigger
- Tools found with the fossils of Homo species also got more complex over time (they help date fossils using carbon dating on wood or looking at depth in older rocks

- Bacteria and antibiotic resistance

Variation in the population

Bacterium with antibiotic resistance allele
Bacterium without resistance allele

Bacteria exposed to antibiotic

Reproduction
Survival
Resistant bacteria are more likely to survive
Non-resistant bacteria die

Resistant bacteria reproduce and pass on resistance allele

Resistance allele becomes more common in the population

Darwin and Wallace (p46)
- Darwin developed the theory of evolution by natural selection
- He noticed variation and linked it to survival but didn't know about DNA or how characteristics were passed on
- Wallace worked at the same time — he came up with the same idea but Darwin had more evidence and a better developed theory

Classification (p49)
- Organisms are classified (grouped) using similarities and differences
- 5 kingdom classification system
- Animals, plants, fungi, prokaryotes (single-celled organisms with no nucleus, single-celled organisms with a nucleus/eukaryotes)
- Kingdoms are subdivided into smaller groups with more in common
- 3 Domain classification system
- Technology and understanding of DNA led to a new classification system with 3 large groups (prokaryote kingdom split into 2)
- Eukarya : animals, plants, fungi and protists
- Bacteria: single celled organisms with no nucleus
- Archaea: organisms which look like bacteria but have difference in DNA

Kingdom
Phylum
Class
Order
Family
Genus
Species

Breeds and Varieties (p50)
- Breeds = animals e.g. dog breeds
- Varieties = plants e.g. apple varieties

Pentadactyl limb (p48)
- A limb with 5 digits found with similar structure but a different function in many species
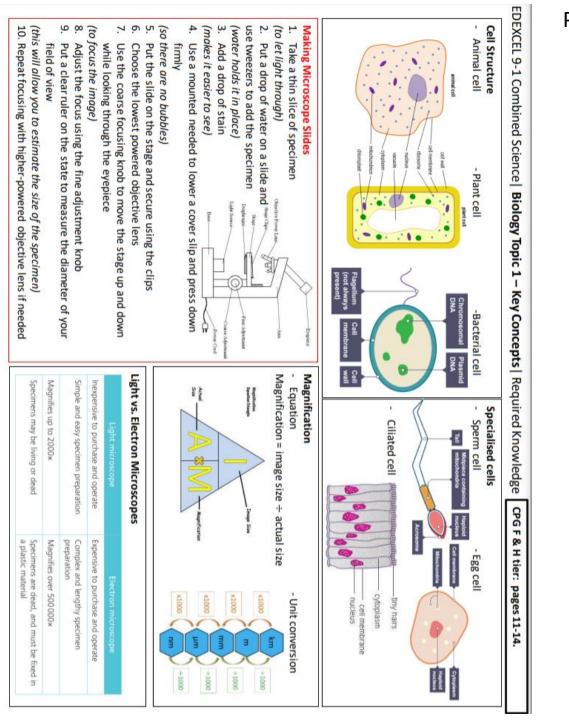- Similarity = evidence that all these species evolved from a common ancestor (as it is unlikely this structure would evolve twice)

EDEXCEL 9-1 Combined Science | Biology Topic 1 – Key Concepts | Required Knowledge

Cell Structure

- Animal cell

animal cell

- Plant cell

plant cell

- Bacterial cell

Flagellum (not always present)
Cell membrane
Cell wall
Chromosomal DNA
Plasmid DNA

Specialised cells

- Sperm cell

Tail
Midpiece containing mitochondria
Haploid nucleus
Acrosome

- Egg cell

Mitochondria
Cell membrane
Haploid nucleus
Cytoplasm

- Ciliated cell

tiny hairs
cell membrane
cytoplasm
nucleus

CPG F & H tier: pages 11-14.

Making Microscope Slides

1. Take a thin slice of specimen *(to let light through)*
2. Put a drop of water on a slide and use tweezers to add the specimen *(water holds it in place)*
3. Add a drop of stain *(makes it easier to see)*
4. Use a mounted needle to lower a cover slip and press down firmly *(so there are no bubbles)*
5. Put the slide on the stage and secure using the clips
6. Choose the lowest powered objective lens
7. Use the coarse focusing knob to move the stage up and down while looking through the eyepiece *(to focus the image)*
8. Adjust the focus using the fine adjustment knob
9. Put a clear ruler on the state to measure the diameter of your field of view *(this will allow you to estimate the size of the specimen)*
10. Repeat focusing with higher-powered objective lens if needed

Objective Power Lens
Stage Clip
Diaphragm
Fine Adjustment
Light Source
Base
Coarse Adjustment
Power Cord
Arm
Eyepiece

Magnification

- Equation

Magnification = image size ÷ actual size

$$I = A \times M$$

Actual Size
Magnification
Image Size

- Unit conversion

Light vs. Electron Microscopes

Light microscope	Electron microscope
Inexpensive to purchase and operate	Expensive to purchase and operate
Simple and easy specimen preparation	Complex and lengthy specimen preparation
Magnifies up to 2000x	Magnifies over 500,000x
Specimens may be living or dead	Specimens are dead, and must be fixed in a plastic material

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EDEXCEL 9-1 Combined Science | Biology Topic 1 – Key Concepts | Required Knowledge

Enzyme Structure

Enzyme
Substrates
Enzyme-substrate complex
Enzyme
Product

As the enzyme experiences warmer conditions it (and the substrate) will move more quickly, there will be more collisions and more reactions.

After the optimum the heat causes the shape of the active site to change in the same way as pH.

As the enzyme experiences conditions away from the optimum the shape of the active site begins to change meaning the substrate can't fit as well and less reactions will occur.

Enzymes speed up chemical reactions where things are split apart or joined together. Enzymes only work with one substrate, they have a high specificity due to the shape of the active site. The substrate's shape has to match the active site's shape exactly. This is called the 'lock and key model.'

Factors affecting enzymes

Ethanol production
Substrate concentration
Fixed amount of enzyme present
Saturation of enzyme with substrate

Rate of enzyme activity
Temperature (°C)
Optimum temperature

Increasing enzyme activity
pH

As the substrate is added the more collisions there will be with available enzymes and more reactions, up until a certain (saturation point), where all of the enzymes are already working at their maximum rate.

Specific digestive enzymes

Lipids
Carbohydrate
Protein
Protease
Lipase
Starch
Glucose
Amino acids
Fatty acids + glycerol

All of these digestive processes can happen in reverse = synthesis.

Transport

Diffusion
Movement of particles from high concentration to low concentration e.g. carbon dioxide into plant leaves

Osmosis
Movement of water particles across a partially permeable membrane from high water concentration to low water concentration e.g. water into plant roots
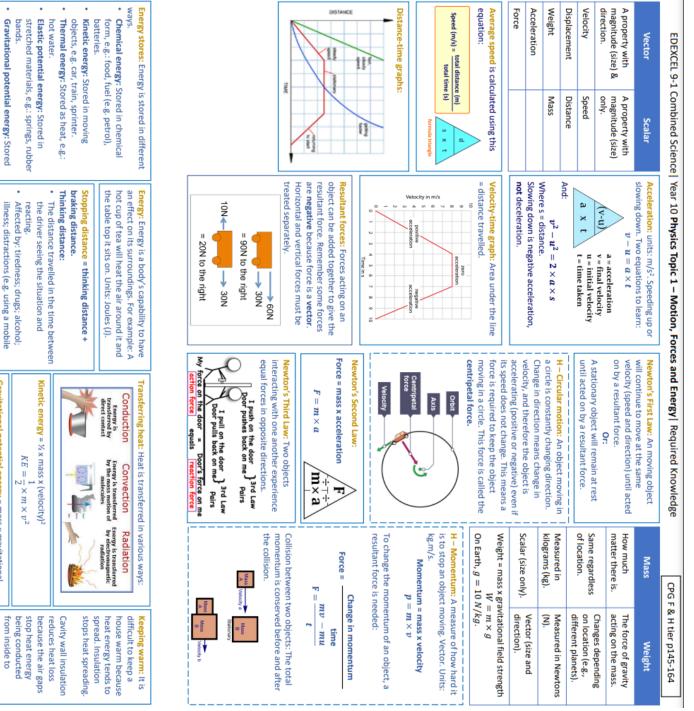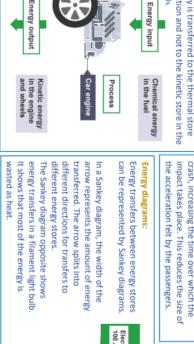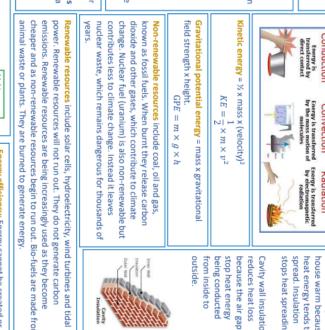
Active Transport
Movement of particles across a membrane from high concentration to lower concentration, using energy transferred during respiration e.g. nitrates into plant roots

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EDEXCEL 9-1 Combined Science | Biology Topic 1 – Key Concepts | Required Knowledge

Investigating Enzymes

The enzyme amylase catalyses the break down of the starch into maltose (sugar). The enzyme is added to buffer solutions of different pHs. The enzyme is added to buffer solutions of different pHs. The time it takes for the enzyme to work is calculated by continuously sampling the mixture and adding it to iodine. Only when all of the starch has been broken down will the iodine stop changing colour. Calculation needed: Rate = 1 ÷ time taken.

amylase, starch and buffer solution
mixture sampled every 10 seconds
dropping pipette
drop of iodine solution
spotting tile

Investigating Osmosis

1. Prepare sucrose solutions of 5 concentrations
2. Measure the mass of potato cylinders
3. Put one cylinder into a test tube of each solution
4. Leave for 40 mins
5. Pat dry and reweigh

Results

Calculate percentage change in mass.

Percentage change = final mass – initial mass x100 / initial mass

Change in mass (%)
Concentration of sucrose solution (mol/dm³)

The point where the line crosses the x-axis means the concentration inside and outside of the potato cylinder were the same.

These cylinders gained mass, water conc. was higher than in cylinders, water was drawn in

These cylinders lost mass, water conc. was lower than in cylinders, water was drawn out

CPG F & H tier: pages 15-17.

Science

EDEXCEL 9-1 Combined Science | Year 10 Physics Topic 1 – Motion, Forces and Energy | Required Knowledge
CPG F & H tier p145-164

Vector	Scalar
A property with magnitude (size) & direction.	A property with magnitude (size) only.
Velocity	Speed
Displacement	Distance
Weight	Mass
Acceleration	
Force	

Average speed is calculated using this equation:

$$\text{Speed (m/s)} = \frac{\text{total distance (m)}}{\text{total time (s)}}$$

formula triangle: d / (s × t)

Distance-time graphs:

Acceleration: units: m/s². Speeding up or slowing down. Two equations to learn:

$$v - u = a \times t$$

$$\frac{(v-u)}{a \times t}$$

- a = acceleration
- v = final velocity
- u = initial velocity
- t = time taken

And:

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

Where s = distance.

Slowing down is negative acceleration, **not deceleration.**

Velocity-time graph: Area under the line = distance travelled.

Resultant forces: Forces acting on an object can be added together to give the resultant force. Remember some forces are **negative** because force is a **vector**. Horizontal and vertical forces must be treated separately.

10N → ← 30N = 20N to the right

30N → ← 60N = 90N to the right

Newton's First Law: An object moving will continue to move at the same velocity (speed and direction) until acted on by a resultant force.

Or:

A stationary object will remain at rest until acted on by a resultant force.

H – Circular motion: An object moving in a circle is constantly changing direction. Change in direction means change in velocity, and therefore the object is accelerating (positive or negative) even if its speed does not change. This means a force is required to keep the object moving in a circle. This force is called the **centripetal force.**

Velocity | Centripetal force | Axis | Orbit

Newton's Second Law:

Force = mass x acceleration

$$F = m \times a$$

triangle: F / (m × a)

Newton's Third Law: Two objects interacting with one another experience equal forces in opposite directions.

I push on the door → Door pushes back on me = 3rd Law Pairs
My force on the door **action force** equals Door's force on me **reaction force**
I pull on the door → Door pulls back on me = 3rd Law Pairs

Mass	Weight
How much matter there is.	The force of gravity acting on the mass.
Same regardless of location.	Changes depending on location (e.g., different planets).
Measured in kilograms (kg).	Measured in Newtons (N).
Scalar (size only).	Vector (size and direction).

Weight = mass x gravitational field strength

$$W = m \times g$$

On Earth, g = 10 N/kg.

H – Momentum: A measure of how hard it is to stop an object moving. Vector. Units: kg.m/s.

Momentum = mass x velocity

$$p = m \times v$$

To change the momentum of an object, a resultant force is needed:

$$\text{Force} = \frac{\text{Change in momentum}}{\text{time}}$$

$$F = \frac{mv - mu}{t}$$

Collision between two objects: The total momentum is conserved before and after the collision.

Energy stores: Energy is stored in different ways.

- **Chemical energy:** Stored in chemical form, e.g.: food, fuel (e.g. petrol), batteries.
- **Kinetic energy:** Stored in moving objects, e.g. car, train, sprinter.
- **Thermal energy:** Stored as heat, e.g.: hot water.
- **Elastic potential energy:** Stored in stretched materials, e.g.: springs, rubber bands.
- **Gravitational potential energy:** Stored in objects raised a height above ground, e.g. a ball held above the ground.
- **Nuclear energy:** Stored inside atoms.

Conservation of energy: Energy cannot be created or destroyed. It can only be transferred from one store to another. For example, a car transfers energy from the chemical store (fuel) to the thermal store (in the engine) and then to the kinetic store (in the wheels). The total amount of energy stays constant. This is the **law of conservation of energy.** Some of the energy is transferred to the thermal store as friction and not to the kinetic store in the wheels.

Energy: Energy is a body's capability to have an effect on its surroundings. For example: A hot cup of tea will heat the air around it and the table top it sits on. Units: Joules (J).

Stopping distance = thinking distance + braking distance.

Thinking distance:
- The distance travelled in the time between the driver seeing the situation and reacting.
- Affected by: tiredness; drugs; alcohol; illness; distractions (e.g. using a mobile phone).

Braking distance:
- The distance travelled while the brakes are applied.
- Slows the car down by friction.
- Affected by: Road conditions (e.g. loose gravel, wet); tyre conditions; weight of the vehicle.

Crash hazards: Rapid acceleration (positive or negative) – like in a car crash – is dangerous to the human body. Cars have **crumple zones** where the engine compartment crumples in a crash, increasing the time over which the impact takes place. This reduces the size of the acceleration felt by the passengers.

Energy diagrams:
Energy transfers between energy stores can be represented by Sankey diagrams.

In a Sankey diagram, the width of the arrow represents the amount of energy transferred. The arrow splits into different directions for transfers to different energy stores. The Sankey diagram shows opposite energy transfers in a filament light bulb. It shows that most of the energy is wasted as heat.

Electrical energy 100 J
Light energy 10 J
Heat energy 90 J

Transferring heat: Heat is transferred in various ways:

Conduction — Energy is transferred by direct contact

Convection — Energy is transferred by the mass motion of molecules

Radiation — Energy is transferred by electromagnetic radiation

Kinetic energy = ½ x mass x (velocity)²

$$KE = \frac{1}{2} \times m \times v^2$$

Gravitational potential energy = mass x gravitational field strength x height.

$$GPE = m \times g \times h$$

Non-renewable resources include coal, oil and gas, known as fossil fuels. When burnt they release carbon dioxide and other gases, which contribute to climate change. Nuclear fuel (uranium) is also non-renewable but contributes less to climate change. Instead it leaves nuclear waste, which remains dangerous for thousands of years.

Renewable resources include solar cells, hydroelectricity, wind turbines and tidal power. Renewable resources will not run out. They do not generate carbon emissions. Renewable resources are being increasingly used as they become cheaper and as non-renewable resources begin to run out. Bio-fuels are made from animal waste or plants. They are burned to generate energy.

Keeping warm: It is difficult to keep a house warm because heat energy tends to spread. Insulation stops heat spreading. Cavity wall insulation reduces heat loss because the air gaps stop heat energy being conducted from inside to outside.

Energy efficiency: Energy cannot be created or destroyed. Some energy is transferred to the useful store (light in the case of the lightbulb). Some of the energy is transferred to a different store and is wasted (heat in the case of the lightbulb).

$$\text{Efficiency} = \frac{\text{Useful energy transferred by the device}}{\text{Total energy transferred by the device}}$$

A lightbulb which consumes 100 J of electrical energy and outputs 10 J of light energy has an efficiency of 0.10.

Car engine — Process
Chemical energy in the fuel — Energy input
Kinetic energy in the engine and wheels — Energy output

Cabot Learning Federation

9.11 My school – vocab. list

¿Cuál es tu asignatura favorita?	What is your favourite subject?
El inglés	English
El español	Spanish
El francés	French
El teatro	Drama
El dibujo	Art
El deporte	PE
La informática	Computer Science
La música	Music
La tecnología	Technology
La geografía	Geography
La historia	History
La religion	RE
La educación personal y social	PSHE
Las matemáticas	Maths
Las ciencias	Science
Las humanidades	Humanities
¿Qué Piensas?	**What do you think?**
Es	It is
Interesante	Interesting
Práctico	Practical
Útil	Useful
Ínutil	Useless
Fácil	Easy
Difícil	Difficult
Aburrido	Boring
Emocionante	Exciting
Creativo	Creative
Importante	Important
Demasiado	Too
Muy	Very
bastante	Quite

¿Cómo es tu uniforme escolar?	What is your school uniforme like?
Llevo…	I wear..
Una chaqueta	Blazer
Un jersey	Jumper
Una camisa	Shirt
Una camiseta	T-shirt
Una corbata	Tie
Una falda	Skirt
Unos calcetines	Socks
Unos pantalones	Trousers
Unos zapatos	Shoes
Unas medias	Tights
Feo	Ugly
Bonito	Pretty
(in)cómodo	(un) comfortable
Caro	Expensive
Barato	Cheap
De moda	Fashionable
Pasado de moda	Unfashionable

La jornada escolar	The school day
Salgo de casa	I leave home
Voy al insti	I go to school
Las clases empiezan…	Classes start…
Las clases terminan…	Classes end…
Dura…	It lasts…
El recreo	Break
La hora de comer	Lunch
Por la mañana	In the morning
Por la tarde	In the afternoon

¿ Cuáles son las reglas?	What are the rules?
(no) se debe	You must(n't)
(no) se puede	You can('t)
Hay que	You have to
Está prohibido	It is forbidden
Escuchar en clase	To listen in class
Usar el móvil en clase	To use your phone in class
Llevar joyas	To wear jewellery
Llevar maquillaje	To wear make up
Llevar zapatillas de deporte	To wear trainers
Dañar las instalaciones	To damage the facilities
Respetar el turno de palabra	To wait your turn to speak
Comer chicle	To chew gum
Hacer los deberes	To do homework

¿Qúe quieres hacer en el futuro?	What do you want to do in the future?
Aprobar mis exámenes	To pass my exams
Sacar buenas notas	To get good grades
Hacer un aprendizaje	To do an apprenticeship
Buscar trabajo	To look for a job
Trabajar como voluntario	To work as a volunteer
Viajar por el mundo	To travel the world
Tener hijos	To have children
Casarme	To get married
Aprender a conducir	To learn how to drive
Médico/a	Doctor
Profesor(a)	Teacher
Abogado/a	Lawyer
Mecánico	Mechanic
Fontanero	Plumber
Bombero	Firefighter
Veterinario	Vet
Peluquero	Hairdresser

Spanish

School – Subjects, uniform and time
Future plans & jobs

Cabot
Learning
Federation

The present tense	AR verb	ER verb	IR verb
yo (I)	-o	-o	-o
tu (you)	-as	-es	-es
él/ella (he/she)	-a	-e	-e
nosotros/as (we)	-amos	-emos	-imos
vosotros/as (you all)	-áis	-éis	- ís
ellos/ellas (they)	-an	-en	-en

The future tense in Spanish

You can talk about the future by using the **near future** tense.
Use part of the verb IR + a + the infinitive to say what you are **going** to do.

Este tarde **voy a jugar** al tenis. *This evening I am going to play tennis.*
Mañana Paul **va a hacer** un pastel. *Tomorrow Paul is going to make a cake.*

You can also use the following phrases with an infinitive to refer to the future.
Quiero = I want
Me gustaría = I would like
Quisiera = I would like
Espero = I hope

Adjectives describe nouns e.g. a **black** blazer.

In Spanish, adjectives normally go after the words they are describing e.g. una camisa azul (a blue shirt) and they have to agree with the noun they are describing.

Adjectives must agree with the noun (or pronoun) they describe in gender and in number.

This means that if the noun an adjective describes is feminine, the adjective must be feminine e.g. una chaqueta negra (a black blazer).

If that same noun is also plural, the adjective will be feminine AND plural as well e.g. las medias negras (black tights).

Comparatives – to express more or less than
 ... **es más...adjective...que** - is more...adjective...than
... **es menos ...adjective ....que** - is less...adjective... than
 ... **es tan...adjective....como** – is as...adjective...as
For example:
*El inglés es **más** interesante **que** la geografía. (English is more interesting than Geography)*
*La historia es **menos** activa **que** la educación física. (History is less active than PE)*
*El francés es **tan** difíil **como** las matemáticas. (French is as difficult as maths).*

Textiles

What is the difference between a hem and a seam?

A hem is a neat non fraying edge made by folding fabric over and stitching it down. A seam is a line along which pieces of cloth are joined by sewing.

Hem

Seam

One image is called a 'motif'

The motif has been repeated to make two different patterns

plain repeat pattern

brick repeat pattern/ offset repeat pattern

Equipment	Use
Bobbin	A bobbin is a cylinder, to which cotton thread is wrapped around. It is found in the bottom part of a sewing machine.
Overlocker machine	An overlocker does not replace a sewing machine. Its primary function is to clean finish a raw edge, giving the project a professional appearance
Quick unpick	It is used to quickly remove stitches and seams.
Tailor's chalk	Used to mark on to fabric. It is easily washed off.
Measuring Tape	It is a flexible ruler that can be used for body measurements, tailoring and dressmaking. It is flexible to measure fabric and curves of the body.

Year 9 Textiles Knowledge Organiser

About Designers

Orla Kiely

Orla Kiely is known for her print designs inspired by her early childhood – the colours of the countryside and her home.

Kiely's design work lends itself to CAD for its repetitive style. Her original work was hand painted using gouache paint. 'Stem' is her most iconic print which consists of simple graphic strength – clean, measured and bold.

Kiely believes her work is never finished and can be re-worked several times until she is satisfied with the end result.

Laura Ashley

Print has been at the forefront of the Laura Ashley brand since it was first established when Laura Ashley started printing her own designs for head scarves.

She went on to design dresses for social wear at the end of the 1960s. Her popular long Victorian-inspired dresses became known as the 'Laura Ashley look'.

The business expanded into coordinated ranges of furnishing fabrics using natural materials such as cotton and recycled paper for wallpaper.

Textiles Hierarchy of Key words

Tier 3 — 'Academic' keywords.

Plain seam
analyse
sustainable
embellishment
Woven/ bonded/ knitted
Free machine embroidery
function
develop

Tier 2 — Valuable keywords used in most lessons every lesson.

Complementary colours
contrast
environment
fastening
compare
embroidery
iron
equipment
context
appliqué
effect
improve

Tier 1 — Basic keywords used in almost every lesson.

colour
design
shape
machine
pattern
line
Texture
tone
theme
thread
Fabric
sew

Questions and activities – hints and tips

Summarising a lesson:

Answer the following questions to help you summarise your learning in a lesson. This will help you recap and think again about your learning, and will be useful to look back on in the future.

- What key words did you use in the lesson?
- Can you define those key words and use them in a sentence?
- What new content did you cover?
- How does this link to your previous learning?
- Can you summarise your learning into one sentence?

Knowledge quizzes:

Create a set of questions using the information from your knowledge organiser, or from your lesson.

You could make them about key words, and maybe even give multiple choice answers.

Go over the questions you keep getting wrong.

Try the questions out with those at home, or maybe your teacher could use them for their starter quiz in class.

Revision:

If you have an assessment approaching, you could create some revision material based on your knowledge organiser.

Can you get down the key information in a spider diagram?

Can you use diagrams, pictures, symbols etc to recall your knowledge?

Keyword Development:

Practise the spellings of key words. Use the look-cover-write-check method to help you.

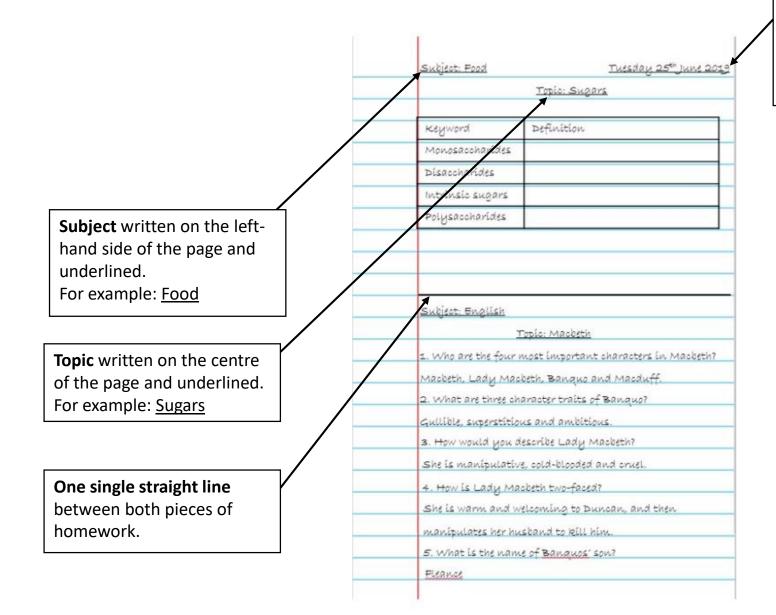Can you explain what the key words mean?

Can you link the key words together?

Copy out the key words with their definitions.

What might it look like?

Lesson summary:

Knowledge Quiz:

How to present your homework:

Date written fully on the right hand side of the page and underlined – this should be the day you complete the homework.

Subject written on the left-hand side of the page and underlined.
For example: <u>Food</u>

Topic written on the centre of the page and underlined.
For example: <u>Sugars</u>

One single straight line between both pieces of homework.

Subject: Food   Tuesday 25th June 2019

Topic: Sugars

Keyword	Definition
Monosaccharides	
Disaccharides	
Intrinsic sugars	
Polysaccharides	

Subject: English

Topic: Macbeth

1. Who are the four most important characters in Macbeth?
Macbeth, Lady Macbeth, Banquo and Macduff.
2. What are three character traits of Banquo?
Gullible, superstitious and ambitious.
3. How would you describe Lady Macbeth?
She is manipulative, cold-blooded and cruel.
4. How is Lady Macbeth two-faced?
She is warm and welcoming to Duncan, and then manipulates her husband to kill him.
5. What is the name of Banquos' son?
Fleance