Year 10

KNOWLEDGEABLE AND EXPERT LEARNERS

January - February

enjoy learn succeed

- Self Quizzing
- Flash Cards
- Mind Maps
- Brain Dumps
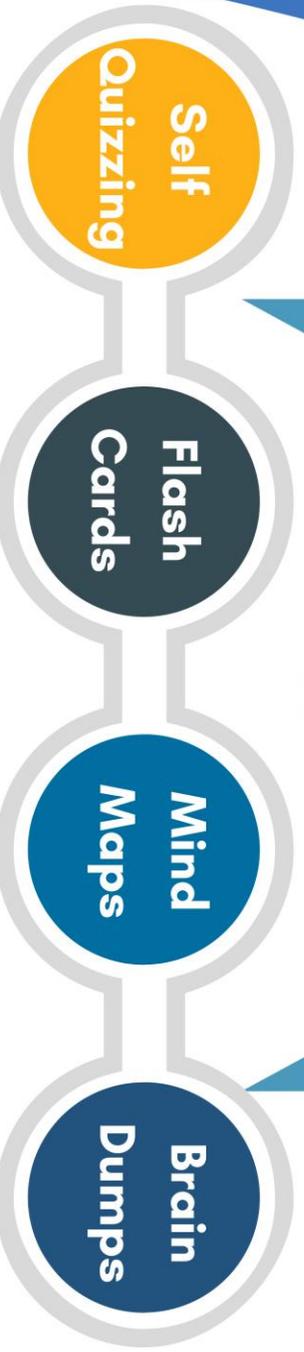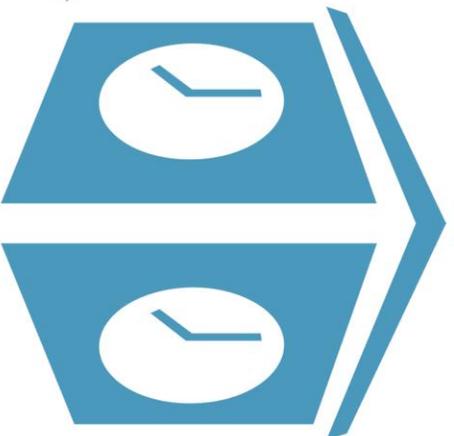
INDEPENDENT LEARNING BOOKLET

NAME: ....

TUTOR GROUP: ....

CONTENTS

- Using Class Charts Instructions
- Accessing SENECA
- Independent Learning log
- Mind Map instructions
- Subject Knowledge Organisers

You will need an A4 application booklet.

HOMEWORK:

- Your teacher will set specific tasks, with a deadline, on Class Charts
- Instructions for your homework and how to access it are in this booklet
- You must complete and hand in the work by the deadline

INDEPENDENT LEARNING EXPECTATIONS AND REWARDS:

- You should complete 1 task per day, 5 days a week.
- The tasks will be set on Class Charts to help you keep track of what you need to do.
- You must bring your ILB and application book to school every day.
- You can choose the subject/topic you want to work on.
- Your tutor will check your ILB regularly to see how you are getting on.
- You will be rewarded for going above and beyond expectations.

SUBJECT KNOWLEDGE ORGANISERS CONTENTS

USING CLASS CHARTS

All of your homework will be set by your teachers using the Class Charts System.

You should check Class Charts every day to make sure you are up to date, and that you meet all your deadlines.

Below, shows you how to log on and track your homework.

Logging in to Class Charts

1. Enter your email address and password into the fields provided

Please enter the access code supplied by your teacher.

☑ Remember me

Access code *

Your access code

2. Click on the Log in button

3. Enter your date of birth if prompted and click on the OK button

Date of birth

Please enter your date of birth below.

Date of Birth
12/06/2009

OK   CANCEL

LOG IN

Homework

- Select the homework tab on our account.
- This will display a list of the homework tasks which you have been given.
- To change the date range for displayed homework tasks, click on the orange Date button.
- To display tasks in the order they are expected to be handed in, click on the Due date button.
- To mark a homework task as completed, view the homework task of your choice in more detail and tick the Completed checkbox.
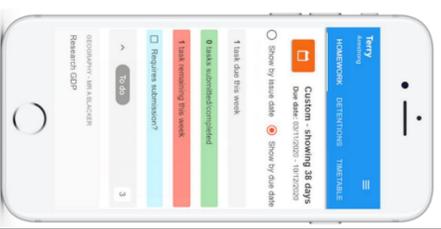
To view a homework task in more detail, click on the expand icon in the bottom right hand corner of the homework tile. A popup will appear that contains the a description of the homework task, the estimated completion time and any links or attachments that may have been included.

Type: Blended Learning
Issue date: Monday 09/11/2020
Due date: Wednesday 11/11/2020
Estimated completion time: 1 hours

Please write a short paragraph on what GDP is and how it is used.

Research GDP
GEOGRAPHY - 8F/GG - MR A BLACKER

Keeping track of homework

To track your homework use the three banners above the homework status. This shows the the number of homework tasks that are due that week, how many of those tasks you have completed and how many tasks you still need to complete.

To only see homework tasks that require an attachment submission, tick the checkbox labelled Requires submission.

If you are viewing the Homework tab via a desktop or laptop, expanding a homework status category will display a table overview of each homework task for the selected date range.

1 task due this week

0 tasks submitted/completed

1 task remaining this week

☐ Requires submission?

Homework ↑↓	Teacher ↑↓	Lesson ↑↓	Issued ↓	Due ↑↓	Estimated time ↓	Type ↑↓	Feedback ↑↓
Research GDP	Mr A Blacker	8F/Gg	Monday 09/11/2020	Wednesday 11/11/2020	1 hours	Blended Learning	
Write a soliloquy	Mr J Kato	8y/En2	Tuesday 10/11/2020	Tuesday 17/11/2020	30 minutes	Homework	
Create a poster on French food	Mrs A Abell	7YEL/Fr	Friday 06/11/2020	Thursday 19/11/2020	45 minutes	Homework	Feedback

Homework attachment submissions

For certain homework tasks, you may be asked by your teacher to upload your work as an attachment. When viewing a homework task in more detail, you will see the Upload attachment button if your teacher is expecting your work to be uploaded. To submit a homework attachment, click on the Upload attachment button and select the files of your choice. Successfully uploaded files will then appear above the button

If your teacher leaves feedback on one of your homework attachments, you will see a Feedback icon appear on the associated homework task.

To view the feedback, click on the expand icon in the bottom right hand corner of the homework tile. Your teacher's feedback will appear directly below your homework attachment

Type: Homework
Issue date: Friday 20/03/2020
Due date: Friday 27/03/2020
Estimated completion time: 10

☐ Completed?

Write a 500 word review on the book of your choice.

My attachments

☑ My book review.doc

+ UPLOAD ATTACHMENT

You can upload a maximum of 5 attachments, each up to 250mb in size.

Supported file formats: doc, docx, pdf, xls, xlsx, ppt, pptx, pub, txt, png, jpeg, jpg, gif, rtf, mp3, odt, odp, csv, mp4, mov, m4a, sb3

Write a book review
RECREATION - C6RRC5 - MRS A ABELL

Write a book review
RECREATION - MRS A ABELL
Issued: Friday 20/03/2020
Due: Friday 27/03/2020
Feedback

To-Do: These are homework tasks that you need to complete. Once you have completed them, tick the checkbox.

To do	Io-Do: These are homework tasks that you need to complete. Once you have completed them, tick the checkbox.
Completed	Completed: These are homework tasks that you have ticked as completed but have not been marked by your teacher.
Submitted late	Late: These are homework tasks that have been handed in past the deadline.
Not submitted	Not submitted: These are homework tasks that were not handed in on time.
Submitted	Submitted: These are homework tasks that have been handed in on time.

HOW TO ACCESS SENECA ❋

Seneca learning is a free online platform that will help you revise for all your subjects.

1. Go to https://senecalearning.com/en-GB/

2. Click 'Log In' at the top right hand corner.

🇬🇧 Login
Sign up

3. Select 'Continue with Microsoft'.

Continue with Microsoft

4. Enter your school email and password.

5. Select the course(s) you want to work on

If you need any help accessing SENECA please speak to your class teacher, or Miss Holmes.

You can also scan this QR code for a video walkthrough of how to log in as a student

SCAN HERE ↙

INDEPENDENT LEARNING LOG
MIND MAPS

Expectation this ½ term: Mind maps
1. Create 1 Mind Map a Day

- This should be done once a day , for approximately 20 minutes.
- All your Mind Maps should be evidenced in your application booklet.
- Use this log to track how what subjects you have done (see example)

Week Beginning	Monday	Tuesday	Wednesday	Thursday	Friday
EXAMPLE:	English: KG1 & 2	Science: KG2 & 4	History: KG4 & 5	PSHCE: KG 1 & 2	Drama: KG 1 & 3
5/01/2026					
ILB CHECK (10 Mind Maps) 12/01/2026					
19/01/2026					
ILB CHECK (20 Mind Maps) 26/01/2026					
02/02/2026					
09/02/2026					

MIND MAPS – INSTRUCTIONS

1. Identify knowledge

Select a topic you wish to cover.

Decide which type of mind map you are creating

- **Retrieval**: No material
- **Concept**: Material needed

2. Topics & Subtopics

Place the main topic in the centre of your page and identify subtopics that will branch off.

3. Branch off

Branch of your subtopics with further detail.

E.g. Key terms, definitions, examples or descriptions.

Try not to fill the page with too much writing.

4. Review

Is the information on your mind map accurate?

Green pen: Do you need to correct anything?

Green pen: Do you need to add anything?

5. Revisit it

Use it to help you prioritise your revision; you can **RAG** rate it.

Use it to help you summarise the topic, or use your mind map to teach someone else a topic.

Start up options

1	**Key Idea**	There are a variety of ways to start a business. Sole Trader Partnership Private Limited Company Public Limited Company Franchise Each option comes with advantages and disadvantages
2	**Key Idea**	There are many factors that influence where a business locates as it is such an important decision. • Proximity to the market (where the product is going to be sold) • Where do the workers come from • Where are the raw materials coming from • Where are the competitors • What the business sells
3	Key Idea	E-commerce is he buying and selling of goods or services using the internet, including the transfer of money and data. E-commerce is any transaction that takes place through the internet. E-commerce and M-commerce allow businesses to choose cheap locations, because there is no requirement to be located near to customers. These businesses are able to sell items online and then send them to customers using couriers. Common examples of businesses that operate online are clothing companies, designers, bloggers and influencers
4	**Main benefits of E-Commerce**	lower costs flexible working hours access to a much larger market of potential customers ability to be open 24 hours a day, seven days a week relatively low-price marketing and promotion
7	**Drawbacks of E-commerce**	Customers like to try on clothes, or feel stuff before they buy it Personal shopping experience Internet can be unreliable Internet can be hacked

Legal Structures

		Advantages	Disadvantages
1	Sole Trader	Quick and Easy to set up Cheap to set up Keep all profits Make own decisions Work when you want to	Unlimited liability – liable for all debts When you don't work you don't get paid High levels of responsibility Nobody to cover you when you go on holiday Work long hours
2	Partnership	Quick and easy to set up Shared decision making – takes away some of the stress Shared responsibility for debts	Unlimited liability Disagreements over decision making Work long hours Relying on everyone to put their weight so the business can be successful
3	Private Limited Company (Ltd)	Owners (shareholders) have limited liability Business is a separate legal identity to its owners Large amounts of capital can be raised through selling shares	Profits have to be shared with shareholders (dividends) Owner loses complete control of the business Less privacy – the company has to produce accounts which are available to the public
4	Public Limited Company (PLC)	Owners have limited liability Large amounts of capital can be raised through selling shares	Same as Ltd Original owners lose control and ownership of the business. Professional directors and manager appointed to run the business may have different aims to those of the shareholders. Must disclose all main accounts to the **public**. **Company** can be taken over if a majority of shareholders agree to bid
7	Franchise	Given support in setting up the business Benefit from being part of a large business establish name Less investment required than setting up a completely new business Proven product, loyal customers to the brand therefore less risky	Cost of buying the franchise Pay a percentage of the profits to the Franchisor Have to follow the Franchise model Other franchisee operations can have a negative effect on yours

Key Vocabulary

1	**Limited Liability**	This is when an investor can only lose what they invest. They are not liabile for the all the debts the company incurs. This is a less risky option
2	**Unlimited Liability**	When the owners of a business are liable for all debts of the business. This means that owners can lose personal possessions to cover the cost of the debts.
3	**E-Commerce**	E-commerce is he buying and selling of goods or services using the internet, including the transfer of money and data.
4	**M-Commerce**	M-commerce is any transaction that takes place using mobile technologies, for example a mobile phone app

Marketing Mix

1	Key Idea	The marketing mix refers to the set of actions, or tactics, that a company uses to promote its brand or product in the market. The 4Ps make up a typical marketing mix - Price, Product, Promotion and Place. It is a marketing tool used to attract customers to a business, and all four elements should be carefully considered in order for a business to be effective.
2	Key Idea	The right marketing mix should work well together and each element of the marketing mix should complement the rest, for example the type of promotion will be applicable to the product being sold by a business.
3	Key Idea	The most effective marketing mixes constantly adapt to the ever-changing business environment. This could mean a business adapting their price, adopting new types of promotion, updating their product or changing distribution channels as required.
4	Price	Factors that influence price include: competition – a business may need to reduce its prices to compete with other businesses customer opinions – about the product and its worth brand image – some products can have a higher price because customers perceive the business' brand as desirable availability – if a product is in short supply, this can drive up the price
7	Place	Businesses that sell mass-market products may use many different options to make sure that their customers can easily purchase their products. Place can also include the channel of distribution used to get the product from the manufacturer to the final customer. Types of distribution include: manufacturer → customer manufacturer → wholesaler → customer manufacturer → wholesaler → retailer → customer
8	Promotion	A business will use a mix of different promotion methods to increase its sales. Its chosen method will depend on the type of product or service on offer, the relative costs of the different methods and the size of the budget the business has. This is often referred to as the 'promotional mix' for a business. This includes: TV adverts use of billboards social media activity
9	Product	The product element refers to the goods or services the business sells. A business should conduct market research to find out the needs and wants of its target market.
10	Impact of Technology	Technological advances create many opportunities for businesses. This means that a business' **promotional mix** may need to change to enable it to interact with its customers through increasingly popular technologies (such as online messaging and digital advertising). The use of **social media** has changed how much many businesses spend on traditional promotional activities (eg TV advertising) and on advertising in other media types (eg newspapers). **Sponsorship** and **influencers** on social media are commonly used as a means of promoting products and services.

Key Vocabulary

1	Marketing Mix	A description of marketing–product, price, promotion, place.
2	Product	The good or service a business is selling. A business needs its products to stand out from the products of its competitors so that customers buy from it. To do this, a business creates a **unique selling point** (or **USP**)
3	Price	**Price** is the amount a business charges its customers for its product or service.
4	Promotion	**Promotion** is the methods a business uses to create interest in its products and services among its customers and potential customers. The main aim of promotion is to either persuade customers to purchase, or inform about products.
5	Place	Where the product is sold. In a shop, online, geographical location
6	Mass Market	A market for products and services that are aimed at large groups of customers with similar characteristics.
7	Promotional Mix	The combination of promotional activities used to build customer awareness of a product to increase sales.
8	Retailer	A store (or person) that sells products directly to customers.
9	Channels of distribution	The channels of distribution are the different ways in which a product gets from the producer to the end consumer.
10	Consumer	A person who uses a product
11	Customer	A person who buys the product
12	USP	The distinctive factors that make a product or brand stand out from rivals.
13	Target Market	A group of people or area of a market that a business aims to sell its products to.

The Product

1	Goods	**Goods** are a **tangible** item that a customer can physically touch, for example a mobile phone or a chocolate bar.
2	Services	a **service** is an **intangible** product that cannot be touched, such as a spa day experience or having a haircut.

Business Plans

1	Key Idea	A business plan is a document created by a business or entrepreneur that provides details about each element of the business. Creating a business plan means an entrepreneur considers all of the different elements of their business. Having a BP reduces the risk of starting a business and encourages investors.
2	Key Idea	A business plan is usually made up of several sections: the business idea – what product or service the business will be, the business' aims and objectives – using the SMART principles, target market determined through market research, revenue forecast, projected costs and profit, cash flow forecast, sources of finance, location, marketing mix – the four Ps.
3	Key Idea	The purpose of a BP is to reduce risk and obtain finance

Number Bases and Binary addition

1. Decimal - Base 10
2. Binary - Base 2
3. Hexadecimal - Base 16
- Converting from binary to denary.
- Converting from denary to binary.
- Converting between hex and denary.
- Converting between hex and binary.
- Adding binary numbers.
- Overflow.

Binary Addition
- 0 + 0 = 0
- 1 + 0 = 1
- 0 + 1 = 1
- 1 + 1 = 10
- 1 + 1 + 1 = 11

Units of Information

(1000)	(1024)
- Bit	- Bit
- Nibble	- Nibble
- Byte	- Byte
- Kilobyte	- Kibibyte
- Megabyte	- Mebibyte
- Gigabyte	- Gibibyte
- Terabyte	- Tebibyte

Data Compression

- What is data compression?
- Need for compression
- Types of compression
    - Lossy (example: image file)
    - Lossless (example: text file)
- Huffman Tree Coding
- Run Length Encoding (RLE)

Images and Sound

Images
Image files are stored in binary on a computer.
- Metadata
- Pixel
- Colour depth
- Resolution
- Bitmap images
- Vector images

Sound
- - Sample rate
    - Quality of sound
    - File size
- Sample resolution: is the number of bits per sample
- Calculate file sizes:
    - File size (bits) = rate x res x secs

Key Vocabulary

1	Binary	The computers language. A counting system which uses 1s and 0s, also known as machine code.
2	Character Set	A group of characters that a computer recognizes from their binary representation.
3	Decimal	A digit represented in base ten
4	Hexadecimal	A digit represented in base 16

Hex	Decimal
A	10
B	11
C	12
D	13
E	14
F	15
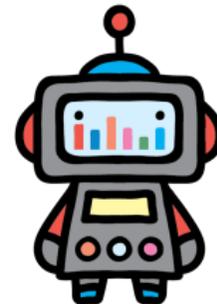
Comparison Operators

Operator	Meaning
==	Is equal to
>	Is greater than
<	Is less than
<> or !=	Is not equal to
>=	Greater than or equal to
<=	Less than or equal to

Data Types and Operations

- Integer e.g. 23
- Real e.g. 23.7
- Character e.g. A or 5
- String e.g. A546TH
- Boolean e.g. TRUE or FALSE.
- **Operations**
- ADD +
- SUBTRACT –
- DIVIDE /
- MULTIPLY *
- MOD
- DIV
- EXPONENTIATION **

Translators & Facilities of Language

Low level languages:
- Machine language
  - Op-code & Operand
- Assembly language
  - Mnemonics

High level languages:
- Closer to human language

1. Assembler
2. Compiler
3. Interpreter

Integrated development environment (IDE)
- Source code editor.
- Error debugger.
- Run time environment.
- Translator (compiler or interpreter).
- Automation tools

Robust Programs

- Defensive design considerations:
  - Input validation
  - Planning for contingencies
  - Anticipating misuse
  - Authentication
- Maintainability:
  - Comments & Indentation
- Types of testing
  - Iterative
  - Final / terminal
- Logical errors, syntax errors, and runtime errors

Key Vocabulary

1	**Variable**	A named value which can be changed as the program is running.
2	**Constant**	A named value which cannot be altered as the program is running.
3	**Syntax**	The arrangement of words and phrases
4	**Boolean**	A way of defining 1 or 0. Sometimes used as a way of defining algebraic notation

Costs

What are costs?	Costs are the amounts that businesses pay to obtain something in order to produce their goods or services. They represent an outflow of money from the business.
Fixed Costs	These costs stay the same irrespective of the output of the business
Variable costs	These costs vary in line with the output, the higher the output the higher the variable costs
Total Costs	This is the sum total of fixed and variable costs
Average cost	This is the total cost divided by the total output. It represents the average cost of producing a single unit of output.

Revenue

Revenue	This represents the amount gained by the business from selling its product or services. Revenue = Price x quantity sold Note: This is not the same as profit because it doesn't take into account any costs.
Average revenue	This is calculated as: Revenue / sales It represents the average revenue gained from selling a single unit of output/product

Profit

What is profit?	Profit is calculated by deducting ALL costs from revenues. Profit is the reward for entrepreneurship. Profit is an indicator of success, i.e. it shows that the business has got it right. Profit shows that the business is meeting its customers needs.
Calculating profit	Profit = Revenue – Total costs* • Total costs = Total fixed costs + total variable costs Profit = Revenue – (Total fixed costs + Total variable costs)

Business objectives

Businesses have objectives which seek to explain what they want to achieve in the short and the long term.
Long term goals are known as aims
Short term goals are objectives, although the two are often used interchangeably

Profit maximising	This aim means that the business wants to make as much profit as possible. So there strategy may involve charging higher prices and keeping costs low
Sales growth	This aim means that the business is trying to sell as many products as possible. They may engage in more marketing, keep prices lower, improve their service and quality. Any steps that may lead to more sales.
Increasing market share	The business is aiming to maximise their market share. In order to achieve this they need to sell as much as possible. The business wants to be the dominant player in the market. Look up the formula for calculating market share!

Decisions that use revenue information	Decisions that use cost information	Decisions that use profit/loss information
What price to charge to maximise revenue	Whether to take on new staff	Whether to invest in new equipment or buildings
Which products need to be withdrawn	Whether to move to larger premises	Whether to develop new products or offer additional services
Where to focus any marketing activity	Which suppliers to use to obtain the best value for money	How much can be taken out of the business by the owners or shareholders

What is production?

"Production is the organised activity of transforming resources into finished products in the form of goods and services; the objective of production is to satisfy the demand for such transformed resources"

Entrepreneurs organise resources i.e. factors of production
They convert the factors of production into finished goods in order to sell to consumers
This process is known as production

Production requires land, labour, capital and entrepreneurship

Businesses that successfully produce goods/services and satisfy demand from consumers can expect to make a profit

Production is a measure of output e.g. the factory made 35 bikes in a week

DO NOT CONFUSE PRODUCTION WITH PRODUCTIVITY!

What is productivity?

Productivity is a measure of efficiency that calculates the amount of outputs produced per unit of input

It calculates how efficiently resources are being used in the creation of goods/services & provides a metric for comparison e.g. after training workers proved to be 27% more efficient in their productivity

It is a measure of efficiency e.g. 3 cans produced per worker

Higher productivity is important for a firm & economy for the following reasons

1. It lowers costs & improves a firms national & international ability to compete
2. It allows firms to produce more output with the same input which puts it in a position to generate increased economies of scale
3. Firms can generate higher profits
4. Higher profits may mean that the firms can pay their workers more
5. Higher profits may mean that the government revenue from corporation tax will increase
6. An improved ability to compete in international markets will help to generate economic growth

Higher productivity is important for a firm & economy for the following reasons

Production is often influenced by the state of the economy
1. During a recession production falls
2. During a boom period, production increases
• As production is dependent on the demand for goods/services, any change to any of the conditions of demand will result in changes to production
• As production is also dependent on the supply of the factors of production, any change to any of the conditions of supply will result in changes to production

$$Productivity = \frac{Units\ of\ output}{Units\ of\ input}$$

Exam Tip

Students often confuse the terms **production** and **productivity**—make sure you know the difference.

Remember: **production (output)** can increase even when **productivity (efficiency)** decreases.

GCSE Economics	Economies of scale	1.4

Economies & Diseconomies of Scale

As a firm grows, it is able to increases its scale of output generating efficiencies that lower its average costs (AC) of production

These efficiencies are called economies of scale

• As a firm continues increasing its scale of output, it will reach a point where its average costs (AC) will start to increase
• The reasons for the increase in the average costs are called diseconomies of scale

Internal Economies of Scale

• Financial Economies
• Managerial Economies
• Marketing Economies
• Purchasing Economies
• Technical Economies
• Risk-bearing Economies

Diseconomies of Scale

• Management Diseconomies
• Communication Diseconomies
• Geographical Diseconomies
• Cultural Diseconomies

Engineering Manufacture

Unit R014: Principles of engineering manufacture
Topic Area 2: Engineering Materials

KS4

BECKFOOT SCHOOL
enjoylearnsucceed
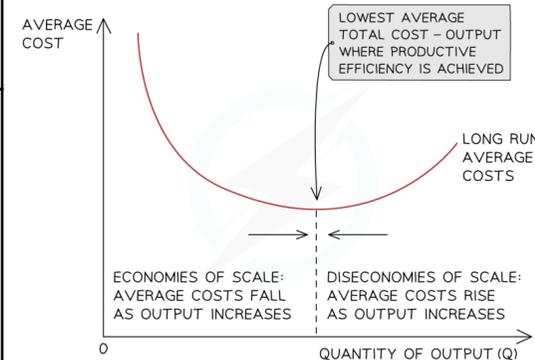
2.1 Mechanical Properties of Materials

1	**Yield Strength**	The **maximum** force that can be applied before a material begins to **change shape permanently** (will return to its original shape before this point is reached).
2	**Tensile Strength**	The maximum force that a material can take before breaking when it is stretched (pulled).
3	**Compressive Strength**	The ability of a material to withstand loads that reduce the size of that material (squash it).
4	**Elasticity**	The ability of a metal to resume its normal shape after being stretched or compressed.
5	**Ductility**	The ability of a material to be drawn out into wire or thread without losing strength or breaking.
6	**Hardness**	The measure of the resistance of a material to surface indentation, abrasion, or scratching.

2.2 Other Properties Influencing Manufacturing

|		
7	**Malleability**	Is capable of being extended or shaped by beating with a hammer or by the pressure of rollers.
8	**Machinability**	A characteristic of a metal that makes it easy to drill, shape, cut, grind, etc. Materials with good machinability can be cut with relatively little power and low cost.
9	**Material Cost**	Material costs can be a balancing act between the function of the part and the cost. Usually the more expensive materials will be harder, greater wear and corrosion resistance, improved appearance.
10	**Manufacturing Cost**	The material selected will have an impact on the cost of manufacture. Some materials will be harder to machine and will take more time to work with which will have costs implications. Wear and tear on tools, greater energy costs, regular maintenance of machines.
10	**Sustainability**	Meeting the needs of **today** without **compromising** the ability of **future generations** to meet their own needs. **Definition;** The process of **using resources** in a way that **does not** compromise the environment or deplete the materials for future generations.

Standard Plastic Stock Shapes –
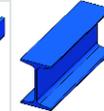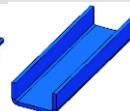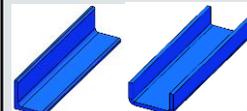

Sheet   Rod   Tube   Granules

Standard Metal Stock Shapes –
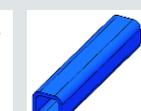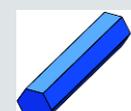
Angle, Channel, I-Beam,, Sheet, Rod, Flat, Hex, Tube, Threaded Rod, Square Bar

2.3.1 Materials; Metals

Ferrous Metals		These Metals Contain **IRON** (Fe).
1	**Iron**	Machine Bases, Metalworking Vices
2	**Tool Steel (Carbon Steels)**	Screwdrivers, Hammers, Saws
3	**Low Carbon Steel (Mild Steel) (<0.6% Carbon)**	Low carbon steel has good enough strength for **building frames in construction projects**
4	**High Carbon Steels (Tool Steel) (>0.6% Carbon)**	Extreme hardness and resistance to wear, very high carbon steel often used for **cutting tools that retain their sharp edge.** (Not as high carbon content are used for Screwdrivers, hammers, saws)
5	**Stainless Steel**	Sinks, Rules, Cutlery
6	**High Speed Steel**	Drill Bits, Lathe Tools
Non-ferrous Metals		Metals which **do not** contain IRON.
7	**Copper**	Plumbing & Electrical Components
8	**Aluminium**	Cooking Foil, Sauce Pans, Ladders
9	**Zinc**	Coatings On Steel Products
Alloys		A mixture. of **two or more** metals.
10	**Brass**	Plumbing Accessories
11	**Bronze**	Boat Propellers

2.3.2 Materials; Polymers

Thermoplastics		**Can** be remoulded numerous times with the application of heat.
1	**Acrylonitrile-butadiene-styrene (ABS)**	Appliance casings
2	**High Impact Polystyrene (HIPS)**	Vacuum Forming, electronics casings
3	**Polycarbonate**	Safety Goggles, Bullet Proof Windows.
4	**Polylactic acid (PLA**	Eco-Products; **cups, lids, cutlery, straws and containers** made from a biopolymer called PLA. Made from starchy plants like corn. Also **Medical Equipment, Food Containers**.
Thermosetting Plastics		Polymers which **cannot** be remoulded once set in shape.
5	**Polyester Resin**	Used in GRP – Car/ Boat bodies
6	**Urea-formaldehyde**	Electrical fittings, Door Handles.
7	**Epoxy Resin**	Glue, Casings, Coatings.
8	**Phenol-formaldehyde**	Heat resistant saucepan handles

2.3.3 Materials; Ceramics

Ceramics have a high resistance to heat and wear		
1	**Tungsten Carbide**	Cutting Tool Tips
2	**Silicate Glass**	Resistant to very high temperatures and very strong, used in the lining of melting furnace burners, as blocks with windows for pyrometers.
3	**Silicon Glass**	Silicon glass is widely used in **optics, photometry and spectroscopy**. It is used in laser lenses and mirror prisms

2.3.4 Materials; Composites

A material made from **two or more** different materials that, when combined, are stronger than those individual materials by themselves. The microstructure can be seen to the naked eye.

1	**Glass Reinforced Plastic (GRP)**	Car / Boat Bodies, Bike frames
2	**Carbon Fibre**	Bicycle Frames, Sports equipment

2.3.5 Materials; Smart & New Materials

Smart materials react to a stimulus in a controlled way, the change can also be reversed.

1	**Shape-memory Alloys**	Dental Braces, surgical implants, fire prevention.
2	**Thermochromic Materials**	React to heat - Thermometers for rooms, refrigerators, aquariums, and medical use.
4	**Quantum Tunnelling Composite (QTC)**	Responds to pressure to create circuits -Switches on mobile phones, pressure sensors and speed controllers
5	**Photochromic Pigment**	Reacts to light - Used **to protect your eyes from harmful UV rays**

Plot Summary

1	Prologue	Sets up main themes of the play. Provides an overview of the action.
2	Act 1	Montagues and Capulets brawl. Romeo depressed about Rosaline. Paris wants to marry Capulet's young daughter Juliet. Juliet's mother and Nurse encourage Juliet to marry Paris. Romeo attends Capulet party, sees Juliet and falls in love.
3	Act 2	Balcony Scene – R&J decide to get married. Romeo asks Friar Lawrence to conduct ceremony. Friar Lawrence hopes marriage will end feud. Nurse visits Romeo to check his commitment. Friar Lawrence marries R&J.
4	Act 3	Romeo refuses to fight Tybalt. Mercutio killed by Tybalt and Tybalt by Romeo. Romeo is banished. Juliet told she is to be married to Paris. Capulet flies into a rage after Juliet refuses.
5	Act 4	Juliet asks Friar Lawrence for help. Friar Lawrence supplies a potion and a plan. Juliet agrees to marry Paris. Wedding plans are underway but Juliet found 'dead' by the Nurse.
6	Act 5	Romeo thinks Juliet is dead. He returns to Verona with a poison. Friar Lawrence discovers Romeo did not get his letter. Romeo kills Paris at Juliet's tomb, takes poison and dies. Juliet wakes and finds Romeo, stabs herself. The feud is over.

Characters

1	Romeo Montague	Initially a typical Petrarchan lover, his love for Juliet is incredibly romantic, impulsive and passionate.	6	Lady Capulet	Juliet's mother. Cold and distant for most of the play, she expects Juliet to follow in her own footsteps.
2	Juliet Capulet	Young and innocent, not yet 14. Her love for Romeo matures her and makes her bolder in her defiance.	7	Nurse	Juliet's nursemaid, they have a close relationship. She acts as confidante and messenger for Romeo and Juliet.
3	Lord Capulet	Juliet's father. Shows concern for Juliet's welfare, but can be aggressive and tyrannical when disobeyed.	8	Tybalt	Juliet's ruthless, hot-tempered and vengeful cousin. Has a deep, violent hatred of the Montagues.
4	Mercutio	A relative of the Prince and a high-ranking man. Mixes well with both families and is Romeo's loyal best friend.	9	Benvolio	Cares about his cousin Romeo and tries to keep peace between the families.
5	Paris	A rich and highly-regarded young man, kinsman to the Prince, who is determined to marry Juliet.	10	Friar Lawrence	A caring, trusted, kind man of the Church who is optimistic about the possibility of peace.

Themes

1	Love	Romantic, sexual, superficial and platonic forms of love are present in the play.
2	Death	The certainty, fear, acceptance and welcoming of death is portrayed in the play.
3	Fate versus Free Will	This is the idea of an inevitable destiny that cannot be escaped.
4	Honour and loyalty	The importance of family & friendship.
5	Masculinity and femininity	The play explores traditional views of masculinity and the role of women: Juliet chooses to control her own destiny.

Context

1	Queen Elizabeth	Reigned from 1558-1603. Her reign saw England prosper and become a major player in Europe. She chose not to marry, defying the expectations of a patriarchal society.
2	Astrology	In both 14th-century Italy and Elizabethan England stars linked to fate and fortune, were believed to predict and influence the course of human events.
3	The role of women	Society was '**patriarchal**' (led by men). Women were said to be lower than men in The Great Chain of Being. Women were expected to marry, to bear children and be subservient to men.

Key Vocabulary

1	Foreshadowing	R&J's deaths are hinted at throughout the play, creating suspense for the audience.
2	Hamartia	Both protagonists can be considered to be tragic heroes: high status, sympathetic characters whose fatal flaws (their impulsiveness) contribute to their inevitable deaths
4	Sonnet	A poem of 14 lines with a strict rhyme scheme, usually associated with love and romance. R&J speak in a shared sonnet when they first meet.
5	Dramatic Irony	Some things are revealed to the audience before the characters, increasing tension.
6	Juxtaposition	Opposites that are placed next to each other. Each idea is being emphasised.
7	Motif	Image, sound, action or other figure that has symbolic significance. Some motifs in R&J include light + dark and poison.

Present Tense

1	Je suis	I am
2	J'ai	I have
3	Je fais	I do/make
4	Je vais	I go
5	J'aime	I like
6	Je déteste	I hate
7	Je joue	I play
8	Je mange	I eat
9	Je bois	I drink
10	Je lis	I read
11	J'achète	I buy
12	Je trouve	I find
13	Je travaille	I work
14	Je pense	I think
15	c'est	it's

Perfect Tense

1	Je suis allé(e)	I went
2	Je suis parti(e)	I left
3	J'ai fait	I did/made
4	J'ai aimé	I liked
5	J'ai détesté	I hated
6	J'ai joué	I played
7	J'ai mangé	I ate
8	J'ai acheté	I bought
9	J'ai trouvé	I found
10	J'ai travaillé	I worked
11	J'ai regardé	I watched
12	J'ai vu	I saw
13	J'ai bu	I drank
14	J'ai lu	I read

Near Future Tense – I am going to…

1	Je vais être	be
2	Je vais avoir	have
3	Je vais aller	go
4	Je vais faire	do
5	Je vais jouer	play
6	Je vais regarder	watch
7	Je vais manger	eat
8	Je vais acheter	buy
9	Je vais travailler	work
10	Je vais voir	see
11	Je vais boire	drink
12	Je vais devenir	become
13	Je vais voyager	travel
14	ce sera	it will be

Conditional Tense – I would like to…

1	Je voudrais être	be
2	Je voudrais avoir	have
3	Je voudrais aller	go
4	Je voudrais faire	do
5	Je voudrais jouer	play
6	Je voudrais regarder	watch
7	Je voudrais manger	eat
8	Je voudrais acheter	buy
9	Je voudrais travailler	work
10	Je voudrais voir	see
11	Je voudrais boire	drink
12	Je voudrais devenir	become
13	Je voudrais voyager	travel
14	ce serait	it would be

Il y a

1	Il y a	There is/are
2	Il y avait	There was/were
3	Il y aura	There will be
4	Il y aurait	There would be

Structures with infinitives

1	J'aime aller/faire	I like going/doing
2	Je n'aime pas aller/faire	I don't like going/doing
3	il faut aller/jouer	you have to go/play
4	on peut/doit aller	you can/must go

Imperfect Tense

1	J'étais	I was/I used to be
2	J'avais	I had/I used to have
3	C'était	It was
4	il y avait	there was/were

Sentence Starters

1	je pense que	I think that
2	je crois que	I believe that
3	à mon avis	in my opinion
4	selon moi	in my opinion
5	je dirais que	I would say that

Connectives

1	et	and
2	ou	or
3	où	where
4	parce que	because
5	car	as
6	mais	but
7	pourtant	however
8	aussi	also

Intensifiers

1	un peu	a bit
2	assez	quite
3	très	very
4	vraiment	really
5	beaucoup	much/ a lot
6	trop	too

Adjectives

1	amusant	fun
2	intéressant	interesting
3	passionnant	exciting
4	utile	useful
5	beau	beautiful
6	fantastique	fantastic
7	incroyable	incredible
8	ennuyeux/ barbant	boring
9	fatigant	tiring
10	difficile	difficult
11	cher	expensive

Signposting Time Frames

1	l'année dernière	last year
2	la semaine dernière	last week
3	hier	yesterday
4	normalement	normally
5	d'habitude	usually
6	ce soir	this evening
7	la semaine prochaine	next week
8	l'année prochaine	next year
9	dans l'avenir	in the future

Frequency

1	tous les jours	every day
2	de temps en temps	from time to time
3	une fois par semaine	once a week
4	deux fois par mois	twice a month
5	ne…jamais	never
6	toujours	always
7	souvent	often
8	quelquefois	sometimes

Exclamations!!!

1	Quel dommage!	What a shame!
2	Quel plaisir!	What a pleasure!

Perfect Phrases For Any Essay

1	Hier je suis allé au cinema/au stade/au restaurant/au parc/au café/à la piscine et c'était…	Yesterday I went to the cinema/stadium/restaurant/park/café/swimming pool and it was…
2	J'ai mangé une pizza/des frites/un hamburger/du jambon/du poisson/une glace et c'était…	I ate a pizza/fries/a hamburger/some ham/fish/an ice-cream and it was…
3	J'ai joué au foot/au tennis/au rugby/au golf et c'était…	I played football/tennis/rugby/golf and it was…
4	J'ai bu un coca/un jus d'orange et c'était…	I drank a coke/an orange juice and it was…

Fancy Phrases

1	je l'ai trouvé génial	I found it great
2	je me suis bien amusé(e)	I really enjoyed myself
3	j'ai tellement hâte	I'm really looking forward to it

Present Tense - I			Perfect Tense (past)- I			Imperfect Tense - I used to			Future Tense – I will			Conditional – I would		
1	Je suis	I am	1	Je suis allé(e)	I went	1	J'étais	… be	1	Je serai	…be	1	Je serais	…be
2	J'ai	I have	2	Je suis parti(e)	I left	2	J'allais	… go	2	J'aurai	…have	2	J'aurais	…have
3	Je fais	I do/make	3	J'ai fait	I did/made	3	J'avais	… have	3	J'irai	…go	3	J'irais	…go
4	Je vais	I go	4	J'ai aimé	I liked	4	Je faisais	… do	4	Je ferai	…do	4	Je ferais	…do
5	Je bois	I drink	5	J'ai détesté	I hated	5	Je jouais	… play	5	Je jouerai	…play	5	Je jouerais	…play
6	Je lis	I read	6	J'ai joué	I played	6	Je regardais	… watch	6	Je regarderai	…watch	6	Je regarderais	…watch
7	Je vois	I see	7	J'ai mangé	I ate	7	J'écoutais	… listen	7	Je mangerai	…eat	7	Je mangerais	…eat
8	J'achète	I buy	8	J'ai acheté	I bought	8	Je mangeais	… eat	8	J'achèterai	…buy	8	J'acheterais	…buy
9	Je trouve	I find	9	J'ai trouvé	I found	9	Je buvais	… drink	9	Je travaillerai	…. work	9	Je travaillerais	…work
10	Je travaille	I work	10	J'ai travaillé	I worked	10	J'achetais	… buy	10	Je verrai	….see	10	Je verrais	…see
11	Je pense	I think	11	J'ai regardé	I watched	11	J'aimais	… like	11	Je boirai	….drink	11	Je boirais	…drink
12	Je crois	I believe	12	J'ai vu	I saw	12	Je lisais	… read	12	Je lirai	…read	12	Je lirais	…read
13	Je dois	I have to	13	J'ai bu	I drank	13	Je travaillais	… work	13	Je partagerai	… share	13	Je partagerais	…share
14	Je peux	I can	14	J'ai lu	I read	14	Je détestais	… hate	14	J'écouterai	… listen	14	J'écouterais	…listen
15	Je veux	I want to												

Present Tense – We/they			Past Tense – We/they			Imperfect – We /they			Future – We /they			Conditional – We/they		
1	On va	We go	1	On a vu	We saw	1	On était	We used to be	1	On sera	We will be	1	On serait	We would be
2	On joue	We play	2	On a fait	We did	2	On avait	We used to have	2	On aura	We will have	2	On aurait	We would have
3	On peut	We/you can	3	On a joué	We played	3	On allait	We used to go	3	On ira	We will go	3	On irait	We would go
4	On fait	We do	4	On est allés	We went	4	Ils étaient	They were	4	Ils seront	They will be	4	Ils seraient	They would be
5	Ils sont	They are	5	On est partis	We left	5	Ils avaient	They had	5	Ils auront	They will have			

Sentence Starters

1	je pense que	I think that
2	je crois que	I believe that
3	à mon avis/selon moi	in my opinion
5	je dirais que	I would say that
6	il me semble que	it seems to me that
7	d'un point de vue personnel	from a personal point of view
8	bien que je sache que	although I know that
9	à cause du fait que	due to the fact that
10	Je considérais que	I would consider that
11	il faut que je dise que	I have to say that

Frequency

1	tous les jours	every day
2	de temps en temps	from time to time
3	une fois par semaine	once a week
4	deux fois par mois	twice a month
5	ne…jamais	never
6	toujours	always
7	souvent	often
8	quelquefois/ parfois	sometimes

Connectives

1	mais	but
2	pourtant	however
3	en revanche	however
4	néanmoins	nevertheless
5	certes	admittedly
6	aussi	also
7	donc	therefore
8	d'ailleurs	besides

Exclamations!!

1	Quel dommage!	What a shame!
2	Quel plaisir!	What a pleasure!

Signposting Time Frames

1	l'année dernière	last year
2	la semaine dernière	last week
3	hier	yesterday
4	normalement	normally
5	d'habitude	usually
6	ce soir	this evening
7	la semaine prochaine	next week
8	l'année prochaine	next year
9	dans l'avenir	in the future

Intensifiers

1	un peu	a bit
2	assez	quite
3	très	very
4	vraiment	really
5	beaucoup de	Lots of
6	trop	too
7	tellement	so
8	extrêmement	extremely

Pronouns

1	Mon/ma/mes	My
2	Son/sa/ses	His/her
3	Notre/nos	Our
4	Leur/leurs	Their
5	Lui/Elle/eux	Him/her/them

Avoir/Etre/Faire

1	C'est	It is
2	Ce sera	It will be
3	Cétait	It was
4	Ce serait	It would be
5	Il y a	There is
6	Il y aura	There will be
7	Il y avait	There was
8	Il y aurait	There would be
9	Il fait beau	It's nice
10	Il fera froid	It will be cold
11	Il faisait chaud	It was hot
12	Il ferait orageux	It would be stormy

Fancy Phrases

1	après avoir mangé	after having eaten
2	je l'ai trouvé génial	I found it great
3	je me suis bien amusé(e)	I really enjoyed myself
4	ça m'a vraiment plu	I really enjoyed it
5	ça en valait la peine	It was worth it
6	je n'aurais jamais pensé	I would never have thought
7	j'ai tellement hâte	I'm really looking forward to it
8	le jeu en vaudra la chandelle	it will be worth it

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A. Ecosystems exist at a range of scales and involve the interaction between biotic and abiotic components.

1	Biotic and Abiotic. Food chains and webs.	The balance between components. The impact on the ecosystem of changing one component.
2	Global ecosystems and Biomes	Distribution and characteristics of large scale natural global ecosystems.
3	Epping forest	An example of a small scale UK ecosystem to illustrate the concept of interrelationships within a natural system, an understanding of producers, consumers, decomposers, food chain, food web and nutrient cycling.

B. Tropical rainforest ecosystems have a range of distinctive characteristics.

1	Rainfall, temperature, structure of a tropical rainforest	The physical characteristics of a tropical rainforest.
2	Relationships between biotic and abiotic components of the rainforest	The interdependence of climate, water, soils, plants, animals and people.
3	Adaptations	How plants and animals adapt to the physical conditions.

Emergent Layer 125ft (38m)
Canopy 95ft (29m)
Understorey 55ft (17m)
Undergrowth 15ft (5m)

C. Deforestation has economic and environmental impacts.

1	Tropical Rainforest-named example	The Amazon rainforest, Brazil
2	Cause of deforestation	economic development, soil erosion, contribution to climate change.
3	Impacts of deforestation	economic development, soil erosion, contribution to climate change.

D. Tropical rainforests need to be managed to be sustainable.

1	Value of tropical rainforests to people and the environment.	Climate regulator, medicine, wood, cultural heritage, habitat, research, precious minerals.
2	Strategies to manage tropical rainforests	Selective logging and replanting, conservation and education, ecotourism and international agreements about the use of tropical hardwoods, debt reduction.

E. Cold environments (polar and tundra) have a range of distinctive characteristics.

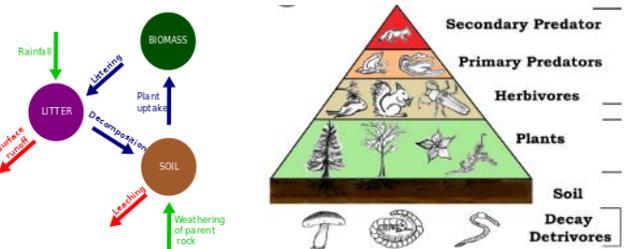| 1	Polar and tundra environments	The physical characteristics of a cold environment.
2	Relationships in a cold environment ecosystem	The interdependence of climate, permafrost, soils, plants, animals and people.
3	Adaptation in cold environments	How plants and animals adapt to the physical conditions.

F. Development of cold environments creates opportunities and challenges.

1	Named example	Alaska USA
2	Opportunities in Alaska	Mineral extraction, energy, fishing and tourism
3	Challenges in Alaska	Extreme temperature, inaccessibility, provision of buildings and infrastructure.

G. Cold environments are at risk from economic development.

1	Wilderness areas	The value of cold environments as wilderness areas and why these fragile environments should be protected.
2	Management of cold environments	Balancing the needs of economic development and conservation in cold environments – use of technology, role of governments, international agreements and conservation groups

Term	Definition
1) Consumer	Creature that eats animals and/or plant matter.
2) Decomposer	An organism such as a bacterium or fungus, that breaks down dead tissue, which is then recycled to the environment.
3) Ecosystem	A community of plants and animals that interact with each other and their physical environment.
4) Food chain	The connections between different organisms (plants and animals) that rely on one another as their source of food.
5) Food web	A complex hierarchy of plants and animals relying on each other for food.
6) Nutrient cycling	A set of processes whereby organisms extract minerals necessary for growth from soil or water, before passing them on through the food chain - and ultimately back to the soil and water.
7) Global ecosystem	Very large ecological areas on the earth's surface (or biomes), with fauna and flora (animals and plants) adapting to their environment. Examples include tropical rainforest and hot desert.
8) Producer	An organism or plant that is able to absorb energy from the sun through photosynthesis.

Term	Definition
9) Biodiversity	The variety of life in the world or a particular habitat
10) Commercial farming	Farming to sell produce for a profit to retailers or food processing companies.
11) Debt reduction	Countries are relieved of some of their debt in return for protecting their rainforests.
12) Deforestation	The chopping down and removal of trees to clear an area of forest.
13) Ecotourism	Responsible travel to natural areas that conserves the environment, sustains the wellbeing of the local people, and may involve education. It is usually carried out in small groups and has minimal impact on the local ecosystem.
14) Logging	The business of cutting down trees and transporting the logs to sawmills.
15) Mineral extraction	The removal of solid mineral resources from the earth. These resources include ores, which contain commercially valuable amounts of metals, such as iron and aluminum; precious stones, such as diamonds; building stones, such as granite; and solid fuels, such as coal and oil shale.
16) Selective logging	The cutting out of trees which are mature or inferior, to encourage the growth of the remaining trees in a forest or wood.

Term	Definition
17) Soil erosion	Removal of topsoil faster than it can be replaced, due to natural (water and wind action), animal, and human activity. Topsoil is the top layer of soil and is the most fertile because it contains the most organic, nutrient-rich materials.
18) Subsistence farming	A type of agriculture producing food and materials for the benefit only of the farmer and his family.
19) Sustainability	Actions and forms of progress that meet the needs of the present without reducing the ability of future generations to meet their needs.
20) Appropriate technology	(Also called Intermediate technology) Technology that is suited to the needs, skills, knowledge and wealth of local people in the environment in which they live. It usually combines simple ideas with cheap and readily available materials, especially for use in poorer countries, and is environmentally friendly.
21) Biodiversity	The variety of life in the world or a particular habitat
22) Fragile environment	An environment that is both easily disturbed and difficult to restore if disturbed. Plant communities in fragile areas have evolved in highly specialized ways to deal with challenging conditions. As a result, they cannot tolerate environmental changes.
23) Polar	The regions of Earth surrounding the North and South Poles. These regions are dominated by Earth's polar ice caps, the northern resting on the Arctic Ocean and the southern on the continent of Antarctica.
24) Tundra	The flat, treeless Arctic regions of Europe, Asia and North America, where the ground is permanently frozen. Lichen, moss, grasses and dwarf shrubs can grow here.
25) Wilderness area	The flat, treeless Arctic regions of Europe, Asia and North America, where the ground is permanently frozen. Lichen, moss, grasses and dwarf shrubs can grow here.

Present Tense

1	Ich bin	I am
2	Ich habe	I have
3	Ich mache	I do/make
4	Ich gehe	I go
5	Ich fahre	I travel
6	Ich mag	I like
7	Ich hasse	I hate
8	Ich spiele	I play
9	Ich esse	I eat
10	Ich trinke	I drink
11	Ich lese	I read
12	Ich sehe	I see
13	Ich kaufe	I buy
14	Ich finde	I find
15	Ich arbeite	I work
16	Ich denke	I think
17	Ich muss	I have to
18	Ich kann	I can
19	Ich will	I want to
20	Es ist	it's

Perfect Tense

1	Ich bin gegangen	I went
2	Ich bin gefahren	I travelled
3	Ich bin geflogen	I flew
4	Ich bin geblieben	I stayed
5	Ich habe gemacht	I did/made
6	Ich habe gespielt	I played
7	Ich habe gegessen	I ate
8	Ich habe getrunken	I drank
9	Ich habe gekauft	I bought
10	Ich habe gearbeitet	I worked
11	Ich habe gesehen	I watched
12	Ich habe gelesen	I read
13	Ich habe gefunden	I found
14	Ich habe besucht	I visited

Using Geben

1	Es gibt	There is/are
2	Es gab	There was/were
3	Es wird…geben	There will be
4	Es würde…geben	There would be

Simple Past

1	Ich war	I was
2	Es war	It was
3	Sie waren	They were
4	Ich hatte	I had
5	Es gab	There was/were

Conditional Fancy

1	Ich wäre	I would be
2	Es wäre	It would be
3	Sie wären	They would be
4	Ich hätte	I would have
5	Es gäbe	There would be

Future/Conditional Tense

Ich werde/möchte… = I will/would like to

1	…sein	be
2	…werden	become
3	…gehen	go
4	…fahren	travel
5	…spielen	play
6	…essen	eat
7	…trinken	drink
8	…sehen	see
9	…arbeiten	work
10	…lesen	read
11	…machen	make/do
12	…besuchen	visit

Structures With Infinitives

1	Ich muss…machen	I have to do
2	Ich darf…machen	I am allowed to do
3	Ich kann…machen	I can do
4	Ich soll…machen	I should do
5	Ich will…machen	I want to do
6	Man muss/kann/soll…machen	You must/can/should do

Sentence Starters

1	Meiner Meinung nach	In my opinion
2	Meines Erachtens	In my opinion
3	Im Großen und Ganzen	All in all
4	Ich denke, dass…	I think that
5	Ich würde sagen, dass	I would say that
6	Ich muss sagen, dass	I have to say that

Connectives

1	und	and
2	aber	but
3	denn	because
4	oder	or
5	jedoch	however
6	außerdem	furthermore
7	weil/da	because
8	dass	that

Intensifiers

1	ein bisschen	a bit
2	ziemlich	quite
3	sehr	very
4	wirklich	really
5	echt	genuinely
6	zu	too
7	so	so
8	ganz	totally

Adjectives

1	lustig	funny
2	interessant	interesting
3	spannend	exciting
4	nützlich	useful
5	schön	beautiful
6	toll	great
7	unglaublich	incredible
8	langweilig	boring
9	anstrengend	tiring
10	schwierig	difficult
11	teuer	expensive
12	billig	cheap

Signposting Time Frames

1	letztes Jahr	last year
2	letzte Woche	last week
3	gestern	yesterday
4	normalerweise	normally
5	gewöhnlich	usually
6	heute Abend	this evening
7	nächste Woche	next week
8	nächstes Jahr	next year
9	in der Zukunft	in the future
10	am Wochenende	at the weekend

Frequency

1	jeden Tag	every day
2	ab und zu	from time to time
3	einmal pro Woche	once a week
4	zweimal pro Monat	twice a month
5	nie	never
6	immer	always
7	oft	often
8	manchmal	sometimes

Exclamations!!!

1	Wie Schade!	What a shame!
2	Wahnsinn!	Wow!

Fancy Phrases

1	Es hat eine Menge Spaß gemacht	It was loads of fun
2	Es hat sich wirklich gelohnt	It was really worth it
3	Das hat mir gefallen	I liked it
4	Ich freue mich schon darauf	I am already looking forward to it
5	Ich werde mich amüsieren	I will enjoy myself

Perfect Past Examples

1	Letztes Wochenende bin ich ins Kino/Café/Restaurant/Stadion/Museum gegangen und es hat eine Menge Spaß gemacht.	Last weekend I went to the cinema/café/restaurant/stadium/museum and it was loads of fun.
2	Ich habe Hähnchen, Pommes und Salat gegessen und ich habe Cola getrunken. Das Essen war sehr lecker und es hat sich wirklich gelohnt. Wahnsinn!	I ate chicken, chips and salad and I drank cola. The food was very tasty and it was really worth it. Wow!

Fantastic Future Examples

1	Nächstes Jahr werde ich mit meinen Freunden nach Berlin fahren und ich freue mich schon darauf.	Next year I will travel with my friends to Berlin. I am already looking forward to it.
2	Ich möchte ins Café gehen und ich möchte Pizza essen. Ich werde mich amüsieren, weil ich Pizza liebe.	I would like to go to café and I would like to eat pizza. I will enjoy myself I love pizza.

Present Tense

1	Ich bin	I am
2	Ich habe	I have
3	Ich mache	I do/make
4	Ich gehe	I go
5	Ich fahre	I travel
6	Ich mag	I like
7	Ich hasse	I hate
8	Ich spiele	I play
9	Ich esse	I eat
10	Ich trinke	I drink
11	Ich lese	I read
12	Ich sehe	I see
13	Ich kaufe	I buy
14	Ich arbeite	I work

Present tense other subjects

1	Er/sie fährt Wir fahren	He/she travels We travel
2	Er/sie sieht Wir sehen	He/she sees We see
3	Er/sie isst Sie essen	He/she eats They eat
4	Er/sie liest Sie lesen	He/she reads They read

Perfect Tense

1	Ich bin gegangen	I went
2	Ich bin gefahren	I travelled
3	Ich bin geflogen	I flew
4	Ich bin geblieben	I stayed
5	Ich habe gemacht	I did/made
6	Ich habe gespielt	I played
7	Ich habe gegessen	I ate
8	Ich habe getrunken	I drank
9	Ich habe gekauft	I bought
10	Ich habe gearbeitet	I worked
11	Ich habe gesehen	I watched
12	Ich habe gelesen	I read
13	Ich habe gefunden	I found
14	ich habe besucht	I visited

Past tense other subjects

1	Er/sie hat…gespielt	He/she played
2	Sie/er ist… gegangen	She/he went
3	Wir haben…gemacht	We did/made
4	Sie sind…gefahren	They travelled

Simple Past

1	ich war	I was
2	es war	it was
3	sie waren	they were
4	ich hatte	I had
5	es gab	there was/were

Conditional Fancy

1	ich wäre	I would be
2	es wäre	it would be
3	sie wären	they would be
4	ich hätte	I would have
5	es gäbe	there would be

Future/Conditional Tense

ich werde/möchte/will = I will/would like to/want to		
Er/sie wird = he/she will Wir werden = we will		
1	…sein	be
2	…werden	become
3	…gehen	go
4	…fahren	travel
5	…spielen	play
6	…essen	eat
7	…trinken	drink
8	…sehen	see
9	…arbeiten	work
10	…lesen	read

Structures With Infinitives

1	ich muss… machen	I have… to do
2	ich darf… machen	I am allowed… to do
3	ich kann… machen	I can… do
4	ich soll… machen	I should… do
5	ich will… machen	I want… to do
6	man muss/kann/soll… machen	you must/can/should… do

Sentence Starters

1	Meiner Meinung nach	In my opinion
2	Meines Erachtens	In my opinion
3	Im Großen und Ganzen	All in all
4	Auf der einen Seite	On the one hand
5	Aber auf der anderen Seite	But on the other hand
6	Es scheint mir, dass	It seems to me that
7	Ich denke, dass…	I think that
8	Ich würde sagen, dass	I would say that
9	Obwohl ich weiß, dass	Although I know that
10	Ich glaube, dass…	I believe that
11	Ich muss sagen, dass	I have to say that

Connectives

1	und	and
2	aber	but
3	denn	because
4	sondern (neg)	but
5	jedoch	however
6	deshalb	therefore
7	trotzdem	nevertheless
8	außerdem	furthermore
9	weil/da	because
10	dass	that
11	obwohl	although
12	wenn	if/when

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2	ich habe mich wirklich amüsiert	I really enjoyed myself
3	es hat sich wirklich gelohnt	it was really worth it
4	das hat mir gefallen	I liked it
5	ich hätte nie gedacht	I would have never thought
6	je (heißer), desto besser	the (hotter) the better
7	ich freue mich schon darauf	I am already looking forward to it
8	es wird bestimmt viel Spaß machen	it will definitely be lots of fun

1.1 Types of Care

Health care settings	Dental practice, GP surgery, Health centre, Hospital, Nursing home, Optician, Pharmacy, Walk-in centre
Health Care Examples	• Visiting the dentist twice a year for a check-up. • Pregnant woman visiting the hospital for an ultrasound scan on her unborn baby. • Visiting Accident and Emergency A and E) at hospital for a sports is.
Social care settings	Residential home, Retirement home, social services department, support group, community centre, day centre, food bank, homeless shelter.
Social Care Examples	• An individual staying at a homeless shelter. • Dementia resident cannot care for themselves in their own home, now living in a residential care home. • A family struggling to cope with the demands of caring for their physically disabled child.

1.2 The Rights of service users

Choice	• Choosing which activities they participate in • Choosing what to eat • Choosing the type of treatment
Confidentiality	• Service users have a duty of care to protect service users' personal information • (verbal and written) • Service providers cannot discuss service users care with their family and friends not directly involved in their care. • Conversations should be in a private room (cannot overhear) • Keep personal information secure in a locked cupboard or filing cabinet. Computers should be password protected • Providers would need a log in with a secure email and password to access data and wear a security badge
Consultation	• Service users should be involved in all decisions that are made about them. • Service providers must find out and respect the service users' opinions, beliefs and concerns to build trust. • Service users involved in decision-making will feel more in control reducing fears or worries they have.
Equal and Fair treatment	• Every service user can access health and social care services, regardless of who they are (not unfairly because of their colour, age, gender, money available or ability to care for themselves. • Misconception - we should treat everyone in the same way, but this means some will be disadvantaged. E.g., providing information in large print, different language, braille.
Protection from abuse and Harm	• Includes health and safety, safe working practices and knowledge of what to do if you have concerns. • Service providers have a duty to prevent harm and abuse - have a clear complaints procedure. • Staff should monitor behaviour, be vigilant and receive the correct training to be able to recognise signs of abuse and how to report them.
Harm	Can occur in unsafe or inaccessible to service users (inadequate lighting, slippery floors, missing handrails equipment not checked regularly, procedures not followed)
Abuse	Can occur deliberately or accidentally (racism, lack of training, sexual orientation) it could be cruel comments, physical action or isolation.

Key Terms

Consultation	Service providers share information with service users and vice versa, so care decisions can be made together.
Physical Hard	Includes smacking, hitting, kicking, shaking and biting. This type of harm can lead to physical injuries such as bruises, burns, bite marks or broken bones.
Emotional Harm	Includes shouting or swearing at a service user, insulting them or ignoring them completely.
Empowerment	Relates to the control or 'power' a service user feels they have over their life
Holistic approach	Consider the emotional and psychological needs as well as the physical health

1.3 The benefits to service users' health and wellbeing when their rights are maintained

Empowerment - Control or 'power' will support the resident to feel stronger and mare confident therefore more independent and self-reliant.

Independence and self-reliance	Encourage service users to remain independent for as long as possible and self-reliance promoting self-worth and self-confidence. Provide physical and intellectual stimulation so the service users life remains interesting and has value. Maintain a service user right to choose leading to self-reliance (involved in all decisions about their care and contributing to self-esteem.
Feelings of Control	Empower service users by ensuring their rights are met giving them a sense of control e.g., Am I okay to listen to your chest?
Choice	Involved in their own care to increase their understanding and increase their self-esteem. A sense of control results in them being likely to agree to care.

High self-esteem - if rights are maintained they will feel valued and respected increasing their self-esteem

Feeling valued	The right of choice will help service users feel valued and worthy of care. More likely to ask for additional support in the future.
Feeling respected	Gain respect by introducing themselves, asking their preferred name and listening to them properly. Will develop a partnership and an understanding based on honesty and trust. Health and wellbeing will improve because of the high standards of care. E.g. correct manual handling techniques used.
Positive mental Health	This contributes to a person's self-esteem and self-worth. Good mental health allows people to cope with change better and identify the benefits of care. Take a holistic approach considering how the person feels about their care.

Service users' needs are not met - care should be specific and well planned to the service user.

Appropriate care or treatment	Service users receive care that is appropriate to their needs showing they are respected and worthy of support. They are more likely to use the service again. Settings should be accessible e.g. lifts, wide doorways and ramps.
Improvements in physical or mental health	If services are appropriate to their needs their health and wellbeing will benefit for example, hunger leads to tiredness and dizziness, lack of focus at school.

Trust - service users will feel safe and confident with the care provided.

Safety from harm	Trusting relationships will allow confidence to develop because they feel safe. Settings should be secure (locks and keypads working, intruders cannot enter) Staff should wear identification to keep service users safe.
Best interests	Care should have their best interest at heart. Gives reassurance and confidence in their care. Staff training makes service users safe
Confidence in the care received	Trust gives service users confidence in their care and to ask questions. They will feel worthy, valued, respected and safe. Trust is linked to confidentiality where conversations are not overheard. This creates confidence.

1. French Indochina

1	Who controlled Vietnam before WWII?	1. The French took control of Vietnam and it's surrounding countries in the 19th Century. 2. It was known as French Indochina 3. French rule was harsh for the Vietnamese people
2	Who were the Vietminh?	1. During WWII, Japan invaded and occupied Indochina 2. Japanese rule was even more difficult than French rule had been 3. Ho Chi Minh, a Vietnamese Communist, formed a resistance group to fight against the Japanese
3	What was the First Indochina War?	1. After the Japanese surrender, France decided to fight to regain control over it's old colony 2. The Vietminh continued to fight for Vietnamese independence 3. The war ended in 1954 with French defeat at the Battle of Dien Bien Phu
4	What did the Geneva Conference agree?	1. In 1954, representatives from Vietnam, the Vietminh, France and the USA met in Geneva 2. They agreed that Vietnam would be split along the 17th Parallel – to be reunited in 1965 with an election 3. The North would be run by Ho Chi Minh and the South would be run by Ngo Dinh Diem

2. Diem's Rule

1	How did Diem rule?	1. He was a harsh and corrupt ruler 2. He was an extreme Catholic and oppressed Buddhists in his country 3. He took lands off peasants to give to his friends and family 4. He rigged the 1955 election in South Vietnam and arrested anyone who opposed him
2	Who opposed Diem?	1. Buddhists organized hunger strikes, mass rallies and press conferences 2. A monk called Thich Quang Duc burned himself alive while other Buddhists handed out leaflets calling for change 3. The NLF were a nationalist group who wanted to unite Vietnam 4. The NFL targeted Diem's officials
3	Civil War in South Vietnam	1. By 1957, civil war broke out between the NLF and the ARVN 2. The NLF were sent money and supplies by Ho Chi Minh 3. The ARVN had the support of the USA, who sent money, weapons, military vehicles and military advisors 4. Over the 1950s the USA sent $1.6 billion to the ARVN 5. In 1961 Kennedy became US president and decided to withdraw his support for Diem 6. Diem and his brother were killed in a coup by his own generals in November 1963

3. Early US involvement

1	Why did the US get involved?	1. The US were fearful of the spread of communism in Asia, especially after the outcome of the Korean War 2. By the mid 1950s, US politicians were convinced that the USSR and China were committed to spread communism 3. Eisenhower first used the term Domino Theory to describe his fear of Laos, Cambodia and Thailand becoming communist if Vietnam did

2	Eisenhower's actions	1. In November 1955 Eisenhower sent military advisors to train the ARVN 2. Between 1955 and 1960 he sent nearly $2 billion in aid to South Vietnam 3. Between 1954-1961 he gave Diem 78% of the US foreign aid budget	3	Kennedy's actions	1. Increased the number of military experts in Vietnam to 16,000 2. Sent 300 US helicopter pilots to South Vietnam to transport ARVN troops 3. Supported the Strategic Hamlet Programme 4. Increased financial aid to South Vietnam – ARVN troops increased by 20,000 by the end of 1961

Key word	Definition
17th Parallel	The dividing line between North Vietnam and South Vietnam
ARVN	Army of the Republic of Vietnam - The national army of South Vietnam.
Containment	The US policy of limiting the spread of any more communism.
Democratic Republic of Vietnam	The name given to the North of Vietnam by Ho Chi Minh
Domino Theory	The political idea that if one nation fell to Communism, the surrounding ones would too
French Indochina	The French colonial term for Cambodia, Laos, and Vietnam
Guerrilla Tactics	A type of warfare that relies on surprise raids and sabotaging communication and supply lines
NLF	National Liberation Front. Formed to fight against Diem's rule
Republic of Vietnam	The corrupt, U.S.-backed government of South Vietnam
Strategic Hamlet Programme	A programme that forced peasants to leave Vietcong controlled areas into fortified villages
Viet Cong (VC)	Slang term for the North Vietnam army used by the USA
Vietminh	Vietnamese Communist resistance forces, based in northern Vietnam and led by Ho Chi Minh

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4. How did USA become directly involved in Vietnam?

1	President Johnson's views	1. When Kennedy was assassinated, his vice president Johnson took over. He was re-elected in 1964 2. He wanted to continue Kennedy's peaceful involvement but his advisors wanted him to become more involved 3. Johnson set up Operation 34A to send mercenaries into North Vietnam and US naval ships into the Gulf of Tonkin
2	What was the Gulf of Tonkin incident?	1. One naval ship patrolling the Gulf of Tonkin was the USS Maddox 2. In August, when the Maddox was thought to have been attacked by North Vietnamese boats, Johnson used this as justification to declare war
3	The Gulf of Tonkin Resolution	1. 7th August 1964, the Gulf od Tonkin Resolution was passed 2. This gave the president permission to take any military action necessary 3. Within six months, the US had launched a mass bombing campaign 4. By March 1965, 3500 US marines arrived in South Vietnam

5. Vietcong tactics

1	Guerrilla tactics	1. Guerrilla fighters did not wear uniform so they were hard to tell apart from civilians 2. They work in small groups, attacked and raided enemy camps in surprise attacks 3. These tactics are designed to destroy the morale of the enemy
2	The Ho Chi Minh Trail	1. This was a 15,000 km supply route for the North Vietnamese government to supply the Vietcong with weapons 2. The Vietcong received 60 tonnes of supplies, weapons and equipment per day
3	Hanging on the belt	1. The Vietcong stayed close to the US troops so they could launch surprise attacks 2. Around 51% of US casualties were caused by Vietcong ambushes 3. This was also a way to avoid bombing attacks
4.	Chu Chi Tunnels	1. The Vietcong built a tunnel system over 300km long to avoid detection 2. They contained workshops, hospitals, storehouses and kitchens
5	Booby traps	1. Punji traps were booby traps made of sharped bamboo – the Vietcong would tip the spikes with excrement to create infection 2. Bouncing betties were land mines that launched into the air and exploded at stomach height 3. 10% of US deaths were caused by Vietcong booby traps

6. US tactics

1	Operation Rolling Thunder	1. This was a mass bombing campaign targeting North Vietnamese government buildings 2. From 1964-1967 1 million tonnes of bombs were dropped
2	Search and destroy	1. A tactic where US soldiers would search villages for Vietcong soldiers and destroy the village as a warning 2. They became known as zippo raids after the lighter used to burn down the village 3. This caused terror and hatred for the US
4	Cluster bombs	1. Sometimes called pineapple bombs. 2. They exploded in the air and released up to 600 smaller bombs to cause injury and attract medics to the scene
5	Chemical weapons	1. Agent Orange was a highly toxic weed killer the US used to destroy the jungle 2. Agent Blue was used to destroy crops and disrupt the Vietcong's food supplies 3. There chemical weapons could birth defects in newborns 4. Napalm was used to burn through jungles but would also burn through skin and bone.
6	Impact of US tactics	1. The tactics were horrific and caused hatred of the US as many innocent civilians were killed 2. There was some success in disrupting the supply lines but not for long

Key word	Definition
Agent Blue/Orange	A chemical herbicide and defoliant that U.S. forces sprayed to expose Vietcong hideouts
Bouncing Betty	A form of landmine used by the US troops in Vietnam
Cluster Bomb	Bombs used to cause maximum damage and attract medics for a second explosion
Fragging	When US servicemen killed their own superior officers
Napalm	A flammable, sprayable, gasoline-based gel used by the US troops
Operation Rolling Thunder	Blanket bombing tactic used by the US troops
Search and Destroy	US military strategy of proactively to locate and kill Viet Cong forces.
Zippo raid	Search and destroy missions which involved burning down Vietnamese villages

7. Morale

1	What was US morale like?	1. US soldiers became disheartened from repeated ambush attacks 2. Some were traumatised by the effects of the tactics there were using
2	Impact of low morale	1. Some soldiers began to blame the Vietnamese people and taking out their frustrations on them 2. Some soldiers became so frustrated that they would murder their commanding officers to avoid carrying out their orders

7. The Tet offensive

1	What was the Tet offensive?	1. Om 30th January 1968, there was a temporary ceasefire to honour the Vietnamese new year 2. 84,000 Vietcong and North Vietnamese troops attacked over 100 towns, cities and US bases 3. There was also an attack on the US embassy in Saigon
2	How did it end?	1. Although the Vietcong had early successes 2. The US forces quickly regained control of the attacked areas 3. Around 50,000 North Vietnamese and 10,000 Vietcong fighters were killed while only 10,000 US and ARVN troops were killed
3	Why was it important?	1. It was a major political and psychological victory for the Vietcong 2. The offensive was filmed and photographed by US journalists
4	Impact of the Tet Offensive	1. After the offensive the US public became increasingly disillusioned with the war – they realised the US weren't close to winning 2. At the end of March, Johnson announced that he would not be running for re-election 3. General Westmoreland (head of US forces in Vietnam) was replaced in June 4. US forces used an enormous amount of artillery and air power – the war was costing $30 billion a year 5. A huge number of Vietnamese civilians were killed during the offensive – leading to further opposition.

8. The My Lai Massacre

1	Background to the massacre	1. The Charlie company were a unit of the US army. 2. They suffered 28 casualties including 5 dead as a result of sniper attacks and booby traps
2	What was the My Lai Massacre?	1. In early March, it was reported that a Vietcong base in 200 the My Lai area. 2. Charlie company were ordered to go on a search and destroy mission 3. They began firing as soon as they landed and destroying houses 4. No Vietcong guerrillas were discovered. 5. The soldiers killed somewhere between 300 and 500 civilians. 6. Some soldiers also tortured and raped some of the villagers
3	What happened afterwards?	1. When the US troops returned they reported that only 22 civilians had been killed and the rest were Vietcong fighters. 2. In March 1969 a soldier named Ronald Ridenhour wrote letters to 30 US politicians and military officials exposing the massacre 3. Time magazine published photographs of the massacre taken by an official army photographer
4	The Investigations	1. There were 2 investigations into the massacre. 2. The final report concluded that the Charlie company were guilty of murdering unarmed civilians and recommended action against the men guilty of rape, murder and cover-up 3. In early 1970, 14 high-ranking army officials were charged with covering up the truth but most charges were dropped 4. Only Lieutenant Calley was charge guilty with the murder of 109 people. He was sentenced to life in prison. 5. After some protest, President Nixon was released in November 1974
6	Impact of the massacre	1. The US were deeply shocked by the brutality of their own troops 2. Mistrust of the army and the government increased 3. In late 1969, around 700,000 people protested against the war in Washington

7. Anti-war protest under Johnson

1	Why did people oppose the Vietnam war?	1. Some people objected on moral grounds, asking why humans were bombing other humans 2. Other people questioned why the US were fighting instead of helping South Vietnam 3. People were shocked by the imaged of their own soldiers being killed- the average age of a Vietnam combat soldier was 19. 4. Martin Luther King declared he was against the war, arguing that the money should be spent on the problems in the USA. 5. The draft system was unfair, especially when there were a disproportionate amount of black people being drafted. 6. Many men, known as draft dodgers, tried to avoid being called up to the army – famously Muhammad Ali was arrested for draft dodging 7. Johnson had promised to improve the USA with his Great Society Project, but instead the war was costing $30 billion a year
2	How did people protest?	1. In October 1965 there were anti war protests in more than 90 US cities 2. In October 1967 100,000 protesters gathered at the Lincoln memorial 3. An organization called the SDS began organizing 'teach ins' and organized lectures 4. Often protests became violent and protestors clashed with the police 5. Johnson was personally criticised., student protestors chanted "Hey, hey LBJ! How many kids did you kill today?"

AC2.1 Describe the operation of the back of house

1	**Storage area**	For storing ingredients & materials
2	**Preparation & cooking areas**	For preparing fish, veg, meat and cold dishes
3	**Serving area**	Where food is presented and plated for customers
4	**Dirty area**	Where rubbish waste food, and washing up is done.
5	**Staff area**	Where employees can change, store belongings and use the toilet
6	**Workflow**	For kitchen to work efficiently it needs to have a logical layout for good workflow
7	**Kitchen equipment**	Includes: large, mechanical, small hand-help and first aid and safety equipment
8	**Materials**	For cleaning, food preparation, waste disposal, employee welfare and maintenance
9	**Stock control**	Use a first in, first out policy.
10	**Documentation / admin**	E.g. staff training records, H&S policies, stock, food safety documents
11	**Dress code**	Uniform must be clean, professional, protect body and worn in kitchen only
12	**Safety and security**	Employees need to be aware of risks in kitchen

AC2.1 Describe the operation of front of house

1	**Entrance/ reception**	To greet customers & guide them to a table
2	**Waiting area**	To hold & entertain customers whilst they wait for a table
3	**Bar area**	For customers to have a drink
4	**Dining area**	To serve customers their meal. Usually divided into sections for waiting staff to attend to.
5	**Cloakroom / toilers**	For customers to use to make them more comfortable
6	**Workflow**	The way food passes from the kitchen to the customers.
7	**Equipment**	Includes equipment for; table top, food service, waiting at table, customer seating, organisation, first aid/safety and bar area.
8	**Materials**	For cleaning, food preparation, waste disposal, employee welfare and maintenance
9	**Stock control**	Use a first in, first out policy.
10	**Dress code**	Creates first impression, uniform must be clean, no heavy make-up/jewellery or perfume, can identify staff
11	**Safety and security**	Employees need to be aware of risks in front of house area

AC2.2 Customer requirements

1	**Customer needs**	Things the customer requires when purchasing a product or service.
2	**Customers rights / equality**	Customers have legal rights to protect them when buying products/services

AC2.3 Explain how hospitality and catering provision meets customer requirements

1	**Customer trends**	Businesses need to keep up date with trends e.g online services
2	**Dietary requirements**	Info on: nutrition, food allergies + intolerances & dietary needs
3	**Leisure requirements**	Sports activities, holidays, tourism, outdoor pursuits
4	**Business requirements**	Conferences, meeting, exhibitions, staff training, award ceremonies
5	**Local residents**	Employ local and support economy

Key Vocabulary

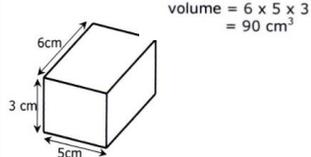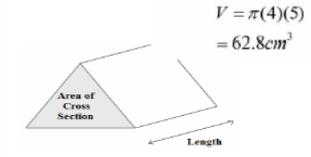|		
1	**Covers**	Customer food orders that are sent to the kitchen
2	**FIFO**	First in, first out- using food stocks in rotation
3	**Customer requirement /expectation**	Factors that decide whether or not a customer is satisfied with the service they receive
4	**Market research**	Ways of finding out customers' needs, requirements and expectations

❑ **Define the 3 levels of customer requirements and expectations**

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Probability

| 3 | Sample Space | The **set of all possible outcomes** of an experiment. |

+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Geometry and Measure – Area, Length and Volume

1	Volume of a Cube/Cuboid **V**$= Length \times Width \times Height$	volume = 6 x 5 x 3 = 90 cm³ 6cm 3 cm 5cm
2	Volume of a Prism $V = Area\ of\ Cross\ Section \times Length$	$V = \pi(4)(5) = 62.8cm^3$ Area of Cross Section Length
3	6. Volume of a Cylinder $V = \pi r^2 h$	$V = \pi x\ 2^2 x\ 5 = 62.8$ cm³ 5cm 2cm
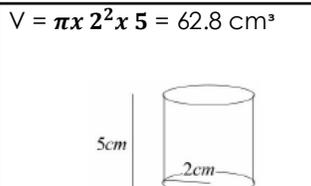
Number – Indices and Standard Form

1	Square Number 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225…	The number you get when you **multiply a number by itself.**
2	Square Root $\sqrt{36} = 6$	The **number you multiply by itself** to get another number (The reverse process to squaring a number)
3	Cube Number 1, 8, 27, 64, 125…	The number you get when you **multiply a number by itself and itself again**.
	Cube Root $\sqrt[3]{125} = 5$	The **number you multiply by itself and itself again** to get another number. The reverse process of cubing a number.
4	Multiplying with Standard Form $(1.2 \times 10^3) \times (4 \times 10^6)$ $= 8.8 \times 10^9$	**Multiply the numbers** and **add the powers**.
5	Dividing with Standard Form $(4.5 \times 10^5) \div (3 \times 10^2)$ $= 1.5 \times 10^3$	**Divide the numbers** and **subtract the powers**.
6	Adding or subtracting with Standard Form $2.7 \times 10^4 + 4.6 \times 10^3$ $= 27000 + 4600$ $= 31600$	**Convert** in to **ordinary** numbers, **calculate** and then **convert back** in to standard form

Key Vocabulary

1	Formulae	Show the relationship between two or more variables
2	Substitution	Replace letters with numbers.
3	Inverse	Opposite
4	Volume	The amount of space inside a solid shape.
5	Surface Area	The total area on the surface (faces) of a three-dimensional shape
6	Prism	A prism is a 3D shape whose **cross section is the same** throughout.
8	Mutually Exclusive	Events are mutually exclusive if they **cannot happen at the same time**.

Geometry: vectors

1	**Add and subtract vectors**	If $x = \binom{a}{b}$ and $y = \binom{c}{d}$ $x + y = \binom{a+c}{b+d}$ $x - y = \binom{a-c}{b-d}$
2	**Multiplication of a vector by a scalar**	$4 \times \begin{bmatrix} 1 \\ 2 \end{bmatrix} = \begin{bmatrix} 1 \times 4 \\ 2 \times 4 \end{bmatrix} = \begin{bmatrix} 4 \\ 8 \end{bmatrix}$
3	**Represent a vector on a diagram**	direction magnitude $\binom{4}{-5}$

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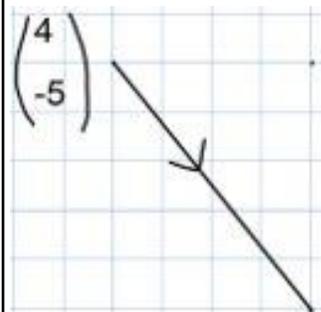
Algebra – Simultaneous Equations

1	**Solve by Substitution**	Usually used for quadratic equations – Rearrange and Substitute
2	**Solve by Elimination**	Usually used for linear equations – same signs subtract, different signs add.
3	**Solve Graphically**	The solution is found at the points of intersection

Geometry & Measure – Properties of Circles

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

6	Alternate segment	7	Equation of a circle $$x^2 + y^2 = r^2$$ Circle with centre (0,0) and radius r

Key Vocabulary

1	Chord	A line which touches the circumference at each end	
2	Arc	A section from the circumference of a circle	
3	Segment	The region of a circle bounded by a chord and the arc subtended by the chord	
4	Sector	The region of a circle bounded by two radii and an arc	
5	Tangent	A line outside a circle which only touches the circumference at one point	

$x^2 + y^2 = 16$ (r = $\sqrt{16}$ = 4)
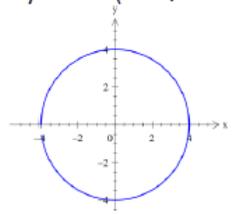
Ratio, Proportion and rates of change – Compound Measures

1	

Density	$density = \frac{mass}{volume}$ The mass of a substance contained in a certain volume Usually measured in g/cm³ or kg/m³	M / D V
Pressure	$pressure = \frac{force}{area}$ The force applied over an area Usually measured in N/m²	F / P A
Speed	$speed = \frac{distance}{time}$ The distance travelled in an amount of time Usually measured in m/s (metres per second) or km/h (kilometres per hour) or mph (miles per hour)	D / S T

2	Distance-Time Graphs	A = steady speed, B = no movement, C = steady speed back to start

3	Velocity-Time Graphs The area under the graph = distance travelled	A = steady acceleration, B = constant speed, C = steady deceleration back to a stop

Geometry & Measure – Construction

1	Angle bisector	
2	Perpendicular bisector	
3	Constructing 60° angles	

Geometry & Measure – Loci

1	Circle		The locus of points that are a fixed distance from a fixed point
2	Parallel lines		The locus of points a fixed distance from a fixed line
3	Perpendicular bisector		The line that cuts another in half at right angles
4	Angle bisector		The locus of points equidistant between two fixed points

Key Vocabulary

1	Compound Measures	Combine measures of two different quantities
2	Velocity	Speed in a given direction, measured in m/s
3	Acceleration	The rate of change of velocity, measured in m/s²

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1. Instrumental families

1	**Strings**	Violin, Viola, Cello, Double Bass and Harp
2	**Brass**	Trumpet, Trombone, French Horn and Tuba
3	**Woodwind**	Flute, Oboe, Clarinet, Bassoon and Saxophone
4	**Percussion**	Bass drum, snare drum, Triangle, Cymbal, Drum kit, Timpani, Glockenspiel and Xylophone
5	**Keyboards**	Piano, Electronic keyboard, Harpsichord, Organ and Synthesizer
4	**Other**	Electric guitar, Bass guitar, Spanish/Classical Guitar, Traditional world instruments.

2. Instrumental terms

1	**Pizzicato**	Plucking the strings
2	**Double stopping**	Playing two strings at the same time
3	**Arco**	Using a bow to play a stringed instrument.
4	**Tremolo**	A 'trembling' effect, moving rapidly on the same note or between two chords (e.g. using the bow rapidly back and forth).
5	**Tongued**	A technique to make the notes sound separated (woodwind/brass).
5	**Slurred**	Notes are played smoothly
5	**Muted**	Using a mute to change/dampen the sound (brass/strings).
5	**Drum roll**	Notes/beats in rapid succession.
9	**Glissando**	A rapid glide over the notes.
10	**Trill**	Alternating rapidly between two notes.
11	**Vibrato**	Making the notes 'wobble' up and down for expression

3. Composing techniques

1	**Theme**	The main tune/melody.
2	**Motif**	A short musical idea (melodic or rhythmic).
3	**Leitmotif**	A recurring musical idea linked to a character/object or place (e.g. Darth Vader's motif in Star Wars).
4	**Underscoring**	Music playing underneath the dialogue
5	**Scalic**	Melody follows the notes of a scale
6	**Triadic**	Melody moves around the notes of a triad.
7	**Fanfare**	Short tune often played by brass instruments, to announce someone/something important; based on the pitches of a chord.
8	**Pedal note**	A long, sustained note, usually in the bass/ lower notes
9	**Ostinato/riff**	A short, repeated pattern
10	**Conjunct**	The melody moves by step
11	**Disjunct**	The melody moves with leaps/intervals
12	**Consonant harmony**	Sounds 'good' together
13	**Dissonant harmony**	Sounds 'clashy'
14	**Chromatic harmony**	Uses lots of semitones/accidentals that's not in the home key
15	**Minimalism**	A style of music using repetition of short phrases which change gradually over time

Listen to Film music by John Williams, Ennio Morricone, Thomas Newman, Hans Zimmer and Howard Shore for a range of different film music soundtracks.

1.1e. Effects of Exercise on Body Systems

KG1 – Short Term Effects of Exercise

Muscular System

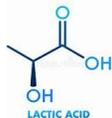|	Short Term Effect	Description	Link to Sport
1	Increased muscle temperature	Heat is released into the muscle during energy production Increases the pliability (stretch) of the muscle	A sprinter can take larger strides when sprinting without risk of injury
2	Increased Lactic Acid production	Produced during **anaerobic** activity (without oxygen). Causes muscle pain and fatigue Performance deteriorates / stops	A 200m runner has to slow down towards the end of the race

Respiratory System

	Short Term Effect	Description	Link to Sport
3	Increased respiratory rate	Respiratory muscles contract faster to take **more breaths per minute** More O_2 is breathed in, more CO_2 breathed out	
4	Increased tidal volume	Respiratory muscles contract with more force to take **deeper breaths** Increased gaseous exchange More O_2 is breathed in, more CO_2 breathed out	A marathon runner can create more energy **aerobically** and run for longer before fatigue.
5	Increased minute ventilation	**More breaths** taken **per minute** More O_2 is breathed in, more CO_2 breathed out	

KG1 – Short Term Effects of Exercise

Cardiovascular System

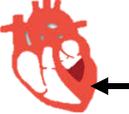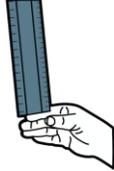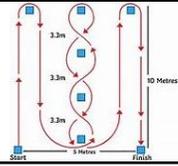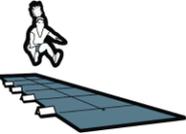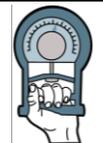|	Short Term Effect	Description	Link to Sport
6	Increased Heart Rate	1. Adrenaline causes an **anticipatory rise** in HR **immediately before** exercise 2. HR increases rapidly at the **start** of exercise 3. HR **continues to increase with intensity** or will **plateau during steady state** exercise 4. HR decreases when exercise **ends,** returning to resting HR	A climber can get O_2 to his muscles and remove waste products to contract their muscles whilst climbing
7	Increased Stroke Volume	More blood is pumped out of the heart **per beat**	
8	Increased Cardiac Output	More blood is pumped out of the heart per **minute** Increased blood flow More O_2 delivered to working muscles More waste products (CO_2 and Lactic Acid) removed	
9	Redistribution of blood flow	1. Vascular shunt mechanism 2. Vessels to working muscles and skin vaso**dilate** to increase blood flow 3. More O_2 delivered to **working** muscles and ore waste products (CO_2 and Lactic Acid) removed 4. Heat released through skin 5. Vessels to organs vaso**constrict** to redirect blood to muscles	A triathlete can deliver enough O_2 to their working muscles to complete all events, and remove heat to avoid overheating
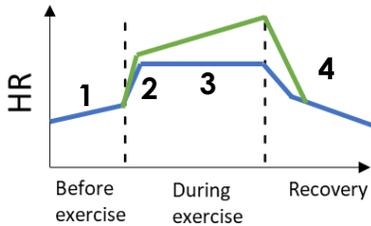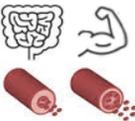
1.1e. Effects of Exercise on Body Systems

KG2 – Long Term Effects of Exercise

Skeletal System

	Long Term Effect	Description	Link to Sport
10	Increased bone density	Bones get thicker and stronger, reducing risk of injury Reduces the risk of Osteoporosis (brittle bone disease)	A footballer is less likely to break their leg when tackled

Muscular System

	Long Term Effect	Description	Link to Sport
11	Muscle hypertrophy	Muscle fibres grow bigger and stronger	A rugby player can push players easier in a scrum
12	Increased muscular strength	Weight / resistance training causes muscles to get stronger and more powerful	A gymnast can perform a pull up on the bars
13	Increased muscular endurance	Endurance training causes muscles to be able contract for longer before fatiguing	A netball player can perform for the entire 60 minutes without muscles tiring
14	Increased resistance to fatigue	Lactic acid is broken down more efficiently and removed quicker Muscles can work for longer before fatiguing	An 800m runner can run faster, for longer, before fatiguing
15	Increased stretch in muscle	Causes muscle to contract quicker and with more force Increases range of movement in muscle	A boxer can punch with more speed and power A hurdler is less likely to get injured when getting into the hurdle position

KG2 – Long Term Effects of Exercise

Cardiovascular System

	Long Term Effect	Description	Link to Sport
16	Hypertrophy of heart wall	The wall of the left ventricle becomes thicker and stronger The heart beats with more force	
17	Increased stroke volume (at rest and during exercise)	A stronger heart means it pumps **more blood** out of the left ventricle **per beat**	A swimmer can swim faster, for longer, before fatiguing
18	Increased cardiac output during exercise	**More blood** is pumped out of the left ventricle **per minute.** More O_2 is delivered to working muscles Waste products (CO_2 and Lactic acid) removed quicker	
19	Decreased resting heart rate	An increased stroke volume means the heart **beats less times per minute (bradycardia)** Heart rate returns to resting quicker after exercise (quicker rate of recovery)	A hockey player can recover quicker between sprints

Respiratory System

	Long Term Effect	Description	Link to Sport
20	Increased strength of respiratory muscles	Diaphragm and intercostals get stronger (hypertrophy)	
21	Increased tidal volume during exercise	Respiratory muscles contract with more force to take deeper breaths Increased gaseous exchange	A rower can create more energy **aerobically,** so they can row for longer before fatiguing.
22	Increased minute ventilation during exercise	More breaths taken per minute More O_2 is breathed in, more CO_2 breathed out	
23	Increased capilliarisation of alveoli	Alveoli surface area increases More capillaries formed around the alveoli Results in increased sites for gaseous exchange	

1.2.a.   Components of Fitness

KG1 – Components of Fitness

	Principle	Description	Sporting Example	Fitness test	Protocol (Main Points)
1	**B**alance	The ability to maintain your center of mass over a base of support	A gymnast doing an arabesque on the beam A rugby player in a scrum to avoid falling over	Stork stand test	1. Hands on hips 2. One foot against knee of standing leg 3. Raise the heel of standing leg 4. Time until heel drops or moves from knee
2	**C**oordination	The ability to move different body parts together effectively	A tennis player serving, coordinating the racket with the ball A cricketer batting, coordinating the bat with the ball	Wall throw test	1. Stand 2m from wall 2. Throw underarm against wall with left hand 3. Catch with right hand 4. Throw with right hand 5. Catch with left 6. Time for 30s 7. Count number of completed catches
3	**R**eaction Time	The time taken to respond to a stimulus	A sprinter reacting to a gun at the start of the race A goal-keeper reacting to the ball from a shot	Reaction time ruler test	1. Partner holds ruler between outstretched index finger and thumb of dominant hand 2. Top of thumb level with 0cm line 3. Partner randomly drops ruler 4. Catch as soon as possible 5. Record distance from 0cm line to top of thumb in cm
4	**A**gility	The ability to change direction at speed	A rugby player weaving through defenders A boxer dodging a punch	Illinois Agility Test	1. Lie on front with head facing start line 2. On 'go' start timing 3. Runner runs around course in direction shown 4. Record time taken to reach finish line (in secs)
5	**P**ower	The product of strength and speed	A basketballer to jump to block a shot A high jumper to jump as high as possible	Vertical / Sargant Jump Test	1. Stand side on to wall 2. Reach up with hand closest to wall 3. Measure point where top of fingers touch 4. With chalk on fingers, jump and touch wall at highest point of jump 5. Repeat 3 times 6. Measure distance between standing reach and jump reach of best attempt (in cm)
				Standing Broad Jump Test	1. Stand with feet facing forward 2. From standing, jump as far as you can 3. Measure from start to closest landing point (usually back of heels)

KG1 – Components of fitness

	Principle	Description	Sporting Example	Fitness test	Protocol (Main Points)
6	**S**peed	The ability of the body to move quickly	A 100m Sprinter finishing as fast as they can / A boxer throwing punches as fast as they can	30m Sprint Test	1. Mark 30m with two cones 2. Accelerate towards first cone 3. Start timing as you pass first cone 4. Sprint as fast as you can to second cone 5. Stop timer as you pass second cone
7	**M**uscular endurance	The ability of a muscle(s) to repeatedly contract without fatigue	A rower to repeatedly row for the whole race / A cyclist in Tour de France to keep pedalling for the whole race	Sit-up Test / Press-up Test	1. Complete as many sit-ups or press-ups (or modified press-ups) as you can in one minute
8	**S**trength	The maximum force a muscle(s) can apply against resistance	A weightlifter to lift weight over the head / A rock climber to pull themselves over an overhang	Grip Strength Dynamometer Test	1. Use grip dynamometer 2. Use dominant hand to squeeze as hard as possible 3. Repeat 3 times with 1 minute rest between 4. Record best result in KG
				1 Repetition Maximum (1RM)	1. Select appropriate exercise for target muscle group 2. Select a realistic, achievable weight and lift once 3. Rest for 2-3 minutes 4. Increase weight and lift again 5. Continue until can no longer lift weight 6. Record highest repetition (1RM)
9	**F**lexibility	The range of movement possible at a joint	A gymnast to perform splits / A high jumper to bend their back when going over the bar	Sit and Reach Test	1. Sit on floor, placing soles of feet against sit and reach box, making sure knees are flat against the floor 2. Gently reach forwards as far as possible 3. Practice 3 times and then hold the fourth for at least 2s 4. Record the distance in cm to the end of fingers
10	**C**ardiovascular endurance	The ability to release energy aerobically over a long period of time	A marathon runner to be able to get O2 to leg muscles for whole race / A long-distance swimmer to be able to get O2 to arm and leg muscles for whole race	12 minute Cooper run	1. Mark out a running area (e.g. 25m x 25m) 2. Run for 12 minutes 3. Count the number of laps completed 4. Measure the distance covered in m
				Multi-Stage Fitness Test	1. Set out cones 20m apart 2. Follow multi-stage fitness test recording to run 20m shuttles. 3. Arriving at the cone before or as the recording bleeps 4. If you fail to meet cones in time, two times in a row, stop. 5. Record level you last successfully completed

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BACKGROUND INFORMATION

Artistic Director	Scott Graham, formed in 1994
Aim of Work	Frantic Assembly makes exciting, high-energy, modern theatre that people remember. Their style uses strong movement, cool design, music, and spoken words all together. They believe in teamwork and collaboration, and everything they do shows how important working together is.

FRANTIC ASSEMBLY'S STYLE

1	Physical Theatre	The use of the body as the primary (but not exclusive) method for story telling. This can include dance, mime, demonstrative movement, use of sound to create atmosphere and mood, as well as dialogue.
2	Music	Music is very important in Frantic's work. It is used in the devising process to create music to and creates mood and atmosphere for the audience.
3	Lighting	The lighting is usually integrated with the choreography to help tell the story. Lighting states drive the focus of the audience and help to create the atmosphere. Projection and LED pixel mapping is often used.

Key Works

1	Things I Know to be True	A show about love in many of its forms. At times comforting and supportive. At others suffocating and destructive. But always love.
2	Lovesong	The show focuses on an older couple who were struggling to come to terms with an illness. As they entered a crucial week in their lives their house became filled with ever vivid memories of each other.
3	Beautiful Burnout	Frantic Assembly wanted to make a show about that conflict, looking with an open mind about the attraction of boxing to those who partake and exploring their feelings about the potential for damage
4	Hymns	A physically demanding show: Four friends are reunited by the death of another friend. As they drink and reminisce it becomes clear that their relationships were not all equal and someone has a big secret.
5	The Curious Incident of the Dog in the Night-time	This show involves inventive and complex choreography to animate Christopher's world and share his singular viewpoint with the audience as he makes his way through Swindon to London to discover the truth.

Contextual Links:
Theatre Company Website: https://www.franticassembly.co.uk/
Book: 'The Frantic Assembly Book of Devising Theatre (2009)
Building Blocks for Devising: https://www.youtube.com/watch?v=qUaZPfGIXAU
Things I Know to be True (show teaser): https://www.youtube.com/watch?v=9PHL8wcefY

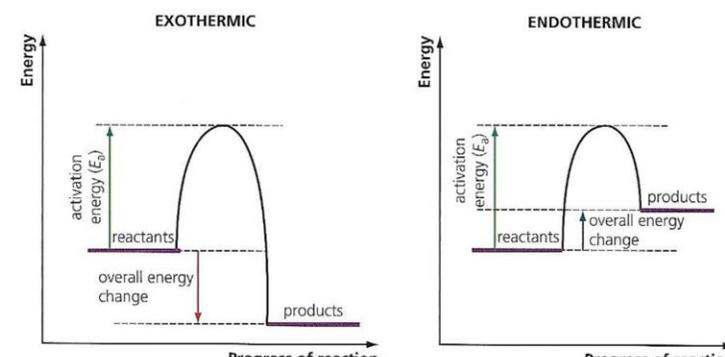## FRANTIC ASSEMBLY KEY TECHNIQUES

1	Push Hands	A movement exercise to enhance partnership and teamwork. Actors move together with joined hands Hands are placed palm to palm, the person with their hands on top is 'leader' and should explore space and levels with their partner.
2	Push / Pull	A sequence of movements/a string of material exploring the transference of control.
3	Chair Duets	Physical movement based on and around chairs – includes touches, action, reaction, embraces, rejections, etc all performed at speed.
4	Round By Through	A string of movement material with R-B-T at the centre of each movement choice. Round = Any move that involves passing closely around the body of partner By = Slotting in move that is neat and efficient. Reducing the space between the partners to as small as possible. Through = Passing through the partner, usually confined to the upper body and arms.
5	Lifts – Rocks and Ledges	Learning to Fly as an example. A physical theatre technique where a performer is raised off the ground.
6	Gestural String	A sequence of movements using only hands and arms
7	Direct Address	The style of questioning or speaking to the audience and breaking the fourth wall is essential to Frantic Assembly's style. This can be spoken in character or 'in role' as a version of yourself
8	The Fives / Grid walking	Walking in unison to a beat (in beats of 5 (if 'The Fives') in a grid sequence.
9	Body as Prop	Creating shapes and movements with your body to replicate objects.
10	Contact Improvisation	A form of improvised dancing that involves the exploration of one's body in relationship to others by sharing weight, touch, and movement awareness.
11	Monologues / First Person Instruction	Speaking directly to the audience. This is often in present tense and as if instructions have been put into the first person.
12	On Blindness Hands	Using actions from British Sign Language to choreograph movement
13	Ensemble Movement	A choreographed movement sequence performed by a group that is abstract in style rather than naturalistic.
14	Hymns Hands	A movement which involves only your hands or someone else's hands and moving creating a movement sequence.
15	Perspective	A particular attitude towards or way of regarding something; a point of view.
16	Select, Delete	A physical theatre technique by Frantic Assembly that involves creating hand gesture sequence.
17	Stream of consciousness	Stream of consciousness is a **style of** aimed at expressing in words the flow of characters' thoughts and feelings in their minds. The technique aspires to give audience the impression of being inside the minds of the characters.
18	String of Choreography	The act of putting together a range of movement sequences together to create one piece of movement.
19	Three Universes	A physical theatre rehearsal technique which gets the performers to think about the relationship between the touch. Before the touch The touch After the touch.
20	Picking Oose	Picking imaginary bits of fluff or dust from a partner to show an intimacy or history between people

Human sexuality and sexual relationships

1	What does heterosexual mean?	Being attracted to a person of the opposite sex
2	What does homosexual mean?	Being attracted to a person of the same sex
3	What do religions say about sex before marriage?	Sex before marriage is wrong. But some liberals accept it
4	What do religions say about extra marital sex?	Adultery is always wrong, you cannot break your marriage vows
5	Give two religious teaching on contraception	contraception should not be used as it prevents procreation. Its allowed to prevent. Some allow it as a form of family planning or to prevent severe disabilities
6	What is family planning?	Controlling how many children a couple has and when they have them

Marriage and Divorce

1	What is the purpose of marriage?	One of Gods gift and allows for procreation
2	What doe religions say about same-sex marriage?	Many oppose it however some liberal religions allow it because it's the most loving thing to do
3	What does cohabitation mean?	Living together unmarried
4	Give two reasons why a marriage may end in divorce	No longer love one another, adultery, inability to have children, illness or addiction
5	Give two religious views on remarriage	Jesus said remarriage is adultery. Some Christians allow it if the vows are taken seriously
6	What does compassion mean?	Sympathy or concern for the suffering of others

Family Life

1	What is the religious view on the role of a parent?	To provide love, care and a religious upbringing
2	What is an extended family?	Family unit of parents and children but also grandparents and cousins etc
3	Give three purposes of a family	Procreation. Stability and protection. Educating on faith
4	How do religions respond to same-sex parents?	Some disapprove but liberals think its more important for a child to be raised in a loving home regardless of the gender of their parents
5	What is polygamy?	Having multiple spouses
6	Give two reasons against polygamy	Children are more secure in nuclear families. Avoids sexual immorality

Gender and Equality

1	What is the role of a man in the traditional family?	To protect the family and provide stability
2	What is the role of a women in the traditional family?	To bring children into the world and be the prime carer
3	What does gender equality mean?	People have the same rights regardless of gender
4	What is gender prejudice?	Unfairly judging some due to their gender
5	What is gender discrimination?	Acting against someone negatively because of their gender
6	Give an example of gender prejudice	Thinking women are the weaker sex
	Give an example of gender discrimination	Not hiring someone for a job because of their gender

Key Vocabulary

Cohabitation	A couple living together without being married/in civil partnership.
Compassion	Sympathy and concern for the suffering of others.
Contraception	Precautions taken to prevent pregnancy and to protect against contracting or transmitting STIs (sexually transmitted infections).
Divorce	Legal ending of a marriage.
Extended family	Family unit comprising two parents and their children, but also grandparents, cousins etc
Family planning	Planning when to have a family and how big a family to have by use of birth control practices and/or contraception.
Gender discrimination	Acting on prejudices against someone because of their gender.
Gender equality	Belief that all genders have equal status and value, so discrimination against any is wrong.
Gender prejudice	Negative thoughts, feelings or beliefs about a person or group based on their gender.
Heterosexuality	Being physically/sexually attracted to persons of the opposite gender.
Homosexuality	Being physically/sexually attracted to persons of the same gender.
Nuclear family	Family unit made up of two parents and their child(ren).
Polygamy	The practice of having multiple spouses (wives and/or husbands).
Procreation	Having a child; seen as a duty in many religions.
Remarriage	Marriage for the second time, after divorce ending an earlier marriage.
Vows	Promises made during a marriage ceremony.

Key Quotes: Relationships and Families

'A man …is united to his wife, and they become one flesh'
Bible OT

'Do you not know that your bodies are temples of the Holy Spirit?'
Bible NT

'Therefore, what God has joined together, let no man separate.'
Bible

'Let he who is without sin cast the first stone.'
Bible NT

'Before I formed you in the womb I knew you.'
Bible OT

"You shall not lie with a male as with a woman."
Bible OT

"Do not go any near adultery;"
Qur'an

There is neither…male nor female…for you are all one in Christ Jesus.'
Bible NT

Students should study religious teachings, and religious, philosophical and ethical arguments, relating to the issues that follow, and their impact and influence in the modern world. They should be aware of contrasting perspectives in contemporary British society on all of these issues.

Exothermic and Endothermic

1	An exothermic reaction is one that transfers energy to the surroundings so the temperature of the surroundings increases.
2	An endothermic reaction is one that takes in energy from the surroundings so the temperature of the surroundings decreases
3	Everyday uses of exothermic reactions include self-heating cans and hand warmers.
4	Endothermic reactions include thermal decompositions and everyday uses include sports injury packs.

Energy changes (Higher Tier)

1	During a chemical reaction energy must be supplied to break bonds in the reactants and energy is released when bonds in the products are formed.
2	In an exothermic reaction, more energy is released making the bonds than is taken in to break the bonds and in an endothermic reaction, more energy is taken in to break the bonds than is released when new bonds are made.
3	Energy change = bond energy in reactants – bond energy in products

Reaction profiles

1	Reaction profiles can be used to show the relative energies of reactants and products, the activation energy and the overall energy change of a reaction
2	

Chemistry Only - Chemical Cells

1	Cells contain chemicals which react to produce electricity. They are made of two different metals in contact with an electrolyte.
2	The potential difference of a cell is dependant on the metals. The bigger the difference in reactivity of the metals, the greater the potential difference.
3	In non-rechargeable cells the chemical reactions stop when one of the reactants is used up. In rechargeable cells and batteries, like the one used to power your mobile phone, the chemical reactions can be reversed when an external circuit is supplied.

Key Vocabulary

1	Exothermic	Energy is transferred to the surroundings
2	Endothermic	Energy is taken in from the surroundings
3	Activation energy	The minimum amount of energy that particles must have to react.

Chemistry Only - Fuel Cells

1	A fuel cell works by having a constant supply of a fuel and oxygen from the air. The fuel is oxidised electrochemically to produce a potential difference. Hydrogen fuel cells are an alternative to rechargeable cells and batteries.
2	A fuel cell has 2 electrodes, the anode (negative) and cathode (positive), and an electrolyte.
3	The overall reaction in a hydrogen-oxygen fuel cell is: hydrogen + oxygen → water $2H_2(g) + O_2(g) \rightarrow 2H_2O(l)$
4	Half equations: Anode: $2H_2 \rightarrow 4H^+ + 4e^-$ Cathode: $O_2 + 4H^+ + 4e^- \rightarrow 2H_2O$

Required Practical – Measure the temperature change when different volumes of alkali are added to the acid in a neutralisation reaction.

Knowledge: Human Defence System

Skin	Acts as a barrier and produces antimicrobial secretions
Nose	Traps particles that contain pathogens
Trachea	Secretes mucus which traps pathogens
Stomach	Produces acid which kills pathogens
White blood cells	Defend against pathogens by: phagocytosis, making antibodies and making antitoxins

Knowledge : Antibiotics and painkillers

Antibiotics	Treat disease caused by bacteria
	Specific antibiotics treat specific diseases
	Reduced deaths from infectious bacterial diseases
	Cannot treat viral pathogens
Penicillin	An antibiotic that helps cure bacterial diseases by killing bacteria inside the body
Painkillers	Treat symptoms of disease but do not kill pathogens
Problems	Greater use of antibiotics has led to the emergence of strains of bacteria that are resistant to antibiotics (superbugs)

Knowledge: Viral diseases

Measles	Fever and red skin rash – can be fatal. Spread by coughs and sneezes
HIV	Human Immunodeficiency Virus
	Flu-like illness. Virus attacks immune system. Spread by sexual contact or exchange of bodily fluids
TMV	Tobacco Mosaic Virus
	Plant pathogen causes discolouration (mosaic) in leaves and affects growth.

Knowledge: Bacterial Diseases

Salmonella food poisoning	Spread by bacteria in food. Causes fever, abdominal cramps, vomiting and diarrhoea.
Gonorrhoea	Sexually transmitted disease (STD). Causes thick yellow/green discharge from genitals.

Knowledge: Fungal diseases

Example	Rose black spot
Symptoms	Purple or black spots on leaves
Effect	Leaves turn yellow and drop off – no photosynthesis or growth
How it spreads	Water or wind
Prevention	Fungicides and remove affected leaves

Knowledge :Protist diseases

Example	Malaria
Symptoms	Fever and death
How it spreads	Mosquito spreads malaria protist by biting humans
Prevention	Mosquito nets and mosquito repellents

Knowledge : History of drugs

Older drugs were extracted from plants and microorganisms

Drug	Extracted from
Digitalis (heart drug)	Foxgloves
Aspirin	Willow
Penicillin	Penicillium mould

Clinical trials use healthy volunteers and patients.
- Very low doses of the drug are given at the start of the clinical trial.
- If the drug is found to be safe, further clinical trials are carried out to find the optimum dose for the drug.
- In double blind trials, some patients are given a placebo.

Key Vocabulary

1	Communicable Disease	A disease that can be passed on to others
2	Non Communicable Disease	A disease that cannot be passed on to others.
3	Pathogen	Microorganisms that cause infectious diseases.
4	Bacteria	Reproduce rapidly in body and may produce poisons (toxins).
5	Virus	Live and reproduce in cells, causing cell damage.

Knowledge: Vaccination

1	Small quantity of dead or inactive pathogen is injected into the body
2	White blood cells produce specific antibodies
3	If the same pathogen re-enters the body white blood cells can produce antibodies quickly
4	Antibodies prevent infection
5	If a large proportion of the population is immune, the pathogen is less likely to spread

Knowledge: Monoclonal Antibodies

Identical copies of one type of antibody produced in laboratory

1	A mouse is injected with pathogen.
2	Lymphocytes produce antibodies.
3	Lymphocytes are removed from the mouse and fused with rapidly dividing mouse tumour cells .
4	The new cells are called hybridomas
5	The hybridomas divide rapidly and release lots of antibodies which are then collected.

Knowledge: Monoclonal Antibodies can be used in a variety of ways

1) Diagnosis	2) Detecting Pathogens
Pregnancy test – measure the level of hormones	Can detect very small quantities of chemicals in the blood
3) Detecting molecules	4) Treatment
Fluorescent dye can be attached so it can be seen inside cells or tissues	Bound to radioactive substance, toxic drug or chemical Cancer cells are targeted to normal body cells are unharmed

Knowledge : Detection and prevention of plant diseases

Detection	Identification
1-Stunted growth	Reference using gardening manual or website, laboratory test for pathogens, testing kit using monoclonal antibodies
2- Spots on leaves	
3- Area of decay	
4 -Growths	
5- Malformed stems/leaves	
6 - Discolouration	
7 - Presence of pests	

Plant Defences

Physical	Mechanical
Thick waxy layers, cell walls stop pathogen entry	Thorns, curling up leaves to prevent being eaten
Chemical	
Antibacterial and toxins made by the plant.	

Culturing microorganisms (BIOLOGY ONLY)

1	Bacteria multiply by simple cell division (binary fission), approx 1x per 40mins. Bacteria can be grown in nutrient broth solution or as colonies on an agar plate gel.
2	Aseptic techniques to prepare an uncontaminated culture:

Heat the wire loop to RED hot and allow to cool. To kill any microbes on it. *Take Care*

Streak the bacteria across the surface of the agar. Make a zig-zag. Put the lid back on as quickly as possible – so microbes don't get in.

Dip the loop into the bacteria you want to grow. (Professionals flame the neck of the bottle – this kills microbes there too)

Seal the lid of the petri dish. We want oxygen to get in so we don't grow harmful anaerobic bacteria. But, we don't want microbes getting in.

Heat the used wire again afterwards. To kill any microbes.

3	Required practical: Antibiotics and antiseptics can be used to inhibit the growth of bacteria and zones of inhibition can be calculated: Measure zone of inhibition with a ruler and use πr^2

Zone of inhibition
Confluent bacterial growth
Millimeter ruler

Following incubation, measure the diameter of each zone of inhibition with a millimeter ruler.

HT ONLY: use standard form (see sheet 1)

Subject: Science (Physics)	Topic: Forces- Part 1	Year Group: 10

Equations in this topic

1	Mass, weight and gravity	**Weight = mass x gravitational field** Units: Weight in Newtons (N) Mass in kilograms (kg) Gravitational field in Newtons per kg (N/kg)
2	Work done	**Work done = force x distance** Units: Work done in Joules (J) Force in Newtons (N) Distance in metres (m)
3	Spring constant	**Force = spring constant x extension** Units: Force in Newtons (N) Spring constant in Newtons per metre (N/m) Extension in metres (m)
4	Moments (PHYSICS ONLY)	**Moment = force x distance** Units: Moment in Newton metres (Nm) Force in Newtons (N) Distance in metres (m)
5	Pressure (PHYSICS ONLY)	**Pressure = force / area** Units: Pressure in pascals (pa) Force in Newtons (N) Area in metres^2 (m^2)

Resultant forces - examples

Two forces, 3 newtons (N) and 2 N, act to the right. Calculate the resultant force.

3 N + 2 N = 5 N to the right

Two forces acting in the same direction

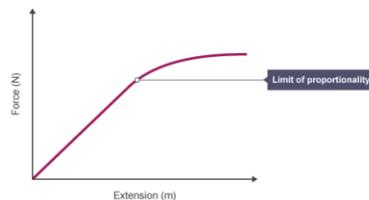A force of 5 N acts to the right, and a force of 3 N act to the left. Calculate the resultant force.

5 N - 3 N = 2 N to the right

Two forces acting in opposite directions

Required practical – Hooke's law

Extension happens when an object increases in length. The extension of an elastic object, such as a spring, is described by Hooke's law:
**force = spring constant × extension**

Key Vocabulary

1	Resultant Force	The resultant force is a single force that has the same effect as two or more forces acting together
2	Scalar	A quantity that has magnitude only
3	Vector	A quantity that has both magnitude and direction
4	Weight	A result of mass and the gravitational field you are in
5	Mass	The number of particles in an object. Stays the same wherever you are in the universe
6	Work done	Whenever a force is used to move an object through a distance work is done on that object.
7	Inelastic deformation	An object will not return to its original shape and size when the force is removed.
8	Elastic deformation	An object will not return to its original shape and size when the force is removed.
9	Spring constant	Spring constant is a measure of the stiffness of a spring up to its elastic limit.

## Resultant forces – Vector diagrams

A **scale vector diagram** can be used to calculate **resultant forces** that are not acting directly opposite of one another, on a straight line.

Worked example 1:

A boat is being pulled toward the harbour by two winch motors. Each motor is pulling with a force of 100N and they are working at right angles to one another.
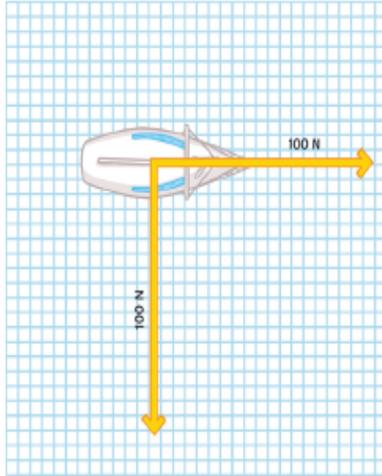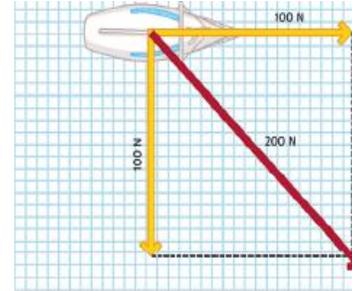
To find the resultant force, you would first draw construction lines from the end of each arrow parallel to the other force arrow.
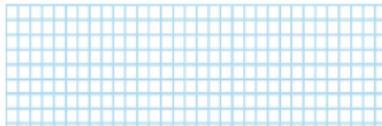
Remember that the size of the arrow is representative of the size of the force being exerted.

Where the construction lines intercept indicates the direction of the resultant force: from the centre of mass through the intercept.

The resultant force is the sum of the forces acting so in this example, that is 200N.

Worked example 2:

A horse-drawn carriage is pulled by two horses at 400N each. One of the horses is pulling in a different direction to the other horse. Show the resultant force and direction of the horse-drawn carriage.

As before, you will need to draw construction lines from the end of each force arrow and parallel to the other one. The intercept represents the direction of the resultant force. The resultant force is the sum of the individual forces so in this example, it is 800N.

Key Vocabulary

1	Contact Forces	The objects are touching e.g. friction, air resistance, tension and contact force
2	Non-contact Forces	The objects are not touching e.g. gravitational, electrostatic and magnetic forces
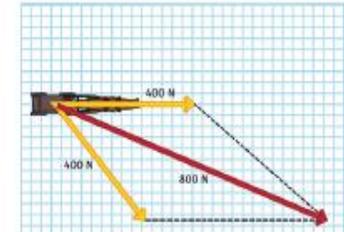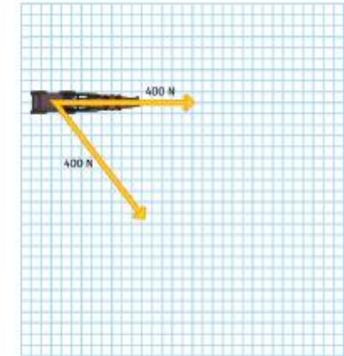
1. Contextual Links

1	Zoe Bradley	Zoe Bradley is a UK fashion designer known for her constant exploration and discovery of new and exciting materials,

2. Technical Knowledge Origami

1	Origami	The Japanese art of folding paper into decorative shapes and figures	
2	Sonobe origami modular unit.	A process of folding 3 singular units that slot together to create the Sonobe unit. Easy	
3	Tato Envelope origami singular unit	A process of folding and scoring an individual piece of paper to create an envelope. Medium	
4	Kawasaki Rose origami singular unit	A process of folding and scoring an individual piece of paper to create a rose Hard	

3. Key Vocabulary

1	**Body Adornment**	Body adornment is something that a person puts on or changes to embellish themselves.
2	**Manipulation**	A process of playing with a fabric to change its appearance.
3	**Paper Folding**	A process of transforming a flat square of paper into a finished sculpture through folding and sculpting techniques.
4	**Sublimation Printing**	A process of transferring an image onto fabric using a heat press.
5	**Free Machine Embroidery**	A process of using a sewing machine to add detailed patterns and textures. This technique will use a free machine embroidery foot.
6	**Hand Embroidery**	A process of using a embroidery threads and an embroidery needle to add detailed patterns and textures.
7	**Geometric**	A pattern that involves regular lines and shapes.
8	**Insects/insect wings**	A small arthropod animal that has six legs and generally one or two pairs of wings. The wings can be studied as part of the structures project due to the lines and geometric shapes that are formed in the veins.
9	**Repeat Pattern**	A rigid motion of repeating a motif over and over along horizontal or vertical lines.
10	**Distortion**	Something that is not clear to the eye, may trick the eye into thinking it is seeing something else.
11	**Repetition**	A process of repeating a process or motif over and over again.
12	**Symmetry**	An identical motif or product that is repeated.

Personal Safety: Screen time

1	What is screen time?	Screen time refers to any time spent using a device with a screen, e.g. computer, television, tablets and smartphones.
2	Why can screen time be harmful to our physical health?	Reduction in exercise can lead to weight gain, less healthy diet, too much blue light can affect sleep patterns.
3	Why can screen time be harmful to our mental health?	Can affect self-esteem and mood.

The science behind: Stem cells

1	What are stem cells?	A stem cell is a cell that has not yet become a specialised cell. A stem cell can replicate many times. A stem cell has the potential to become a different type of cell
2	What can stem cells be used to treat?	Severe aplastic anaemia (bone marrow failure) Leukaemia – a type of cancer affecting white blood cells Lymphoma – another type of cancer affecting white blood cells Multiple myeloma - cancer affecting cells called plasma cells Certain blood, immune system and metabolic disorders – including sickle cell anaemia, thalassaemia, severe combined immunodeficiency (SCID) and Hurler syndrome
3	Challenges with the use of/donation of stem cells.	Lack of donors Expensive Not always successful Not finding suitable donors Obtaining and storing stem cells Ethical issues

Health prevention: Screening

1	What is screening?	A way of detecting early disease or risk factors for disease in people.
2	Types of screening test on the NHS	Cervical screening. Breast cancer screening. Screening in pregnancy for infectious diseases, including HIV, hepatitis B and syphilis. Screening in newborn babies. Bowel cancer screening for people over 60. Eye screening for people with diabetes. Abdominal aortic aneurysm screening for men aged 65.
3	Benefits of screening	The main benefit of screening is the early detection of a problem, before any symptoms develop.

Substance misuse: Alcohol

1	Short term effects of alcohol	Can lead to risky behaviours.
2	Long term physical effects of alcohol	Alcohol poisoning, stroke, cancer, heart/liver disease, sexual problems, weight gain or brain damage.
3	Effects on emotional and mental health	Anxiety, depression, unpredictable behaviour, self harm, family/relationship problems, affects performance at school or work

Healthy vs Inactive lifestyles: Diet and Sleep

1	What are macronutrients?	Large quantities needed Provide energy.
2	What are micronutrients?	Small quantities needed Maintain health & wellbeing
3	Effects of energy drinks	Caffeine causes your heart – rate and blood pressure to increase, An energy 'high', is often followed by a 'crash' as the chemicals that allow you to feel tired have been blocked & then flood your brain afterwards. Over time, your body can become immune to caffeine meaning you require more for the same impact and it can also be addictive.
4	What is glutamate?	Aids learning, memory, sleep & relaxation
5	What is serotonin?	Regulates your mood, concentration levels & happiness
6	What is dopamine?	Helps sleep & motivation
7	What are endorphins?	Helps manage pain relief, manage stress & improve well-being
8	What is noradrenaline?	Controls arousal, attention & reactions to stress

Healthy eating: Eating disorders

1	Different types of eating disorders	Anorexia nervosa, bulimia, binge eating disorder
2	Difference between eating disorders and disordered eating	Eating for reasons other than hunger, restricting, binging, purging, avoiding major food groups, only eating certain types of foods, elaborate habits related to food and labelling foods good/bad.

Notes