Y9 Revision Skills

Effort + Time = Success

Your Targets:

1)

2)

Name: _____

Form: _____

Contents

1. Why Revise?
2. Top Tips for Effective Revision
3. Effective Revision Methods – Prepare, Retrieve and Apply
4. Knowledge Overviews

1. Why Revise?

Revision means to 'go over again'.

'Being familiar with something is not the same as knowing it'

We can often falsely assume we really know something. If we haven't actually engaged with something, and being made to think hard about this, it's likely we aren't' able to recall this.

Look at the multiple-choice question below.

1. **Which logo is the correct colour combination for Google?**

A) Google
B) Google
C) Google
D) Google

Whilst Google is a logo we have all seen multiple times each week, or even daily, we haven't necessarily studied the correct colour pattern. Therefore, we aren't able to recall the correct answer.

Revision is the bridge in achieving this. Going over content again and again means that the information is far more likely to stick in our long-term memory.

However, in order for revision to be purposeful, we have to 'think'.

The following strategies listed below are **NOT effective**, and often give the illusion that we feel we are revising, when actually it serves very little impact:

- Reading
- Highlighting
- Re-writing notes out in the same format

2. Top Tips for Effective Revision

- Revision needs to be carried out in a quiet space with no distractions (put your phone away, turn the TV and your earphones off).
- Revision needs to be short. Carry out short 20-minute sessions with a small break in between.
- Revision MUST be spaced out. Cramming a few nights before your exam is proven to not be effective.

3. Effective Revision Methods

Effective Revision is a cycle. This cycle needs to be repeated continuously for core knowledge to ensure it gets stuck in our long-term memory.

1) Prepare
2) Retrieve
3) Apply

Part 1) Prepare

First, we need to break down the important information to our own words.

Making revision material is an important part of revising. When you make your own resource, you are taking large amounts of content from a revision guide or textbook and reducing it down.

Part 2) Retrieve

This step is about checking your knowledge. Here you need to work out what is sticking in your brain and what you are struggling to remember so that you can go back over it.

Part 3) Apply

Attempt your questions FROM MEMORY, do not copy from your notes – it is important for you to find out what you can remember!

1) Prepare

Mind Maps

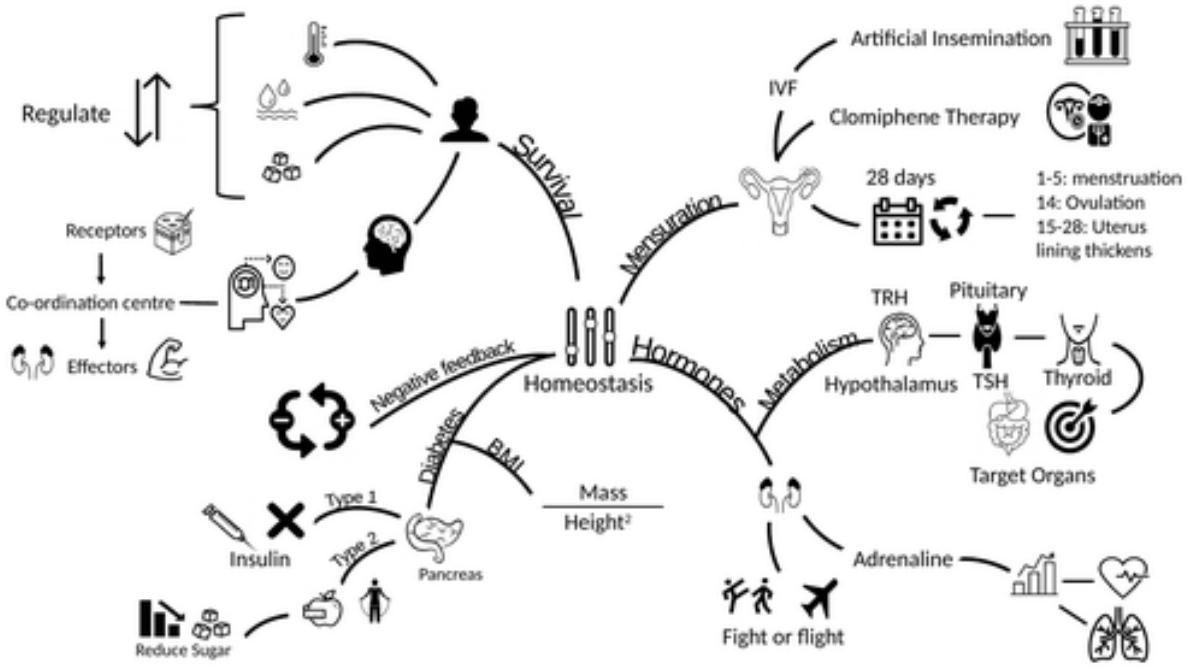
Creating Mind Maps

Step one: Read through the material you want to review and highlight (or underline) the important points.

Step two: Identify the sub-topics in what you have read, and then add these to your mind map.

Step three: Add the important points to the correct sub-topic (make sure it is short and to the point)

Step four: Add colour or images to make important points stand out.



Flashcards

Front

What happened during the Battle of Hastings?

Back

Harold Godwinson's army made a shield wall on top of Senlac Hill.

The Norman army tried to break the shield wall with archers, knights and foot soldiers.

The Normans pretended to retreat and the English army left the safety of the hill.

The Normans won and Harold Godwinson was killed.

Creating Flashcards

Step 1) Take one page of A4, and cut this into four squares.

Step 2) On the front cover, write the topic title and key questions – 'How can you support your child with their revision?'

Step 3) On the reverse side write 4-5 short facts which answer the question or are linked to the topic.

2) Retrieve

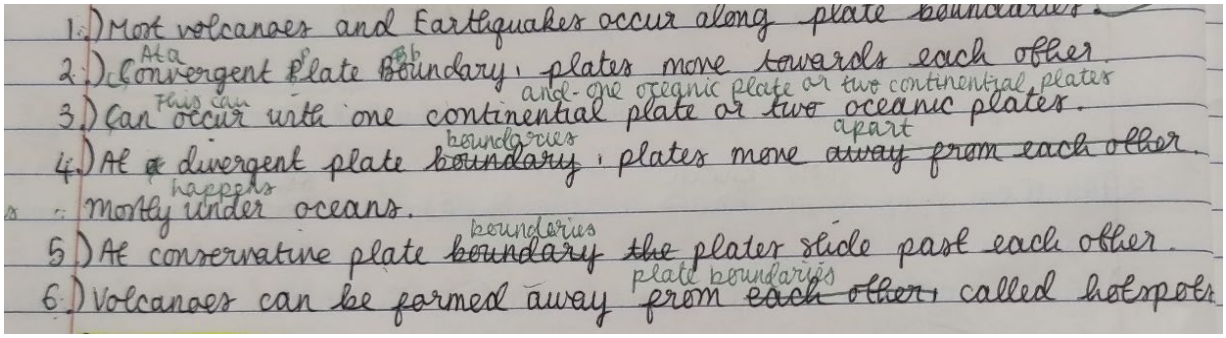
Look, Cover, Write, Check

Step 1) Read through the content in your knowledge organiser.

Step 2) Cover up the information and see how much you can **write from memory**.

Step 3) Go back and **check**. Did you miss anything? If so, add in your corrections in a different colour pen.

Step 4) Repeat again until you can write everything out from memory, with no corrections needed.



Using Flashcards

Step 1: Organise your flashcards in a pile with the questions facing up.

Step 2: Ask yourself the questions on each flashcard, then turn it over to see if you got it right. Create a pile for the ones you answered correctly and a pile for ones you didn't.

Step 3: Repeat step 2 for the cards you got wrong until all of the cards are in the correct pile.

Step 4: Shuffle the cards ready for the next time you use them (at least three times).

Other ways of using flashcards

1. Get someone else to test you using the questions and answers.
2. Use the flashcards with the answer facing up. Can you work out what the question was?

3) Apply

- Re-do questions from their exercise books or homework
- Example questions in revision guides and workbooks

Year 9		
Subject	**Term 1**	**Resources**
Biology	• Topic 9 – Ecosystems and Material Cycles • Topic 1 – Key concepts in Biology	• BBC Bitesize https://www.bbc.co.uk/bitesize/examspecs/zcq2j6f • GCSE POD • Knowledge organisers
Chemistry	• Topic C2 – Matter and Mixtures • Topic C1.1 – Atoms, Periodic Table, Ionic Bonding and Properties	• BBC Bitesize https://www.bbc.co.uk/bitesize/examspecs/zy984j6 • GCSE POD
Computing	• Programming • Impact of technology • App development • Computer systems • Networks • Data representation • Web development • Software skills	• Knowledge organiser • https://www.bbc.co.uk/bitesize/subjects/zvc9q6f • https://www.bbc.co.uk/bitesize/subjects/z8mtsbk
Design Technology	• Brief • Specification • Mind Maps • Research • Biomimicry	• Knowledge organiser • Yardleys VLE • BBC Bitesize

	• Environmental considerations • Product Analysis • Drawing types • Modelling • SWOT Analysis • Design Inspirations • Polymers • Woods • CAD / CAM • Finishes • Manufacturing	
Creative Design	• Character Design • Artists 'Gawx & 'Vexx'	• https://www.youtube.com/watch?v=GxJqC1uUFU0 • https://www.youtube.com/watch?v=BRtpM1YAkD0
English	• Conflict • 'The Bone Sparrow'	• Red exercise book • amnesty.org.uk
Food Technology	• Healthy eating in the kitchen • Bacteria and high-risk foods • Social and economic issues	• Knowledge organiser • https://www.youtube.com/watch?v=flxmB8NKMzE • https://www.youtube.com/watch?v=UIQ1Hyq9HG0

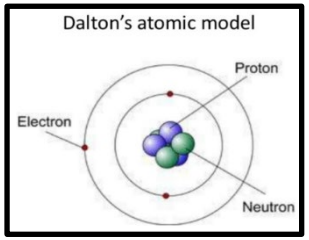
		• https://www.youtube.com/watch?v=UIQ1Hyq9HG0
French	• **Food and drinks** – verbs for eating, food items, drink items • **Tenses revision** – present, preterite and near future • **Healthy lifestyles** – healthy foods, what you do to be healthy, and lead a healthy lifestyle, what you should do and what you are going to do	• Exercise book • Purple Grammar book • K.Os in exercise books • DIP tasks and improvement tasks • K.O revision packs • www.linguascope.com • Username: yardleys • Password: europe2
Geography	• Urban change in Birmingham - regeneration of Brindley Place • The world ocean - how the oceans affect us on land.	• Green exercise book • Knowledge Organizers on VLE • BBC bitesize
History	• Suffragettes • The Nazis taking and maintaining power • The Holocaust	• Exercise book • Booklets • Knowledge organisers (VLE)
Maths	• Dividing by decimals • Error intervals	• Corbett Maths

	• Recurring decimals • Percentages • Solving equations • Index Laws • Standard form • Ratio • Angles in parallel lines • Properties of shapes	
Music	**Musicals** • Learn to play ostinato patterns • Learn how to read and use key signatures • Learn how to read and use time signatures • Learn how to read sheet music song lyrics	• VLE Lesson PowerPoints
Physics	• Topic 1 and 2 (Forces and Motion)	• BBC Bitesize https://www.bbc.co.uk/bitesize/examspecs/zqpshv4 • GCSE POD
RE	• Causes and types of suffering • The Story of Job	• Knowledge Organiser • Exercise book

	• Examples of suffering studies – anti-Semitism and Islamophobia • The Inconsistent Triad • Four Buddhist sights of suffering • Dharma, Karma, 4 Noble Truths and Eight-Fold Path • Traditions in Buddhism • Evaluation of how successful Buddhism is in overcoming suffering • Christians schisms, Islamic schism and Jesus's message – teaching and parables (Year 8) • Sikhism, Hinduism, and Judaism (Year 7)	
Spanish	• **Food and drinks** – verbs for eating, food items, drink items • **Tenses revision** – present, preterite and near future • **Healthy lifestyles** – healthy foods, what you do to be healthy, and lead a healthy lifestyle, what you should do and what you are going to do	• Exercise book • Purple Grammar book • K.Os in exercise books • DIP tasks and improvement tasks • K.O revision packs • www.linguascope.com • Username: yardleys • Password: europe2

Chemistry C1.1 – Atoms, Periodic Table, Ionic Bonding and Properties

Atomic Structure



Why do atoms have overall charge of 0?
The number of protons are the same as the number of electrons

Sub-atomic particles

Atoms are made from smaller particles called **subatomic particles**. There are three type:

Particle	Relative mass	Relative charge	Found?
Proton	1	Positive, +1	In nucleus
Neutron	1	Neutral, 0	In nucleus
Electron	Neglible ($\frac{1}{1840}$)	Negative, -1	In shells orbiting nucleus

Reading the Periodic Table

19
F
fluorine
9

Relative Atomic Mass
The total number of protons and neutrons added together.

Atomic number
The number of protons or electrons.

Note: on some periodic tables, they are the wrong way up, just remember that the smaller number is the proton/atomic number.

What's in my atom?

Protons = atomic number
Electrons = atomic number
Neutrons = relative atomic mass subtract atomic no.

19
F
fluorine
9

Atomic number = 9
Relative Atomic mass = 19

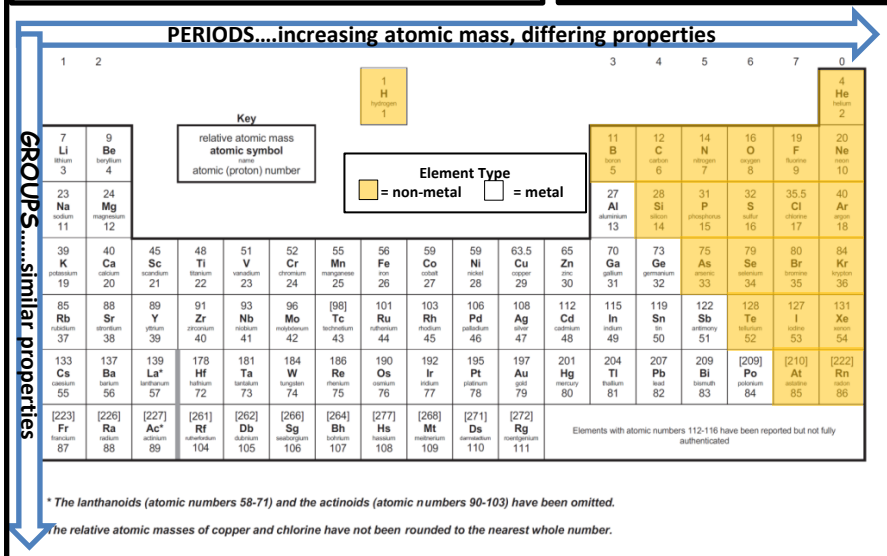
Protons = 9
Electrons = 9
Neutrons = 19-9 = 10

Isotopes

- **What are isotopes?**
- Isotopes are atoms of the same elements with the same numbers of protons and electrons, but different numbers of neutrons.
- For example, Neon has three isotopes which are Ne 20, Ne 21 and Ne 22.

Neon Isotope Mass	Relative Abundance (%)
20	90.5
21	0.3
22	9.2

- Relative atomic mass of Neon = $$\frac{20 \times 90.5 + 21 \times 0.3 + 22 \times 9.2}{90.5 + 0.3 + 9.2} = 20.2$$
- This is why some atoms have a relative atomic mass with a decimal point.



** The lanthanoids (atomic numbers 58-71) and the actinoids (atomic numbers 90-103) have been omitted.*

The relative atomic masses of copper and chlorine have not been rounded to the nearest whole number.

Electron Configuration

How are electrons arranged around the nucleus?

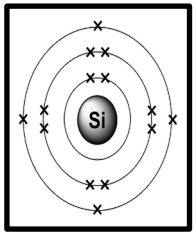
- First shell - 2 electrons
- Second shell – 8 electrons
- Third shell - 8 electrons
- Fourth shell – 2 electrons

Example: Silicon

28
Si
silicon
14

This can be written as: **2.8.4**; or drawn as:

Note: Si is in period **three** and group **four** of the periodic table; it also has **three** electron shells and **four** electrons in the outer shell – this is no coincidence!



Mendeleev

Arranged elements by:
- Increasing relative atomic mass
- He arranged elements together with similar chemical and physical properties.
- Left some gaps if an element's properties weren't similar to the one above it.

C1.1 – Atoms, Periodic Table, Ionic Bonding and Properties

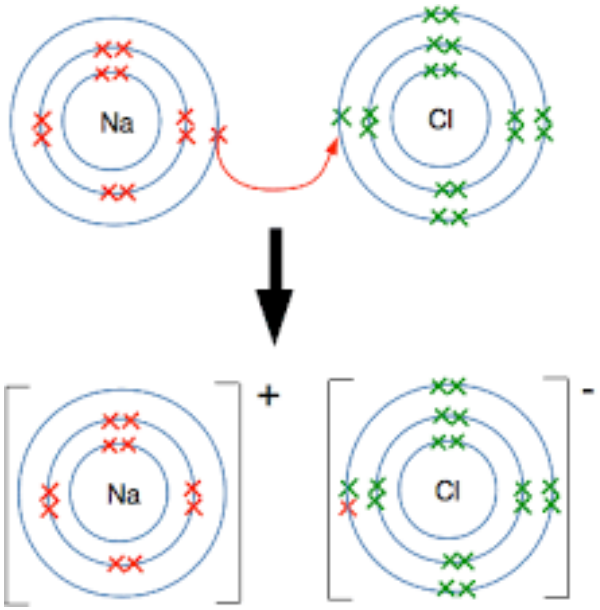
What are ions?
Ions are charged particles, formed when an atom loses or gains an electron.

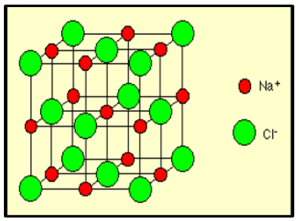
Making Ionic Compounds

- **An ionic bond** involves the **transfer of electrons** forming ions.
- An ionic bond is the attraction between a positive and a negative ion.

Example 1:
Sodium reacting with Chlorine.

- Cl forms Cl^- ions (gains electron)
- Na forms Na^+ ions (loses electron)
- **Formula** = NaCl
- **Name:** sodium chloride

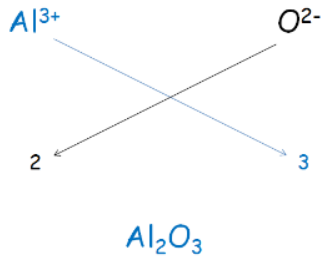




Lattice Structure

Ionic compounds have a lattice structure. This consist of a regular arrangement of ions, which are held together by strong electrostatic forces between oppositely-charged ions.

Deucing the formulae of ionic compounds



Properties of Ionic Compounds

- **Melting point:** High due to strong bonds between ions.
- **Boiling point:** Higher, due to strong bond between ions.
- **Solid:** do not conduct electricity
- **Molten (liquid):** do conduct electricity
- **Dissolved (aqueous):** do conduct electricity

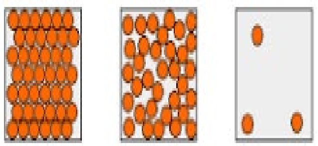
Why? Electrical Conductivity

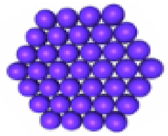
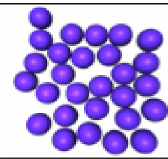
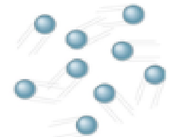
- Electricity is conducted when there are **charged particles** that are **free to move**.
- **Solid:** there are charged particles (the ions), but they are not free to move, so they do not conduct.
- **Liquid/Aqueous:** the ions are now free to move, so they do conduct

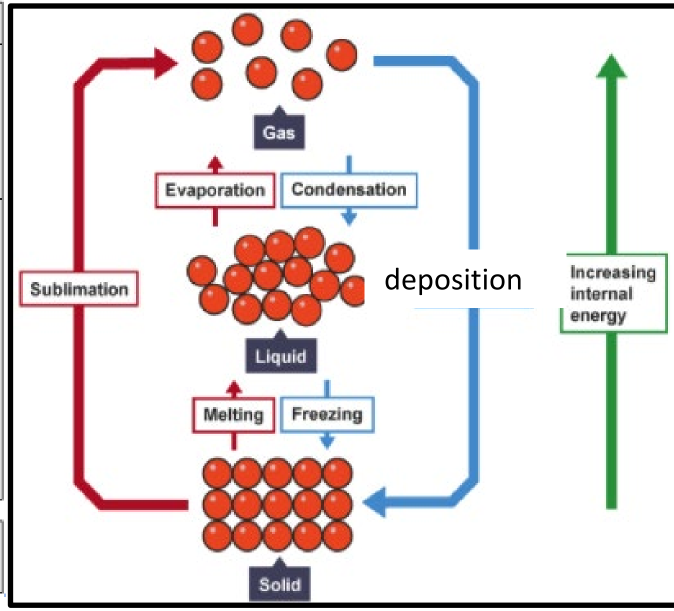
High Melting/Boiling Points

- Ionic bonds (attraction between positive and negative ions) are very strong.
- Melting and boiling require these bonds to be broken.
- This takes lots of (heat) energy.

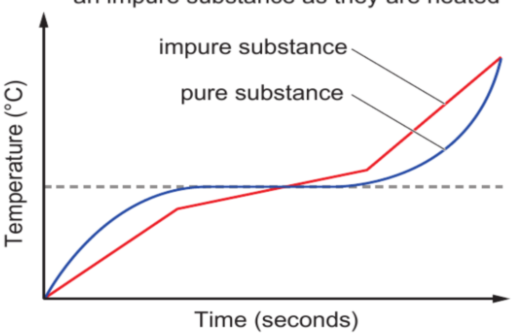
Chemistry C2 Matter and Mixtures



Solids	Liquids	Gases
		
• Strong attraction between the particles. • Particles are very close together and neatly arranged. • Particles vibrate in place.	• Moderate attraction between particles • Particles still very close together but not neatly arranged • Particles are able to slide passed each other.	• Very weak attraction between particles. • Particles are much further away from each other. • The particles move all around and bump into each other.
• Definite shape • Definite volume	• Indefinite shape • Definite volume	• Indefinite shape • Indefinite volume



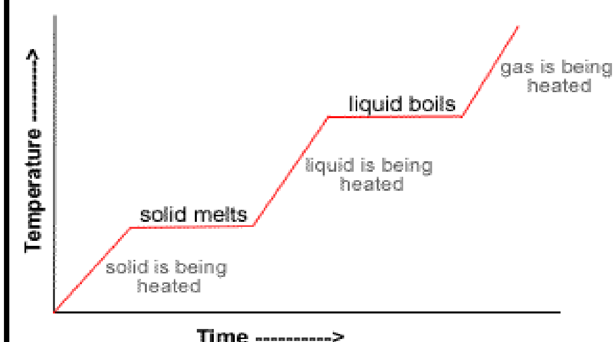
How temperature changes in a pure substance and an impure substance as they are heated

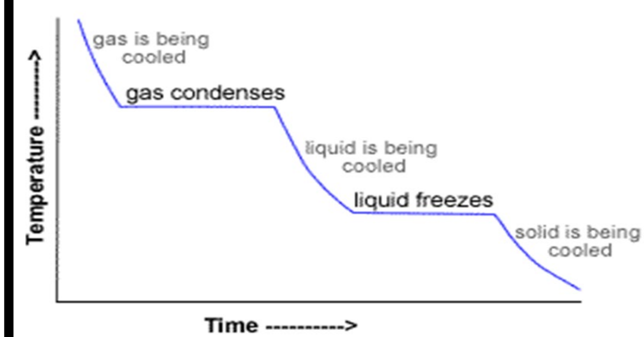


D heating curves for a pure substance and a mixture

Heating curve – what keywords can be used to describe the **movement** and **arrangement** of particles during **heating** and **changing state**?

Cooling curve – what keywords can be used to describe the **movement** and **arrangement** of particles during **cooling** and **changing state**?





Melting point: Temperature when a solid becomes a liquid, the graph shows where the line goes flat is the meting point.

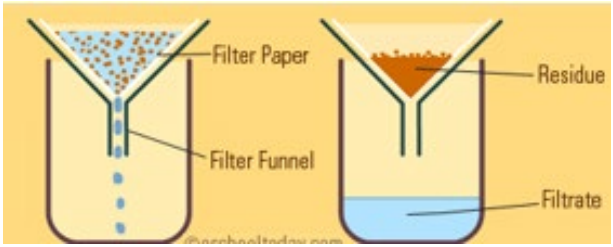
The **pure substance** has a sharp melting point. The **impure substance** has a range of melting points.

Melting point: If a solid is heated enough it will melt to become a liquid. The graph shows where the line goes flat is the meting point.

The **pure substance** has a sharp melting point. The **impure substance** has a range of melting points.

C2 – Matter and Mixtures

Filtration

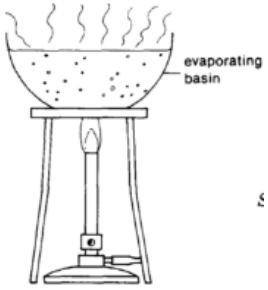


Insoluble – substance does not dissolve in solvent
Filtration used to separate an insoluble solid from a liquid. When a mixture of sand and water is filtered:

- the sand stays behind in the filter paper (**residue**)
- the water passes through the filter paper (**filtrate**)

Crystallisation

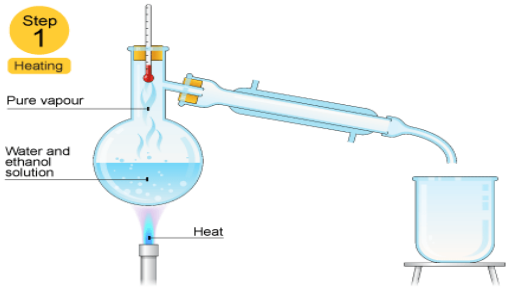
Evaporation is used to separate a soluble solid from a liquid. During evaporation, the water evaporates away leaving a solid behind



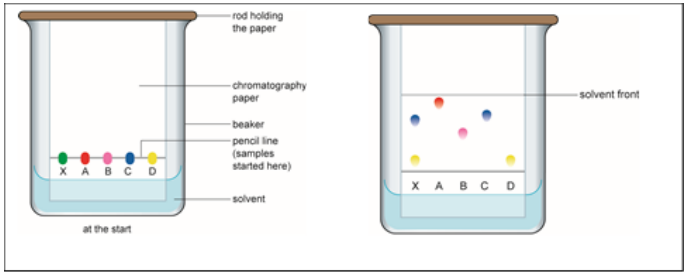
The solution is heated to evaporate most of the solvent.

Distillation

The mixture is heated in a flask. **Ethanol has a lower boiling point than water so it evaporates first**. The ethanol vapour is then cooled and condensed inside the condenser to form a pure liquid. Pure ethanol is collected in the beaker (distillate)



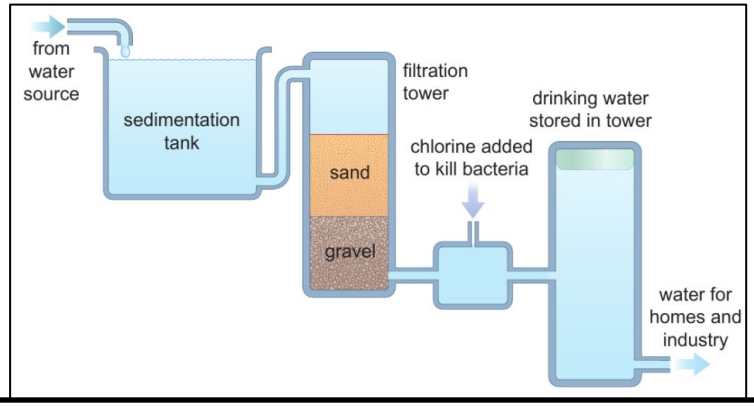
Chromatography



Chromatography can be used to separate mixtures of coloured compounds (inks, dyes and colouring agents in food).
A spot of the mixture is placed near the bottom of a piece of chromatography paper and the paper is then placed upright in a suitable solvent, e.g. water. As the solvent soaks up the paper, it carries the mixtures with it, this separates the mixture out.

Calculating Rf Values

$$R_f = \frac{\text{Distance from start to center of substance spot}}{\text{Distance from start to solvent front}}$$



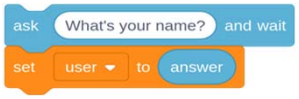
Making Drinking Water Potable Potable means making it **safe to drink**.
Much of the water in the UK comes from rivers, lakes and aquifers (groundwater). The process for making potable water:

1. Screening: using a sieve/wire mesh twigs, branches and leaves are removed
2. Sedimentation: small particles settle out at the bottom of the tank. Aluminium Sulfate is added here to cause smaller particles to clump together and sink to the bottom (flocculation).
3. Filtration: A special filter of fine sand and gravel will remove any further particles in the water.
4. Chlorination: chlorine is added to kill bacteria

Year 9 Computing Knowledge Organiser

1. Programming

Writing a sequence of instructions which can be interpreted or compiled by a computing system to perform a meaningful task.

Python – text based	Scratch – block based
print("What's your name?") user = input() print("Hello", user	

Programming constructs

Sequence	The order in which instructions occur
Selection	Determines which path a program takes (IF/ELIF/ELSE)
Iteration	The repeated execution of a section of code (FOR LOOP/WHILE LOOP)

3. Developing for the Web - HTML

```
<h1> This is the main heading </h1>
<h2> This is a smaller heading </h2>
<p> This is a paragraph </p>
<b> This would be bold </b>
<em> This would be italic</em>
```

HTML

```
<body>
<h1>Test Page</h1>
<p>Hello, world!</p>
</body>
```

OUTPUT

Test Page

Hello, world!

2. App Development

An app is designed for a mobile device such as a smartphone or tablet. We can create a mobile app using block or text based programming.

Computational thinking	The process of solving problems by breaking them down into simple steps
Decomposition	Breaking a problem down into smaller more manageable chunks
Algorithm	Step by step instructions
Events	Flow of program is determined by events such as user actions
Variable	Location in memory that stores a value that can be changed
Debugging	Detecting and fixing errors in a program

3. Developing for the Web - HTML

HTML = Hyper Text Markup Language	Images can be added using the <img> tag **<img src ="MyPhoto.jpg" width = "100px">**
HTML is a language used to write web pages.	
HTML uses tags.	You can add the style attribute to a tag to change how it looks. **<h2 style ="color:red;">Important</h2>** This would make the heading red. Notice the American spelling of colour!
Most tags have an open and close tag.	
Close tags have a forward slash at the beginning <OPEN> </CLOSE>	

4. Impact of Technology	
Cyber-bullying	When a person uses social media to bully another user.
Hacking	The act of intruding into a system by unauthorised means. This is also in breach of the UK Computer Misuse Act.
Malicious damage	In computer terms, this is when a person intentionally sets out to corrupt or delete electronic files, data or software program.
E-Safety (Electronic Safety)	This relates the sensible steps you need to take whilst online in order to avoid any problems. For example, what to do and not do in internet chat-rooms. What to do and not do when shopping online and so on.
Privacy	The right to keep information private.
Phishing	An email sent to a user which is trying to ge t access to their personal data.
Format	The way to present text and adding colour to make a product more appealing.

6. Computer systems	
CPU Central Processing Unit	When executing (running) a program, the CPU fetches instructions and data from main memory as required. It then decodes each instruction to understand what it is asking the CPU to do. It then performs the task that the instruction is asking it to do.

5.Software Skills	
Microsoft Excel	A spreadsheet software which features calculation, graphing tools and pivot tables.
Microsoft Outlook	An e-mail based software used over a server.
Microsoft Publisher	A professional layout software used to design profession al documents.
Microsoft Word	A word processor, it is used to "process"— format, manipulate, save, print, share — a text-based document.
Microsoft Powerpoint	A presentation software– you can create, edit, view, present, or share presentations .
Microsoft Access	A database management system.
E-Mail	Electronic Mail is a message sent over a server.
Carbon Copy	The process of copying in another person when sending a n email.
Blind Carbon Copy	Sending an email to an anonymous recipient, people who are not directly involved with the email but they need to see it for information purposes.
Subject	What an e-mail is about.
Attachment	A file sent with an email e.g. a document.
SPAM	Junk mail which is there to mislead the user.

7. Representations

Data on a computer system is stored in electrical signals, they represent binary data, it can be one of two states,0 or 1.

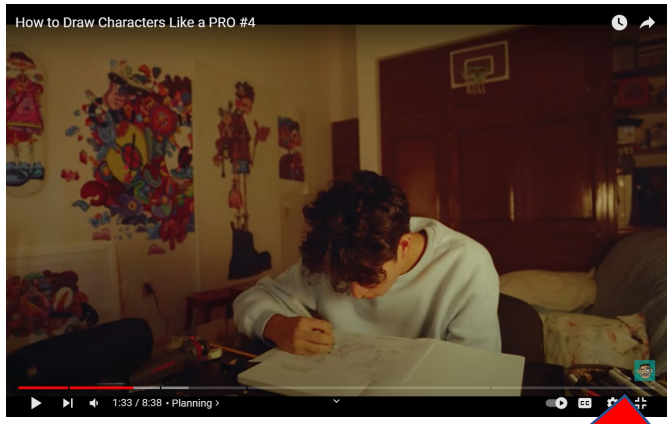
Binary to Denary conversion

128+32+8+2 = 170

128	64	32	16	8	4	2	1
1	0	1	0	1	0	1	0

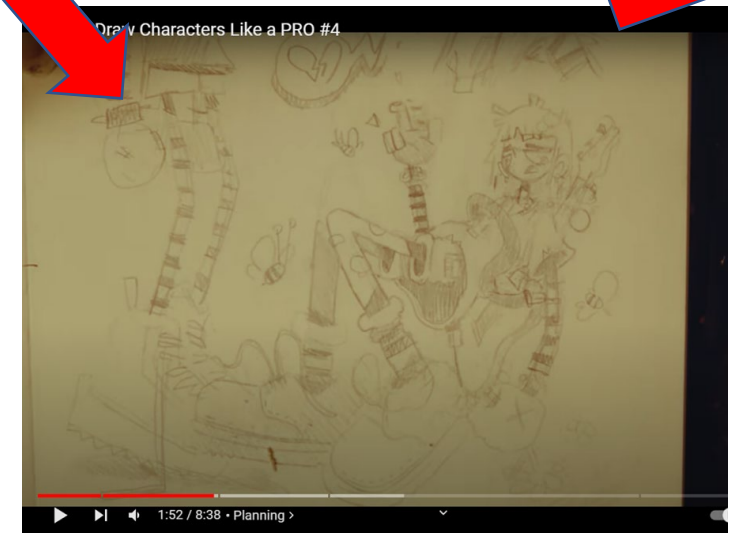
Year 9 – Character Design ('Gawx' Style)

www.youtube.com/watch?v=Wm-uXn8YwgM



Step 1.Planning

- Inspiration from sources, google, pinterest, books, magazines, photos, etc…
- Sketch things you like and attributes you like, do not worry in the sketching stage about making the character look finished, you are experimenting with ideas at this stage of the design process.



Step 2. Brainstorm expressions for your character, different angles, viewpoints and different accessories.

Remember to use the same characteristics as Gawx's figures / style:

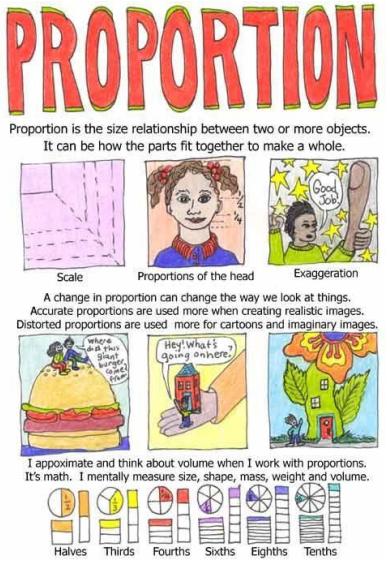
- Big hands and feet
- Large, round heads
- Big ears
- Skinny arms, necks and legs
- Baggy clothing
- Big, exaggerated hair

Step 3: Sketching your character.

Start with basic shapes. Add detail once the basic shapes are in place and the right proportions are shown. Remember to make your character look like you – it needs to be obvious.. Hairstyle, glasses, clothing you wear, accessories you have, etc.

Step 4: Fine liner outlines

Take your time with this step, turn your paper as needed. Drawing the outline should be comfortable. Thicken some lines.
Rub out all pencil marks once the ink is dry.



Key vocabulary

Expressions: a look on someone's face that conveys a particular emotion
Exaggerated: enlarged or altered beyond normal proportions
Proportion: the sizes of different parts of a piece of art, design or shapes in relate to each other.

D&T – Brief, Specification & Mind Map

Design Brief – is a **short** statement of the task you are undertaking. It is always given at the start of a project. A design brief should contain information such as, who is the intended market, the price range of the product, what materials may be used, and what will the function of the product be.

A **Specification** is created after the research has been done. The specification is a detailed list of features that the product will have.

When writing a **specification:**

- The points should be specific, manageable and testable
- Justified (a reason given) which relates back to the research carried out.

After the specification, the concept designs should be created.

Mind Map

A mind map is a graphical way to represent and organise ideas

A good mind map should make good use of space and be well laid out, uncluttered, organised, attractive and easy to follow. It should also contain relevant information, but not be too word-heavy.

D&T – Target Market – ACCESS FM

Target market – is the person/group of people you are designing for.

You may want to consider some things about your market such as; their age, their gender, their hobbies, their likes/dislikes, their budget and their wants/needs of the product. You should also consider if thew product is appropriate for the intended market e.g. is it culturally-sensitive, or age-appropriate?

ACCESS FM

Aesthetics – the way the product should look, shape and colour

Cost – how much the product should cost, considering profits

Customer – which group the product is aimed at

Ergonomics - how the product is designed with the user in mind.

Environment – where it will be used/ the impact on the environment.

Size – what the dimensions and weight of the product are

Safety – how the product will be made safe for the user and to ensure safety of the product itself

Function – how the product should work

Material- what the product should be made from

D&T – Research, Biomimicry, Environmental Impact & SWOT

Research – There are two ways to collect research.

Primary Research – This is where you collect the information yourself e.g. Interviews, questionnaires, user-trials and surveys

Secondary Research – This is where you use information from other sources e.g. Newspapers, websites, case-studies and journals

By **analysing existing products**, we can learn many things. We can analyse a product by using ACCESSFM. We can do this by thinking about the aesthetics, value for money, functionality, target market, etc.

Biomimicry – Is using nature as an inspiration for your design. It can impact the product in its appearance, structure and/or it's functionality.

Environmental Impact -

To ensure that the environment is considered during design and manufacture some of the things we can do are:

- Use materials that can be recycled
- Use sustainable materials
- Use biodegradable materials
- Consider how far a product travels during its life
- Carry out a lifecycle analysis of the product

SWOT Anaylsis -

A SWOT analysis is where we compare the strengths, weaknesses, opportunities and threats of our product against other products, and the market.

D&T – Designers, Finishes, Devices, Drawing Styles & Modelling

The Work of other Designers –Studying the work of other designers can inspire new ideas. It can also help with the understanding of materials, aesthetics, processes and customers.

Finishes – We can use finishes on woods for several reasons. These include protecting it from chemicals, moisture, wear & tear; improving its appearance, and helping the product to last longer.

Devices – There are a number of tools and machines that can be used to create holes in materials, including the laser cutter, hand drills and a pillar drill.

Drawing Styles – below are some types & why we do them.

Isometric – This is good to show realism and scale

Sketching – This is a quick & inexpensive way to get your ideas across

Orthographic – This is good for showing measurements, manufacturing and hidden details

Presentation – This is an impressive, neat, high-quality drawing of what your product looks like.

The rules of isometric drawing are:

1. All vertical lines must remain vertical
2. All horizontal lines are drawn at 30 degrees
3. All parallel lines must remain parallel

Modelling – Creating prototypes is part of the design process. We create models to test features of the product, to get feedback, and to see if any improvements can be made but the real things is manufactured.

Year 9 English Knowledge Organiser: Autumn Term, 'The Bone Sparrow', Conflict

Conceptual Framework: **Conflict**

- (noun): a serious disagreement or argument. Usually this is between two or more people but, in the cases of internal conflict, can be between two conflicting thoughts of one person.
- Conflicts can vary both in severity (how bad they are) and type e.g., internal conflict, physical conflict, emotional conflict. Often, conflict results from **power** struggles resulting from **identity** differences.

Key Unit Vocabulary:

migration (noun): movement from one area or region to another

immigration (noun): the action of coming to live permanently in another country or location

asylum seeker (noun): a person who has left their home country and is seeking protection in another

refugee (noun): a person that has been forced to leave their country in order to escape war, persecution or natural disaster

mirroring (noun): when characters/events closely resemble one another

frame narrative (noun): a literary device whereby there is a story within a story

pathetic fallacy (noun): a literary device whereby the weather/setting/atmosphere gives clues about future events.

Language (types of words and imagery)
common noun: a word for a person, place, or thing ("naming word")
abstract noun: a noun that is not a physical object (a concrete noun); a word that expresses an idea or emotion, e.g., *truth, danger, happiness*
adjective: a word that is used before (pre-modifying) or after (post-modifying) a noun to describe or modify it
verb: a word that shows what action is being performed - e.g., *run, jump* - or the state of 'being' - e.g., *am, are, was, were, is, be* - ("doing word")
imperative verb: a verb that gives an order or command ("bossy verb")
adverb: a word that modifies a verb or an adjective. It expresses when, where, how, why or how intensely an action is performed or an emotion is felt.
simile: comparing two things by saying they are similar (using the words 'like' or 'as')
metaphor: comparing two things by saying they are the same (saying one thing 'is' another)
personification: describing an inanimate object or a non-human being as having human characteristics or emotions.
pathetic fallacy: when the weather or nature is described to reflect human emotions or the specific feelings of characters in a text
juxtaposition: when a writer places two opposing images near to each other to emphasise their difference or contrast.

Structure - Sentences (how a text is organised)
noun phrase: several words (usually adjectives & adverbs) that modify a noun
single-clause sentence: a sentence with one independent (main) clause
multi-clause sentence with a coordinating conjunction: a sentence that contains two main clauses and a coordinating conjunction
multi-clause sentence with a subordinating conjunction: a sentence that contains a main clause, a subordinate clause and a subordinating conjunction
multi-clause sentence with an embedded clause or phrase: a sentence that contains one main clause which is split by a subordinate clause or a phrase
coordinating conjunction: FANBOYS (*for, and, nor, but, or, yet, so*)
subordinating conjunction: *because, if, until, while, since, as, after, before, although*
interrogative question: a sentence used to gain information
rhetorical question: a sentence used for emphasis (rhetorical)
exclamatory sentence: sentence that expresses strong emotion, like shock or anger
fragment: "sentences" that do not contain a full independent clause
repetition: a word or phrase that is written more than once for emphasis

Analysing language and structure devices: PEEL sentence starters

P: In the extract,, the author presents…

Ev: The author writes '…'

Ex: In particular the [language/structure feature] suggests…because…indicating…

Ev: This is reinforced by/coupled with [language/structure feature]

Ex: This implies…because…showing…

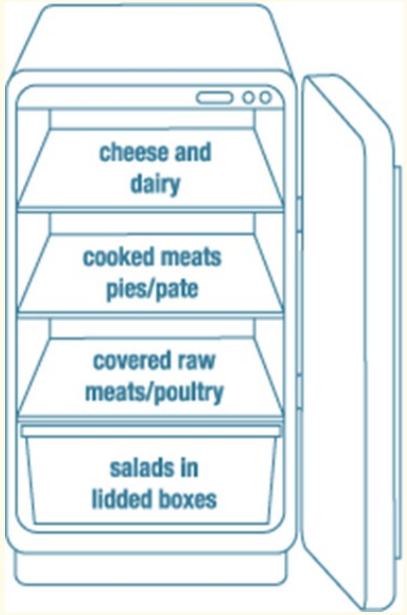
L: This makes the reader think/feel…because…

Boost your mark by:

- ★ **considering alternative interpretations of evidence**
- ★ **considering alternative impacts on the reader**
- ★ **thinking about how events and characters mirror or juxtapose one another**
- ★ **make links between the text and your understanding of context.**

Year 9 Food and Nutrition Knowledge Organiser

Temperature	Description	Image
5-63C	The danger zone, where bacteria grow most readily.	
37 C	Body temperature, the perfect conditions for bacteria to grow.	
0 – 5 C	The temperature that a Fridge should be.	
-18 C	the temperature of a Freezer.	
75 C	when cooking food, the thickest part should be a minimum of this temperature.	



Top and middle shelf
Ready-to-eat foods, such as dairy products, ready meals and packaged foods, leftovers, cooked meats and prepared salads.

Bottom shelf
Raw meat, poultry and fish in sealed containers to stop them touching or dripping onto other foods. Raw meats should always be stored at the bottom of your fridge to prevent cross-contamination.

Salad drawer
Fruit, vegetables and salad vegetables that have been washed prior to storage. Make sure that your fruit, vegetables and salad are wrapped in paper or plastic with air holes to keep them protected from any contamination.

Can you name the equipment below and think of 2 uses for it?

Year 9 Food and Nutrition Knowledge Organiser

Key vocabulary: you need to be able to spell these words but also understand their meaning.	
Nutrients	Provided by all food and water keeping our bodies functioning correctly.
Macro	Fat, carbohydrate and protein that are needed in large amounts and are essential.
Micro	Vitamins and minerals that are essential but needed only in small amounts.
Sustainability	Food that is produced in a way that does not have a negative impact on the environment.
Seasonality	Food that is grown in the UK at a specific time in the year. E.g. Pumpkins in Autumn.
Cross contamination	The movement of bacteria from one place to another; predominantly raw to cooked.
Safe Temperatures	Temperatures to protect the food from bacterial contamination
Sensory Characteristics	Using words to describe the texture, taste and smell of food.
Heat transfer	Oven bake, hob, Grill and Fry
Utensils/ Equipment	The tools we use to prepare and cook products.

Can you name 6 Allergens?

REDUCING FAT

1.Read food labels chose lower in fat products and lower-fat or reduced-fat dairy products or dairy alternatives

2. Grill, bake, poach or steam food rather than frying or roasting

3.Trim visible fat and take the skin off meat.

4. choose leaner cuts of meat that are lower in fat

5. Use try reduced-fat spreads, such as spreads based on olive or sunflower oils

Good food safety practices are necessary in order to produce, make and supply foods that are safe to eat. This involves more than just being clean. A simple way to remember this is the 4 C's:

Cleaning
Cooking
Chilling
Cross-contamination

Year 9 French Knowledge Organiser

Subordinating Conjunctions

Subordinating conjunctions are words that link a main clause (makes sense of its own) to a subordinate clause (gives extra information that doesn't make sense on its own).

because = **parce que**
if = **si**
when = **quand**
while = **lorsque**
as/since = **puisque / comme**
seeing that = **vu que**
given that = **étant donné que**

Fronted adverbials

Adverbial phrases tell you how, when, where or how often something happens.

Time

now = **maintenant**
today = **aujourd'hui**
immediately = **tout de suite**
after = **après**
before = **avant**
soon = **bientôt**
firstly = **d'abord**
later = **plus tard**
then = **puis/ensuite**
finally = **pour finir**
this morning = **ce matin**
this afternoon = **cet après-midi**
this evening = **ce soir**

Coordinating Conjunctions (FANBOYS)

for = **car**
and = **et**
nor = **ni**
but = **mais**
or = **ou**
yet = **or**
so = **donc**

Place

here = **ici**
there = **là / là-bas**
far from = **loin de**
close to = **près de**

Frequency

normally = **normalement**
generally = **généralement**
usually = **d'habitude**
sometimes = **parfois / quelquefois**
from time to time = **de temps en temps**
most of the time = **la plupart du temps**
always = **toujours**
often = **souvent**
rarely = **rarement**
on weekdays = **en semaine**
at the week-end = **le week-end**
in the morning = **le matin**
in the afternoon = **l'après-midi**
in the evening = **le soir**
every day = **tous les jours**
once a week = **une fois par semaine**
twice a week = **deux fois par semaine**

Year 9 French Knowledge Organiser

Les opinions	***Opinions***
J'aime	*I like*
J'adore	*I love*
Je n'aime pas (du tout)	*I don't like (at all)*
Je déteste	*I hate*
Je préfère	*I prefer*
bien que ce soit…	*even though it is…*
parce que c'est…	*because it is…*
goûteux/savoureux	*tasty*
(trop) sucré	*(too) sweet*
(trop) épicé	*(too) spicy*
sain	*healthy*
malsain	*unhealthy*
salé	*salty*
gras	*fatty*
délicieux	*delicious*
sans goût	*tasteless*
dégoûtant	*disgusting*
bon pour la santé	*good for your health*
mauvais pour la santé	*bad for your health*
Je ne peux pas manger de	*I cannot eat any…*
Je ne peux pas boire de	*I cannot drink any…*
Je suis allergique	*I am allergic*
Je suis musulman	*I am Muslim*
Je suis végétarien	*I am vegetarian*

Manger	**to eat**
Je mange	I eat
Tu manges	You (sg) eat
Il, elle mange	He, she eats
Nous mang**e**ons	We eat
Vous mangez	You (pl) eat
Ils, elles mangent	They eat

Boire	**to drink**
Je bois	I drink
Tu bois	You (sg) drink
Il, elle boit	He, she drinks
Nous buvons	We drink
Vous buvez	You (pl) drink
Ils, elles boivent	They drink

Prendre	**to take/to have**
Je prends	I have
Tu prends	You (sg) have
Il, elle prend	He, she has
Nous prenons	We have
Vous prenez	You (pl) have
Ils, elles prennent	They have

The partitive articles

These articles are used when talking about a quantity of something, and means 'some'. Although you don't always use the word 'some' in English, you always do in French.

de = some

- **la ➔ de la (before feminine nouns)**
- **l' ➔ de l' (before nouns starting with a vowel and a silent h)**
- **les ➔ des (before plural nouns)**
- **le ➔ du (before masculine nouns)**

e.g. Je mange **des** fraises tous les jours. I eat (some) strawberries every day. However, you always use 'de' (any) in a negative sentence.➔ Je ne mange pas **de** fraises.

Year 9 – Topic Two: Oceans

Key vocabulary

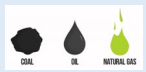
Ocean – a large body of saltwater.

Ocean current – movement of seawater.

Global warming - the current rise in the average temperature of Earth's air and oceans.

Glaciers – a large mass of ice on the land.

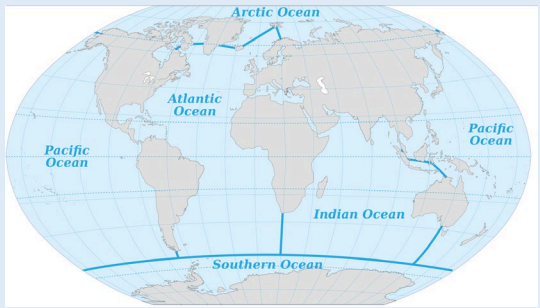
Resource – a resource is a natural material that humans need and value.



Fossil fuels – non-renewable fuels, which include coal, oil, and natural gas.

Tidal – relating to the daily rising and falling of sea levels (tide).

There are <u>five</u> world oceans



Ocean currents

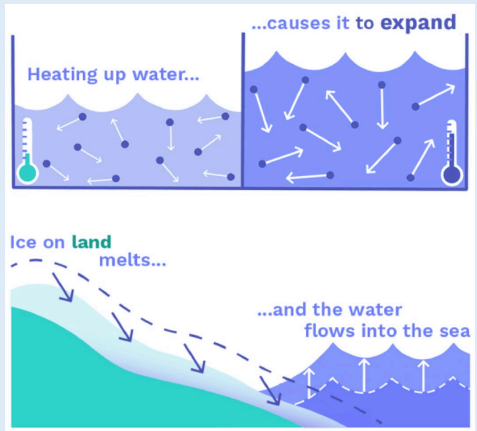
-Thermohaline currents– ocean currents (movement) are caused by the **temperature and salinity** (salt) of the ocean.

-Ocean currents are like conveyer belts of warm and cold water, with warm water rising and moving toward the polar regions and cool water sinking back to the tropics.

-As the seawater gets saltier, its density increases, and it starts to sink. Surface water is pulled in to replace the sinking water, which in turn eventually becomes cold and salty enough to sink.

Causes of sea levels rising

Global warming is heating up the Earth and this causes 1. thermal expansion and 2. glaciers (ice on land) to melt:



Eutrophication

<u>Causes</u>

- Waste from sewers and factories contain different nutrients that are then poured into the ocean.
- Agriculture uses fertilisers that contain nitrogen and phosphate (in USA), so when it rains water will run off the farmland and enter the rivers which go directly to the sea.
- When nutrients are added to the ocean causing more and more algae to be created.
- More algae is created which blocks off the sunlight to the plants on the ocean floor – this reduces the process of photosynthesis, leading to less oxygen.

<u>Effects</u>

- Dead zones are created which are areas of water where aquatic life cannot survive because of low oxygen levels.
- The majority of the world's dead zones are located along the eastern coast of the United States, and the coastlines of Japan, and the Korean Peninsula.
- Habitats that would normally be teeming with life become, essentially, biological deserts.
- The harmful algae blooms can cause fish kills, human illness through shellfish poisoning, and death of marine mammals and shore birds.

Ocean resources

<u>Oil</u>	**<u>Natural gas</u>**	**<u>Tidal</u>**	**<u>Wave</u>**
-Dead marine life coverts to fossil fuels which are found deep underground, often in ocean. -Extract it through drilling offshore oil wells (expensive). -Used for fuel. -Emits greenhouse gasses.	-Dead marine life coverts to fossil fuels which are found deep underground, often in ocean. -Extract it through drilling offshore gas wells (expensive). -Used for fuel. -Emits greenhouse gasses.	-Similar to a wind turbine, but underwater. -Tide rising and falling (kinetic energy) can be changed to electrical energy. -Renewable & no CO2 emissions. -Expensive and may harm marine life.	-Attenuators can convert the kinetic energy from waves into electrical energy. -Renewable, no CO2, no visual impact. -Expensive, only suitable in certain locations.

Year 9 – Topic One: Regeneration

Key vocabulary

Urban decline –is the process of an area of a city deteriorating leading to high levels of unemployment, poverty, and poor housing and public infrastructure.

Regeneration –investing in and renewing urban areas that have declined to bring about social and economic change.

Social – relating to people e.g. wellbeing, education, healthcare.

Economic – relating to money e.g. employment, income, GNI per capita.

Environmental – relating to the natural environment e.g. air pollution, water pollution.

Brownfield site – an old industrial or inner-city site that is cleared for a new building development.

Fieldwork - the process of collecting data about people, places and environments to prove or disprove a hypothesis.

Spiral (cycle) of decline

-Industries decline/close down e.g. manufacturing in the 1950s onwards.
-Unemployment increases.
-Poverty increases, aswell as crime.
-Shops and other services begin to shut down.
-Businesses no longer want to invest in the area.

Regeneration example – Brindley place

In the 1970s many of the factories in this area closed down leading to the spiral of decline taking place.

Advantages of regeneration:
-New businesses e.g. Sea Life Centre and the Legoland Discovery Centre.
-Many new restaurants, cafes offices & hotels.
-This creates jobs.
-Crime in area reduces.
--All of this also increases tourism and spending in local economy.-
MULTIPLIER EFFECT

Disadvantages of regeneration:
-Lower income residents can't afford to live there anymore so have to leave.
-Loss of local shops as they can't compete with new restaurants and cafes.
-Former factory workers may not have skills to access new jobs created.

Fieldwork-Has the regeneration at Brindley place been successful?

Hypothesis- the **prediction** we make about our fieldwork, based on our knowledge. "Urban regeneration at Brindley Place has been a complete success"

Risk assessment-Before you conduct any fieldwork, you must conduct a risk assessment where you identify potential risks/hazards and put in place controls/mitigations to reduce these risks.

Example one: Risk=getting lost/Mitigation = staying with group at all times and knowing the central meeting point (costa).
Example two: Risk=being too cold/Mitigation=ensuring we wear appropriate warm clothing.

Data collection methods

1. 
Land-use mapping survey

2. 

Environmental Quality Survey (EQS)

3. 

Annotated photos

Analysis - In your analysis, you look at the results of your data in detail and discuss patterns. You may have to convert some of your data to a more easily readable format e.g. the EQS to a bar chart.
-Are there any clear trends or are there *anomalies*?
-Quote figures and places to support your points and use accurate geographical terminology.

Conclusion -A short section to draw together the results and answer the enquiry question.

Evaluation-This considers the strengths and weaknesses of the data collection, along with possible improvements or extensions. It is acceptable to talk about weaknesses, as long as improvements can be suggested.
-Were there any issues with your data collection methods?
-Should more data have been collected? Should more sites have been visited?
-Is there any other data that might have been useful to collect?

History 9.1 Is Dr Fern Riddell right to call the Suffragettes terrorists?

Key dates		
1	1903	The WSPU is formed
2	1909	The first hunger strike
3	1910	Black Friday
4	1913	Emily Wilding Davison bombs Lloyd George's holiday home
5	1914	WSPU suspends their campaign to support the war effort
6	1918	The Representation of the People Act (women over 30 are given the right to vote)
Who were the Suffragettes?		
7	Who founded the Suffragettes?	Emmeline Pankhurt
8	What was the WSPU?	The Women's Social and Political Union
9	What did the Suffragettes want?	To have the vote on the same terms as men
10	Who was Christabel Pankhurst?	A Suffragette leader who made the decision to use violent methods to get the vote

The methods of the Suffragettes		
11	What was the first WSPU action?	Annie Kenney asked Winston Churchill when women would be given the vote at a public meeting
12	How did the WSPU share their ideas?	Pamphlets, newsletters and speeches while they were chained to railings
13	Why did the Suffragettes attack property?	To show the government cared more about property than the lives of women
14	What property did the Suffragettes attack?	Post boxes, telegraph wires and unoccupied homes
Reactions to the Suffragettes		
15	What was Black Friday?	When the police reacted with violence to a peaceful march to the Houses of Parliament
16	Why were the suffragettes force-fed?	As they went on hunger strike to protest being classed as criminals
17	What was the Cat and Mouse Act?	A government law that said hunger striking prisoners would be released to recover, then return to finish their sentence

History 9.2 The rise of the Nazis and the Holocaust

Key dates		
18	1929	The start of the Great Depression
19	1933	Hitler becomes Chancellor of Germany
20	1935	The Nuremburg Laws
21	1938	Kristallnacht (The Night of Broken Glass)
22	1942	The Wannsee Conference
23	What event encouraged people to vote for the Nazis?	The start of the Great Depression, which led to nearly 6 million people becoming unemployed
Nazi views on race		
24	What is antisemitism?	Prejudice or hatred of Jewish people
25	Who did the Nazis believe was the superior race?	Aryans (White, non-Jewish, Germans)
26	Which other groups were persecuted by the Nazis?	Jehovah's Witnesses, disabled people, gay people and Black people
27	What were the Nuremburg Laws?	It banned Aryans from marrying or having sex with Jewish people, and removed their German citizenship
28	What was Kristallnacht?	A Nazi organised attack on Jewish homes, businesses and places of worship

The Ghettos		
29	What was a ghetto?	Areas of towns or cities where Jewish people were forced to live
30	Why was overcrowding a problem in the Warsaw ghetto?	More than 400,000 people were forced to live in an area of 1.3 square miles. There was an average of 8 people per room
31	Why was starvation a problem in the ghetto	The Nazis deliberately limited the food supply, leading to thousands of Jewish people dying of starvation
32	How did Jewish people try to continue their lives in the ghetto	They set up secret schools, held religious ceremonies and set up soup kitchens to feed the hungry
How did the Nazis murder the Jews?		
33	Which group carried out the Holocaust by bullets?	The Einsatzgruppen (a group of soldiers from the Waffen SS and the German security services)
34	Where were the death camps?	Sobibor, Belzec, Chelmno, Treblinka, Majdanek and Auschwitz-Birkenau
35	How was Auschwitz-Birkenau different to other death camps?	When Jewish people arrived at Auschwitz, they went through a process called selection. Those who were unable to work were sent to the gas chambers

Music

12 Bar Blues Chord Progression in C

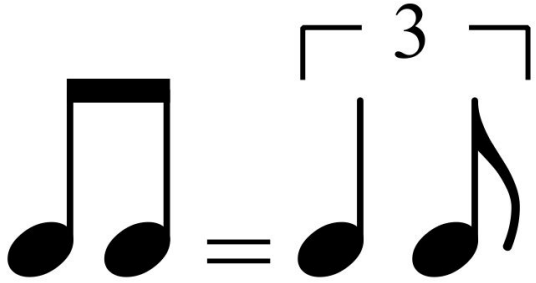
1 C	2 C	3 C	4 C
5 F	6 F	7 C	8 C
9 G	10 F	11 C	12 G

The 12 Bar Blues is the basic structure that most early Blues was played with. Only three chords are used: I, IV and V. (C,F and G in the key of C)

Swing!

- Blues music is played with a rhythmic device called Swing.
- This means that the quaver beat of the music is played in a slightly lazy way, where the first note is longer than the second.
- This gives the music a cool, laid back feel, and it is commonly used in Jazz music as well for the same effect.

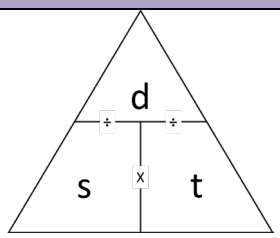
Accuracy and fluency	Technical Control	Expression
• Count along to the beat to play the melody. • Try to play at an even dynamic level • Ensure you have practiced LH and RH separately before attempting to combine.	• Make sure you are using the same fingers each time in the RH • Your wrist should be higher than the keyboard. • Ensure you are facing the keyboard with good posture. (Straight back, loose arms)	• Try to play the melody lightly, using the rebound off the keys. • Match your pace to your partner to enable better practice. • Make sure you are playing the piece at an appropriate speed.



Physics- Motion and Forces (December 2023)

Speed

Speed measures how far an object goes in a set time. For example how many metres it goes in a second. The unit here would be metres per second (m/s).



Distance = Speed x Time

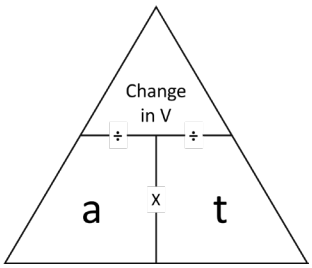
To measure the speed of an object:

1. Measure the distance it goes with a tape measure.
2. Time how long this takes with a stopwatch.
3. Speed = Distance ÷ Time

Acceleration

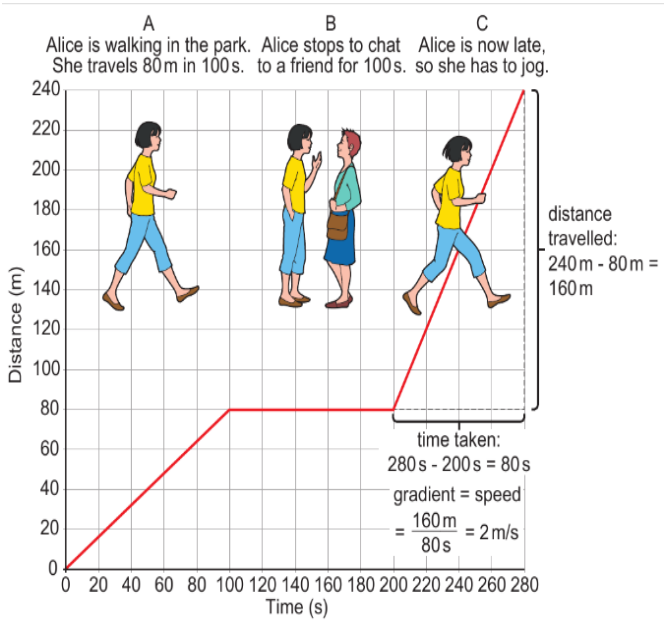
Acceleration measures how quickly the velocity/speed is changing.

- Positive acceleration means it's getting faster.
- Negative acceleration means it's getting slower.
- Zero acceleration means it's going at a steady speed.



The usual units for acceleration are m/s^2.

Distance-Time Graphs



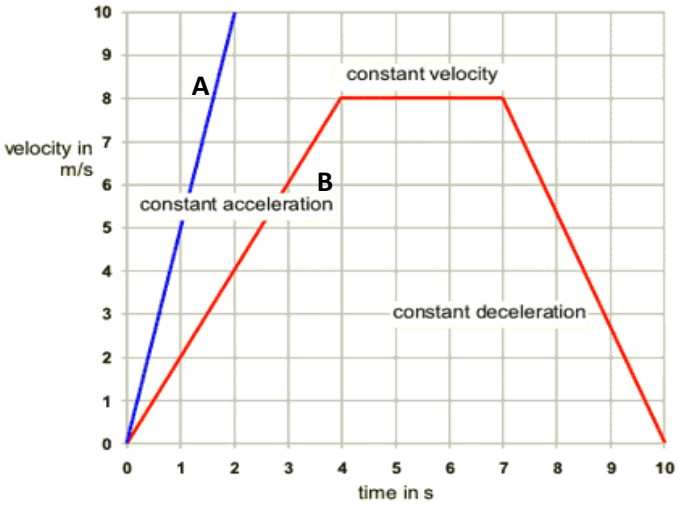
A distance-time graph shows how far something has travelled after a certain time.

The steeper the slope is, the faster they are moving (time C above is faster than time A).

A flat line means they aren't moving (time B above).

You can find the speed using a distance-time graph by finding the gradient. To do this you need to find how much the distance has changed by, and divide it by how much the time has changed by, because speed = distance/time. An example is shown on the graph above at time C.

Velocity-Time Graphs



A velocity-time graph shows how quickly something is moving at a certain time.

The steeper the slope is the faster the object is accelerating (line A shows a faster acceleration than line B).

A flat line means a steady speed (no acceleration) and a line going down means the object is slowing down (negative acceleration).

If you find the gradient of a velocity-time graph it gives you the acceleration. You need to find how much the velocity has changed by, and divide by how much the time has changed.

For example, using line A above:
Velocity went up by 10m/s
Time this took was 2s.
Acceleration = change in V/t
= 10/2 = $5m/s^2$

The area under a V-T graph gives you the distance travelled.

What are forces?

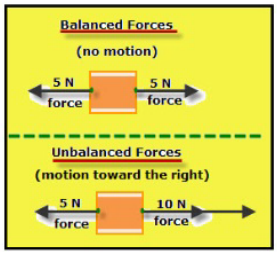
Forces are a push or a pull. These are measured with a Newton meter and the unit is Newtons (N).
Forces either make objects accelerate (changes their velocity) or changes their shape.
In topic 2 we are mainly looking at how forces affect the velocity of objects.

Common misconceptions!

- **Students often think that a moving object slows down and stops by themselves without a force needed. However, moving objects need a force to stop and slow them down!**
- **Remember that not all forced need direct contact. Some forces can act at a distance (for example magnetic or gravitational attractions).**

Balanced and Resultant Forces

A resultant force is a single force and tells you the effect of every force on that object. Forces pointing in the same direction add together, forces in opposite directions take away. The resultant force will point in the direction that the most force did.



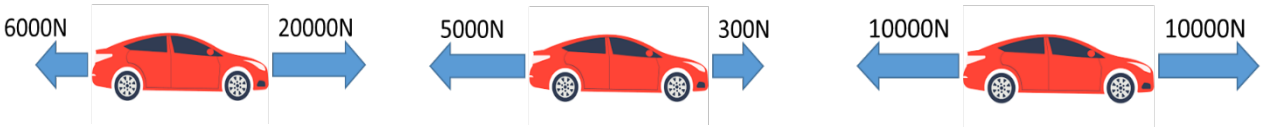
If there is a resultant force the object will accelerate (get faster) in that direction.

If the forces in opposite directions are the same then they are balanced forces. There is zero resultant force and the motion of the object (how it's moving) doesn't change.

Common misconceptions!

Students believe when the resultant force is zero the object is stationary. No! If the forces acting on an object are balanced and the object is in motion, then it will continue in motion with the same velocity.

Examples of Resultant Forces



Resultant force = 14000N forwards. Car will speed up.	Resultant force = 4700N backwards. Car will slow down.	Resultant force = 0N Car will stay at steady speed.

Remember: Resultant forces need both a size and a direction because they are vectors.

Newton's First Law

If the resultant force on an object is zero (if the forces are balanced), then the acceleration of the object will be zero (the object will have a steady velocity.)

Newton's Third Law

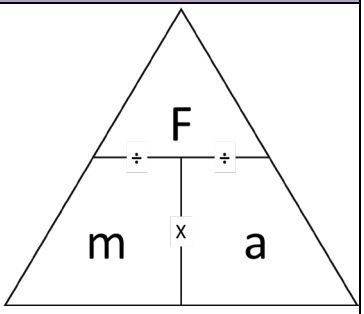
Every force has an equal and opposite force.

For example if you push a wall with 200N, then the wall pushes you back with 200N.

Newton's Second Law

This is an equation that shows how forces affect acceleration.

Force = Mass x Acceleration



The force in this equation is the resultant force.

Teacher tip

Remember to use the formula triangle to rearrange a formula.

Applications of Newton's Laws

$$acceleration = \frac{force}{mass}$$

This tells us that a bigger force makes the acceleration higher.

It also tells us a bigger mass makes the acceleration lower.

This is why sports cars need powerful engines (to get a big force) but need to be as light as possible (to get a small mass).

It also explains why big vehicles like lorries take a long time to slow down, they have a big mass so they can't accelerate (change velocity) quickly.

Common misconceptions!

Students often think that acceleration means speeding things up only, when in fact the term can describing slowing down or changes in direction.

$$Force = mass\ x\ acceleration$$

This tells us that the higher the acceleration is the higher the force is.

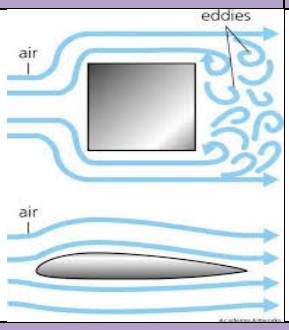
This explains why a car crash is so dangerous. When the car stops very suddenly there is a very quick change in velocity (a big acceleration), this means you get a huge force on your body which causes damage.

Car safety features, like crumple zones and air bags are designed to make it so things take longer to slow down, so the acceleration is lower, which means there is less force.

Friction and Air Resistance

If the objects are moving quicker, this will increase the friction and the air resistance.

Friction also increase if the surfaces are rough. Adding lubrication (like oil) will reduce the friction.
Air resistance can be reduced by giving the object an aerodynamic/streamlined shape so it cuts through the air more easily.
Friction and air resistance both generate heat.



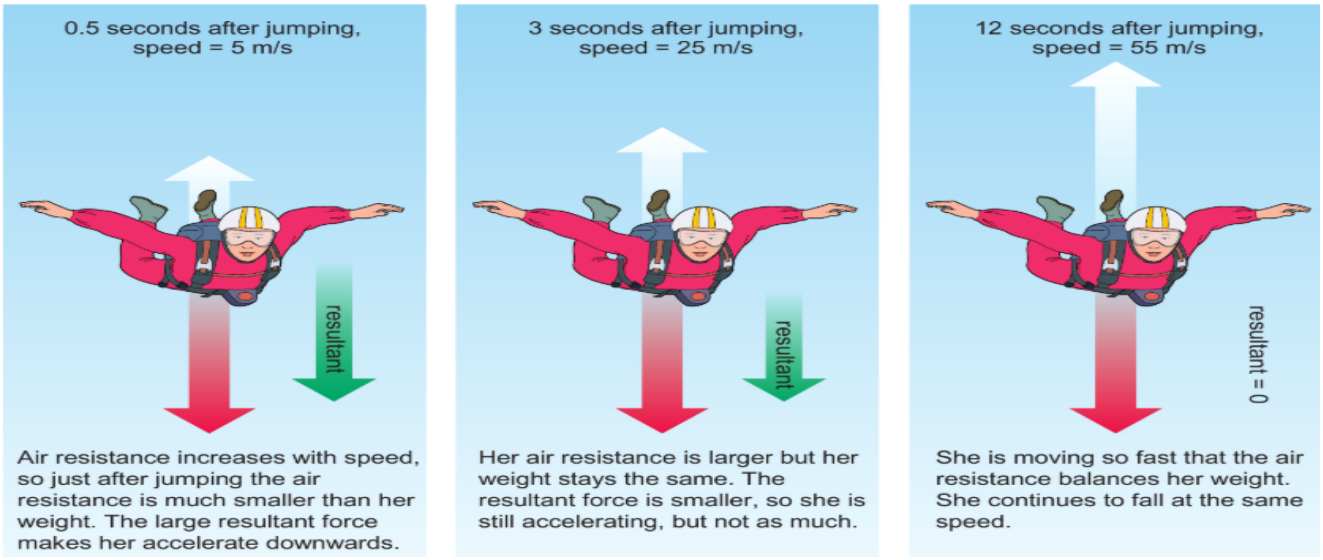
Good luck in your tests

If there is anything in here you don't understand, please ask your teacher.

Check your understanding, get it memorised and you'll do great.

Terminal velocity

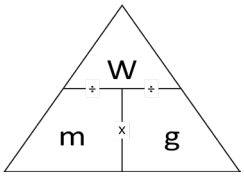
When you drop an object, it will get faster. This is because the weight (that pulls down) is the biggest force.
However, as the object gets faster it will experience more air resistance.
Eventually air resistance will be equal to the weight and the forces will be balanced. This means the object stops accelerating and falls at a steady speed. This speed is called terminal velocity.



<u>Common misconception!</u>
It seems that heavier objects will always fall faster. They will accelerate downwards at the same, however they have more weight so they can reach a higher top speed.

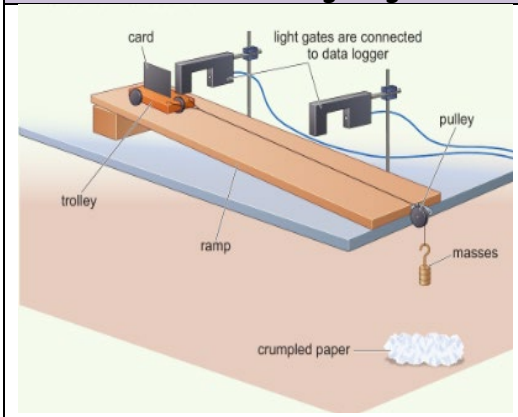
Weight, Mass and Gravitational field strength

Mass – measures the amount of matter an object is made from. Unit is kilograms (kg). Mass is a scalar.
Weight – is a force that a mass has on it because of gravity. This is a vector.
Gravitational field strength – how strong gravity is on a planet or moon. Usually, the more massive a planet or moon is the higher the strength of gravity is.



Weight = Mass x Strength of Gravity

Core Practical – Investigating Acceleration



Aim is to see how changing the pulling force will affect the acceleration.

- Use masses to add a force to the end of the string to pull the trolley.
- Light gates measure the starting and final velocity, this lets you find out the **change in velocity**.
- Light gates also measure the **time** taken to go between the light gates.
- Acceleration = change in velocity/time
- Repeat 5 times and take an average.
- Add more mass to the end of the string to see how the extra force changes the acceleration.
- The ramp is angled to add a small forwards force, this cancels out the small backwards force from friction.

Vectors and Scalars

A vector quantity is something in physics that has a size and a direction. For example, when you draw a force you show the direction it points with an arrow, that's because forces are vectors.
A scalar quantity only has a size, it does not have a direction. For example a mass is a scalar.

Speed and velocity are similar, but speed is a scalar and velocity is a vector, so with a velocity the direction that it is travelling in is important.

VECTORS	SCALARS
Lift	Time
Displacement	Distance
Weight	Mass
Drag	Area
Force	Density
Momentum	Work
Acceleration	Temperature
Velocity	Speed
	Energy
	Power

In most cases you don't need to worry about this, and you can use speed when the equation says velocity, and velocity when the equation says speed.

Stopping Distance

Stopping distance is how far a car goes when it needs to stop suddenly (for example somebody jumps in the way.)
Stopping distance = thinking distance + braking distance.

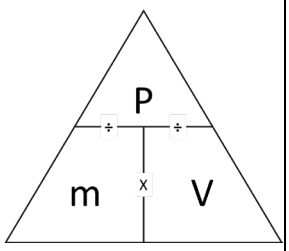
Thinking distance:
How far the car goes before you put your foot on the brake.
Depends on reaction time.

Braking distance:
How far the car goes after you put your foot on the brake.
Depends on friction.

Anything that increases the driver's reaction time, such as drugs or distractions, will increase the thinking distance.
Anything that reduces friction, like icy roads or old brakes, will increase the braking distance.
A higher velocity will increase both, a higher mass of vehicle will increase the braking distance.

Momentum – HIGHER ONLY

Momentum is 'mass in motion.'
An object with a lot of momentum is hard to stop.
Objects with a lot of mass that are moving quickly, like trains and planes, have a lot of momentum.



The units for momentum are kgm/s. The letter is P.

$$momentum = mass\ x\ velocity$$

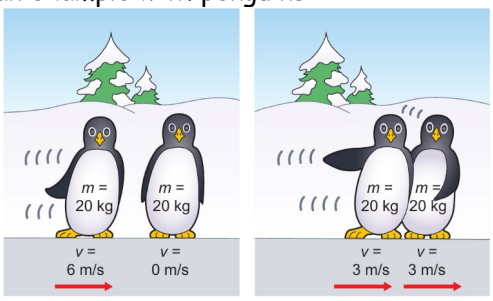
Newton's second law can also be written as:

$$Force = \frac{change\ in\ momentum}{time}$$

Which also tells us that the longer time an object takes to stop, the lower the force is (and the safer it is).

Conservation of Momentum – HIGHER ONLY

Momentum is conserved in collisions.
This means that the total momentum before two objects collide will be the same as the total momentum after they collide. The picture below shows an example with penguins:



before collision after collision

Momentum before = (6 x 20) + (0 x 20) = 120kgm/s

Momentum after = (3 x 20) + (3 x 20) = 120kgm/s

Year 9 RE Knowledge Organiser

1. Suffering

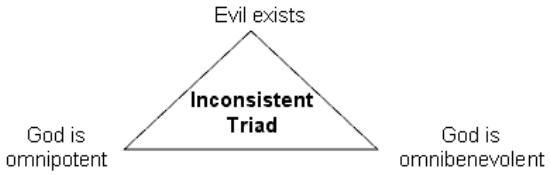
Moral vs natural – moral is manmade evil, whereas natural exists in nature.

Murder - moral, an earthquake - natural.

Evil causes suffering and can lead a person to question:

a) God's Omnipotence (power)
b) God's Benevolence (love)
c) Whether God exists at all.

This is known as the **Inconsistent Triad**.



2. The Story of Job

In the story, **Job suffers** in multiples ways. His cattle and family even die, yet he does not give up on his faith. He comes to realize that he does not know as much as God, and so should not question God's plan for him. Due to his faith he is rewarded many times over.

3. Causes of Suffering

There are degrees of mistreatment humans display towards one another. Humans could behave in this way due to their upbringing, propaganda in their society, out of fear, or several other reasons.

Prejudice	**Pre-judging** someone before knowing them. This involves thoughts, not actions.
Discrimination including hate crimes	**Acting on one's prejudice**. This involves actions, such as preventing a person getting a job due to prejudice. **Hate crimes** involve discrimination towards a person based on their age, race, gender, disability, sexual orientation or religion.
Persecution	This is the **worst form of discrimination** and might involve torture or false imprisonment.

4. Examples of Suffering

Islamophobia
In China, Uighur Muslims are being placed in 'reformation camps' and accused of terrorism. Really the Chinse Communist Party wish to ethically cleanse Uighur communities of their religion, language and dress. This has been called '**cultural genocide.**'

Anti-Semitism
Jews have faced centuries of discrimination and persecution, including deicide, blood libels and the Holocaust. The Holocaust was **genocide.**

B1: Biology key concepts

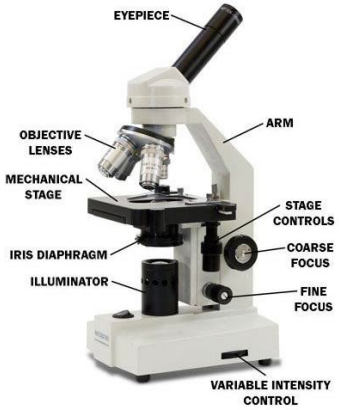
Lesson sequence

1. Microscopes
2. Plant and animal cells
3. Measuring cells
4. Core practical: using microscopes
5. Specialised cells
6. Inside Bacteria
7. Enzymes and Nutrition (Digestive enzymes)
8. Core practical: testing Foods
9. How enzymes work
10. Factors affecting enzymes

Prefix	Effect on unit	Example
milli-	÷ 1000	millimetres (mm)
micro-	÷ 1 000 000	micrometres (μm)
nano-	÷ 1 000 000 000	nanometres (nm)
pico-	÷ 1 000 000 000 000	picometres (pm)

× 1000 / ÷ 1000 between each row

1. Microscopes	
Magnification	The number of times bigger something appears under a microscope.
Eyepiece lens	The lens on a microscope that you look through.
Objective lens	The lens at the bottom of a microscope. There are normally three you can choose from.
Total magnification	Eyepiece lens x objective lens.
Resolution	The smallest distance between two points so that they can still be seen as two separate points.
Stains	Dyes added to microscope slides to show the details more clearly.
Milli	Thousandth, $1x10^{-3}$ (a millimetre is a thousandth of a metre).
Micro	Millionth, $1x10^{-6}$ (a micrometre is a millionth of a metre).



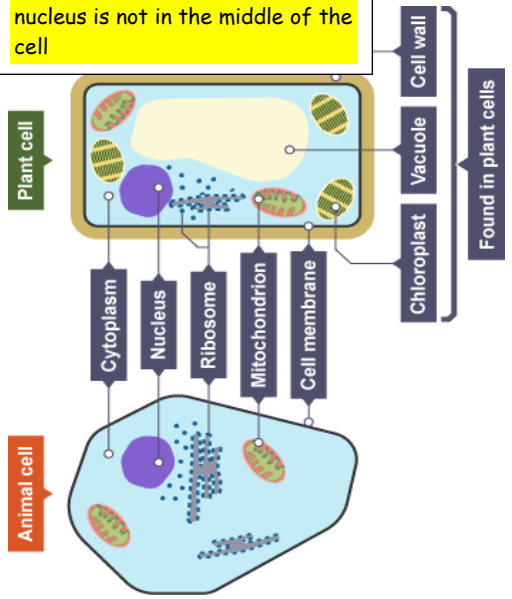
Nano	Billionth, $1x10^{-9}$ (a nanometre is a billionth of a metre).
Pico	Trillionth, $1x10^{-12}$ (a picometre is a trillionth of a metre).

Misconceptions
Make sure that you understand that not all eukaryotic cells have the same organelles, e.g., if something does not have chloroplasts it can still be a eukaryotic cell – it just might be an animal cell.

2. Plant and animal cells	
Cell	The basic structural unit of all living things (the building blocks of life).
Parts of an animal cell	Cell membrane, cytoplasm, nucleus, ribosomes, mitochondria.
Parts of a plant cell	Cell membrane, cytoplasm, nucleus, ribosomes, mitochondria, cell wall, permanent vacuole, chloroplasts.
Cell membrane	Controls what enters and leaves the cell.
Cytoplasm	A jelly-like substance where chemical reactions take place.
Nucleus	Contains DNA and controls the cell.

Ribosome	Produces proteins.
Mitochondria	Releases energy by aerobic respiration.
Cell wall	Protects and supports the cell, made of cellulose.
Permanent vacuole	Stores sap and helps to support the cell.
Chloroplast	Where photosynthesis happens, contains chlorophyll.

Remember in a plant cell the nucleus is not in the middle of the cell



3. Measuring cells	
Micrograph	A picture produced by a microscope.
Light microscope	A microscope that uses light, can magnify up to 1500 times.
Electron microscope	A microscope that uses electrons to produce an image, can magnify up to 1,000,000 times.
Actual size of a cell	Actual size = measured size / magnification

Convert mm to μm	Micrometres (μm) = millimetres (mm) x 1000

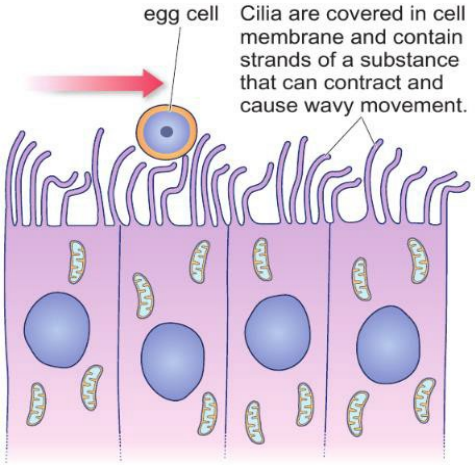
4. Core practical – using microscopes (CP1)	
CP1 – key question	What do cells look like under a light microscope?
CP1 – Prepare the slide	Collect the cells you are studying and place them on the slide. Add a drop of stain and cover with a cover slip.
CP1 – Select lens	Choose between the 4x, 10x and 40x objective lenses.
CP1 – Place slide in microscope	Place slide on microscope stage, adjust the coarse focus until the lens is just touching the slide.
CP1 – Rough focus	Looking through the eyepiece, slowly adjust the coarse focus until you see a rough image.
CP1 – Fine focus	Looking through the eyepiece, slowly adjust the fine focus until you see a sharply focussed image.
CP1 – Record the image	Draw what you see, label any cell parts you can recognise and repeat with different objective lenses.
CP1 - Results	As you increase the magnification of the objective lens, the cells appear larger and more detailed.

5. Specialised cells	
Small intestine cell	**Job:** To absorb small food molecules produced during digestion. **Adaptations:** Tiny folds called microvilli that increase their surface area.
Sperm cell	**Job:** Fertilise an egg and deliver male DNA. **Adaptations:** A tail to swim, mitochondria to give energy for swimming, an acrosome to break through the egg's jelly coat, haploid nucleus with only half the total DNA.

Misconception-The nucleus is not 'the brain of the cell'.
The nucleus controls the cell because it contains the genetic code to make the cell's proteins.

Key points and Misconception
Mitochondria releases energy it does not "create" energy.

Egg cell	**Job:** To be fertilised by a sperm and then develop into an embryo. **Adaptations:** Jelly coat to protect the cell, many mitochondria and nutrients to provide energy for growth, haploid nucleus with only half the total DNA.
Ciliated epithelial cell	**Job:** To clear mucus out of your lungs (and other internal surfaces). **Adaptations:** Small hairs on the surface – called cilia – which wave to

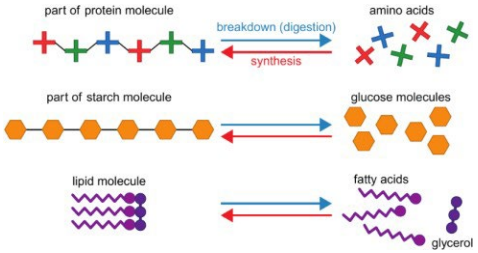


6. Inside bacteria	
Parts of a bacterial cell	**All bacteria:** Cell membrane, cell wall, cytoplasm, ribosomes, chromosomal DNA, plasmid DNA **Some bacteria:** flagellum.
Chromosomal DNA	Large piece of DNA containing most genes.
Plasmid DNA	Small loops of DNA containing a few genes.
Flagellum	A tail used for movement.
Eukaryotic cells	Cells with a nucleus.

Prokaryotic cells	Cells without a nucleus.
Standard form	A way of writing numbers in terms of powers of ten. E.g. $0.015 = 1.5 \times 10^{-2}$ $0.000458 = 4.56 \times 10^{-4}$ The index of ten (the 'minus' number) tell you which decimal point to start on.

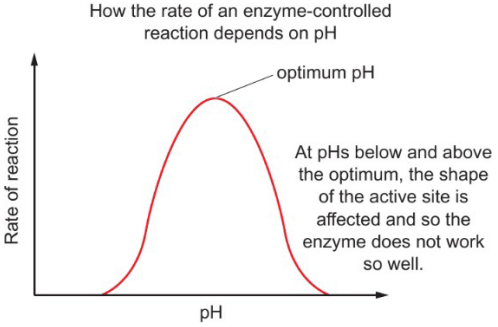
7. Enzymes and nutrition (Digestive enzymes)	
Digestion	Breaking large food molecules down into ones small enough to absorbed by the small intestine.
Catalyst	A substance that speeds up a chemical reaction without being used up.
Enzyme	A protein that works as a catalyst to speed up the reactions in our cells.
Digestive enzymes	Enzymes that break large food molecules down into smaller ones.
Amylase	**Where found:** saliva, small intestine **What it does:** breaks down starch into simple sugars such as maltose
Lipase	**Where found:** small intestine **What it does:** breaks down fats into fatty acids and glycerol
Protease	**Where found:** stomach (pepsin), small intestine (trypsin) **What it does:** breaks down proteins into amino acids

Misconceptions
Not all prokaryotic cells have the same organelles, e.g., the flagellum

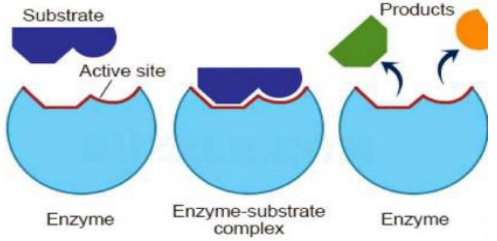


Remember to achieve a mark you need to state that fats are broken down to fatty acids and glycerol

Misconceptions
The term "denatured" does not mean that the enzyme is killed, when an enzyme is denatured the shape of the active site is changed and the substrate cannot bind to it so will not work.
Do not also confuse denaturing with mutation.



9. How enzymes work	
Substrate	The chemical(s) that an enzyme works on.
Active site	An area of an enzyme with the same shape as the substrate.
Lock and key mechanism	The substrate moves into the active site and reacts to form the products. The products leave the active site so another substrate can then enter and so on.
Specificity	Each enzyme can only work on one substrate because the shape of the active site has to match.
Denature	When the shape of the active site changes shape so the enzyme stops working.



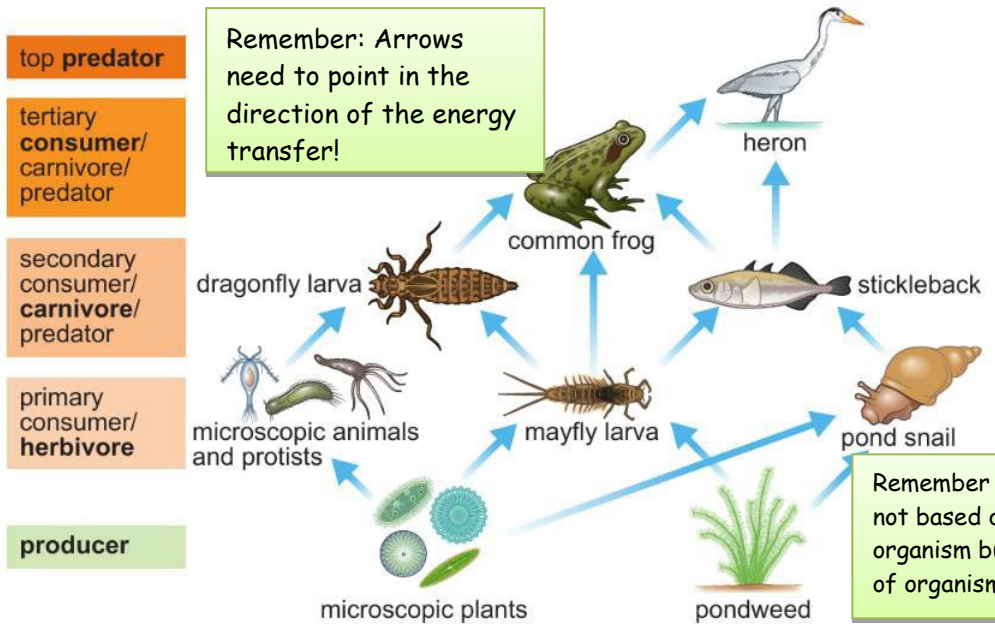
10. Factor affecting enzymes	
Optimum temperature	The temperature when an enzyme works fastest (about 37^{O} for human enzymes).
Changing the temperature	**Increasing to optimum**: rate increases because particles move faster **Increasing past optimum:** rate decreases as enzyme denatures
Optimum pH	The pH when enzymes work fastest (around pH 6-8 for most human enzymes)
Changing pH	Rate decreases as you move away from the optimum because the enzyme denatures.
Increasing substrate concentration	At first the rate increases, but then it levels out as the enzyme is working as fast as possible.

B9: Ecosystems and Material Cycles

Lesson sequence

1. Ecosystems
2. Energy transfers
3. Core practical – quadrats and transects
4. Abiotic factors and communities
5. Biotic factors and communities
6. Assessing pollution
7. Parasitism and mutualism
8. Effect of humans on biodiversity
9. Preserving biodiversity
10. Food security
11. Water cycle
12. Carbon cycle
13. Nitrogen cycle
14. Rates of decomposition

1. Ecosystems	
Ecosystem	An area in which the interactions between all the living organisms and the all the physical factors forms a stable relationship needing no external input.
Habitat	A particular area within an ecosystem.
Community	All the organisms living in an ecosystem.
Interdependence	The way in which the organisms in an area depend on each other, for food, shelter, protection and so on.
Population	The members of one particular species within an ecosystem.
Abundance	The number of members of one species in an ecosystem.



Food chain	The sequence of transfers of matter and energy in the form of food from organism to organism.
Food web	Represents multiple pathways through which energy and matter flow through an ecosystem.
Quadrat	A metal square used to help find the number of small organisms living in an area.
Random sampling	Estimating the population of organisms in an area by randomly dropping a quadrat several times, finding the average number of organisms present and scaling up your answer.
Population size calculation	Population size = number of organisms in quadrat x (total area / quadrat area).

2. Energy transfers	
Biomass	The dry mass of living organisms in an area (habitat) at a particular time.

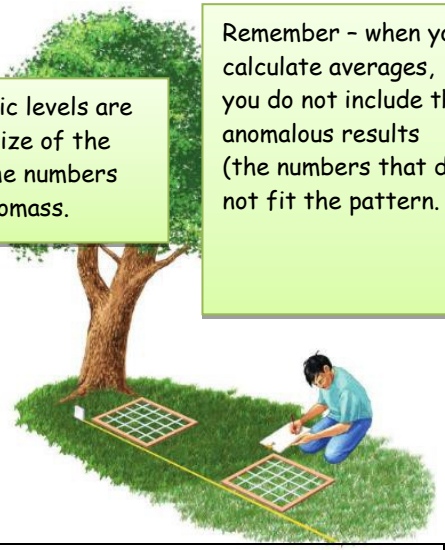
Trophic levels	The group of organisms within an ecosystem which occupy the same level in a food chain.
Sankey diagrams	Summarises all the energy transfers taking place in a process. Sankey diagrams are drawn to scale - the thicker the line or arrow, the greater the amount of energy involved.
Pyramids of biomass	Represents the mass of organisms at each trophic level.

3. Core practical – quadrats and transects (CP8)	
CP8 – Belt transect	A way to study how the population of a species changes as you move through an area but counting the organisms in a quadrat at regular intervals.
CP8 – Key question	How does the number of daises vary as you move away from the base of tree?

CP8 – Collecting data	Place a quadrat so it is touching the base of a tree and record the number of daisies. Repeat, moving the quadrat 1 m away each time until it is 10 m away. Repeat with three different trees.
CP8 – Calculate averages	Calculate the average number of daisies 1 m away, 2 m away and so on.
CP8 – Results	The number of daisies increases as you move away from the tree, and levels out at about 6 or 7 m.

Remember – trophic levels are not based on the size of the organism but on the numbers of organisms or biomass.

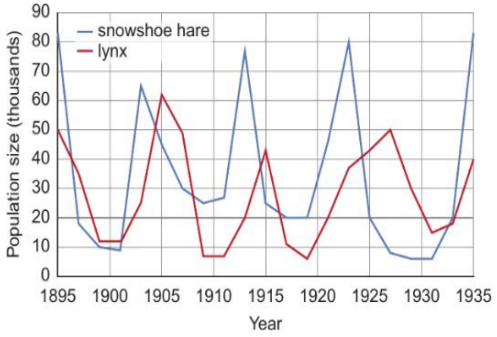
Remember – when you calculate averages, you do not include the anomalous results (the numbers that do not fit the pattern.



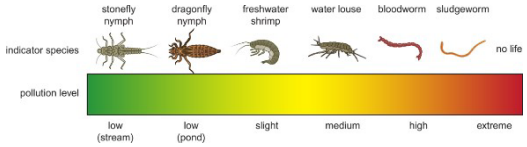
4. Abiotic factors and communities	
Abiotic factor	A non-living factor that influences what can live where.
Important abiotic factors	Temperature, light intensity, rainfall, type of landscape, soil pH, soil nutrients, pollution.
Pollutants	Substances produced by human activities that can poison some or all of the organisms living in an area.

Adaptation to abiotic factors	Features of plants and animals that are suited to the abiotic factors where they live.
Changes to abiotic factors	If an abiotic factor changes – such as temperature increasing due to global warming – organisms may no longer be well adapted to where they live and may die out.

5. Biotic factors and communities	
Biotic factor	A living factor that influences what can live where.
Important biotic factors	The presence of food organisms, predators, competing organisms and disease.
Competition	Often two or more different organisms may compete for the same resource such as food, water or light.
Effects of reducing competition	Reduced competition when a species goes extinct can lead to unpredictable effects on other species with some benefiting from reduced predation, and others benefitting.
Predator-prey cycles	As the number of prey animals increases, the number of predators increase. The predators over-predate the prey leading to a fall in prey numbers which causes the number of predators to go down as there is less food. The number of prey increases again because fewer are being eaten.

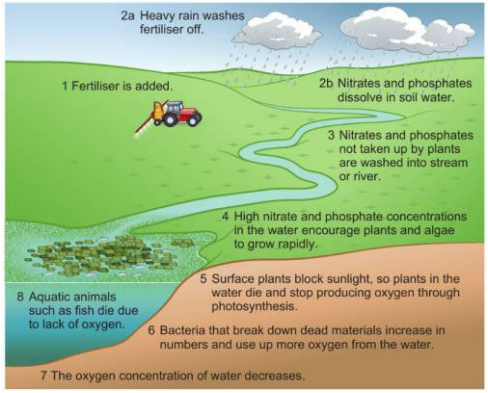


6. Assessing pollution	
Lichen	A composite organism consisting of a fungus and an alga living in a mutualistic relationship.
Indicator species	An organism whose presence, absence or abundance reflects a specific environmental condition.
Pollution	Something introduced into the environment that is dirty, unclean or has a harmful effect.
Blackspot fungus	Is a pathogen specific to roses. The fungus cannot grow well where there is a lot of sulfur pollution.
Aquatic invertebrates	Water living animals without a backbone. These can be used as indicator species.



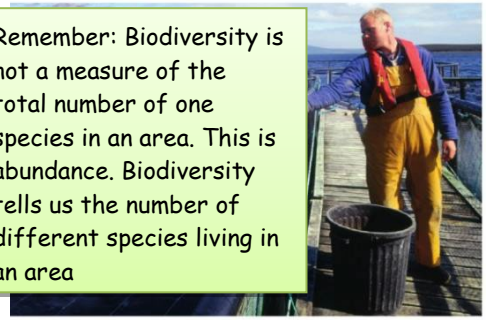
7. Parasitism and mutualism	
Parasitism	A feeding relationship in which a parasite feeds off its host, causing harm to the host but (normally) not killing it.
Examples of parasites	Fleas and leeches sucking blood, tapeworms living in animals' intestines, mistletoe burrowing its roots into tree branches.
Mutualism	Organisms that live together in a relationship where both benefit.
Examples of mutualism	Cleaner fish that swim into a sharks mouths to feed without being eaten. Algae that live inside coral polyps gaining shelter and providing food.

8. Effect of humans on biodiversity	
Biodiversity	The number of different species living in an area. High biodiversity is good.
Fish farms	Farms based in water where fish are farmed in pens to reduce the need to catch them in the wild.
Effect of fish farming on biodiversity	The waste produced by the fish sinks to the sea floor, changing the conditions and harming the organisms living there.
Introduced species	Organisms introduced by humans – intentionally or accidentally – into a new ecosystem.
Effect of introduced species on biodiversity	Many introduced species upset natural ecosystems by changing the food web. Introduced species often lack predators that can control their numbers.
Eutrophication	Fertiliser used on farmland gets washed into lakes and rivers by rain. It causes algae to grow out of control and when the algae die, it sinks to the bottom and rots which uses up the oxygen in the water.



Effect of eutrophication on biodiversity	With less oxygen in the water, many species die, and biodiversity is reduced.

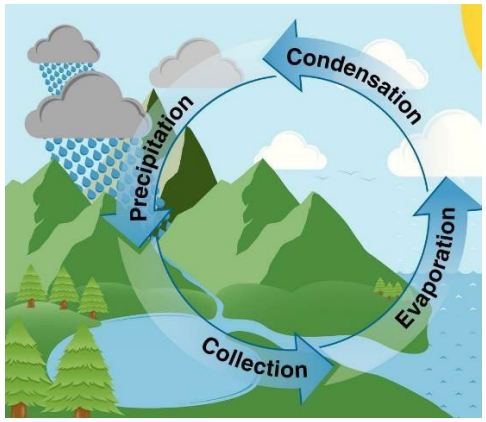
Remember: Biodiversity is not a measure of the total number of one species in an area. This is abundance. Biodiversity tells us the number of different species living in an area



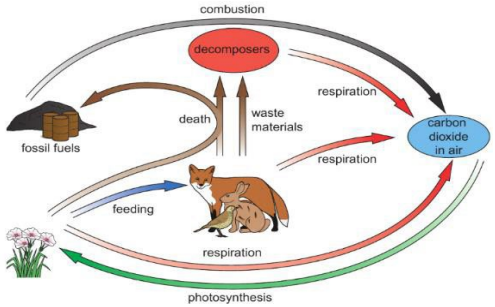
9. Preserving biodiversity	
Importance of biodiversity	Areas with high biodiversity recover more quickly from disasters such as floods and droughts. Many plants and animals are useful for new medicines and products.
Endangered	When a species is at risk of dying out, usually because it has been over-hunted, or its habitat has been destroyed.
Conservation	When an effort is made to protect rare or endangered species or their habitat.
Importance of conservation	Conservation can make the difference between a species dying out or surviving. It increases biodiversity.
Reforestation	Planting trees or allowing trees to regrow on old farmland. It increases biodiversity by increasing the range of habitats in an area.
Captive breeding programmes	Breeding animals in zoos – where they are protected from danger – in order to be able to release them into the wild.

10. Food security	
Food security	The ability of human populations to access food of sufficient quality and quantity.
Yield	The amount of product obtained.
Sustainability	A process or state can be maintained at a certain level for as long as is wanted.
Climate change	A long-term shift in global or regional climate patterns.
Vector	An organism that does not cause disease itself, but which spreads infection by conveying pathogens from one host to another.
Biofuels	A fuel that is produced through contemporary processes from biomass.

11. The water cycle	
Water cycle	The way in water is continuously moved around different parts of the environment.
Water cycle stages	Precipitation, surface run-off and infiltration, evaporation, condensation.
Precipitation	Water falls to the ground as rain, snow and hail.
Surface run-off and infiltration	Water soaks into the ground (infiltration) or runs off into streams and rivers into lakes and oceans.
Evaporation	Water evaporates as water vapour from oceans, lakes and rivers.
Condensation	Water vapour condenses into tiny droplets to form clouds.
Potable Water	Water that is safe for humans to drink
Desalination	Producing potable (drinking water) from salty water, for example by distillation. Useful in areas with low rainfall.

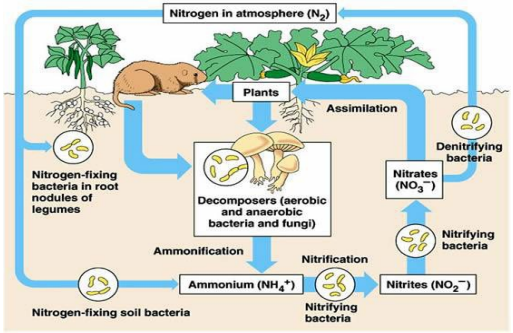


12. Carbon Cycle	
Carbon cycle	The way carbon is continuously moved between different stores in the environment.
Carbon cycle - photosynthesis	Carbon is transferred from the carbon dioxide in the air into plants.
Carbon cycle - feeding	Carbon is transferred from plants into animals, and from animals into other animals.
Carbon cycle – death and excretion	Carbon in waste (urine and faeces) and dead bodies is transferred to decomposers or to fossil fuels.
Carbon cycle - respiration	Plants, animals and decomposers transfer carbon back to the air as carbon dioxide by respiration.



Carbon cycle - combustion	Humans transfer carbon back to the air by burning fossil fuels.

13. Nitrogen cycle	
Importance of nitrogen	Nitrogen is used to make amino acids which are used to make the proteins needed for growth and repair.
Nitrogen cycle	The way nitrogen is continuously moved between different stores in the environment.



Nitrogen cycle – nitrogen fixation	Nitrogen in the air is converted to nitrates in the soil by nitrogen fixing bacteria.
Nitrogen cycle - plants	Plants absorb nitrates from the soil and convert them into amino acids and proteins.
Nitrogen cycle - feeding	Animals eat plants (and other animas) transferring nitrogen into them in the form of protein.
Nitrogen cycle – death and excretion	Nitrogen in the form of urea and protein is transferred to decomposers in the soil by death and excretion.
Nitrogen cycle – decomposers	Decomposers convert nitrogen in urea and proteins into nitrates.
Nitrogen cycle – denitrification	Denitrifying bacteria in the soil convert nitrates back into nitrogen gas in the air.

14. Rates of decomposition	
Preservation	A process that keeps organic things from decomposing.
Methods of preservation	Reducing temperature, Reducing water content, Irradiation, Reducing oxygen.
Irradiation	The process by which an object is exposed to radiation. Irradiation is sued to kill decomposers.
Compost	A mixture of decayed plants and vegetable waste which is added to the soil to help plants grow.
Soil fertility	The ability of **soil** to sustain agricultural plant growth, i.e. to provide plant habitat and result in sustained and consistent yields of high quality.
Decay	The breaking down or rotting of organic matter through the action of bacteria, fungi, or other organisms.
Rate of decomposition	Calculated from a quantity that change over time. Rate of decomposition = Mass lost / number of days

Worked example

The mass of a fresh apple was 153 g. The apple was placed in a compost heap. Ten days later its mass was 37 g. Calculate the rate of decomposition of the apple, using the formula:

$$\text{rate of decomposition} = \frac{\text{mass lost}}{\text{number of days}}$$

$$\text{mass lost} = 153 - 37 = 116\text{ g}$$

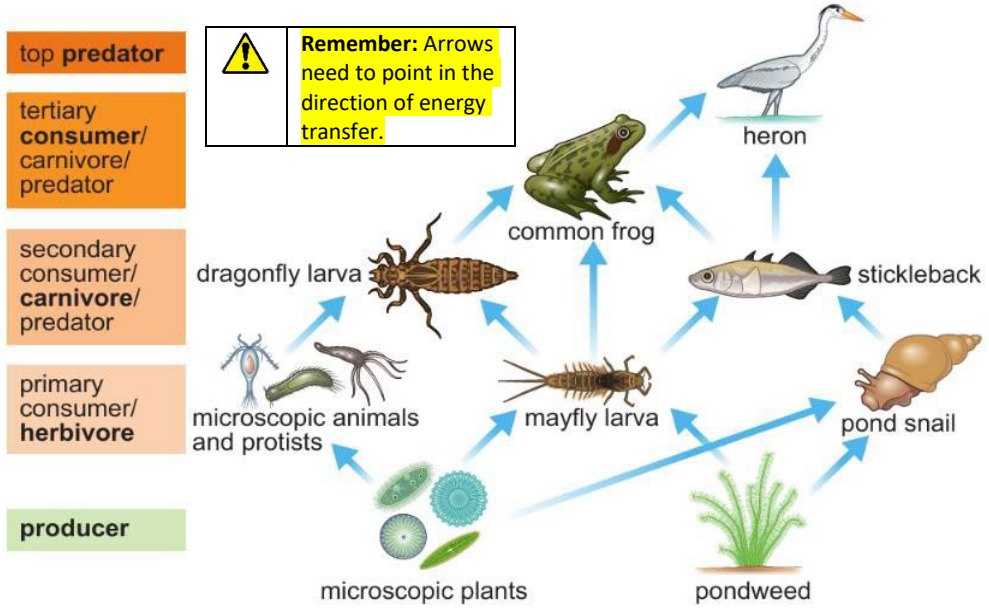
$$\text{rate of decomposition} = \frac{116}{10} = 11.6\text{ g/day}$$

B9: Ecosystems and Material

Lesson sequence

1. Ecosystems
2. Energy transfers
3. Core practical – quadrats and transects
4. Abiotic factors and communities
5. Biotic factors and communities
6. Assessing pollution
7. Parasitism and mutualism
8. Effect of humans on biodiversity
9. Preserving biodiversity
10. Food security
11. Water cycle
12. Carbon cycle
13. Nitrogen cycle
14. Rates of decomposition

1. Ecosystems	
Ecosystem	An area in which the interactions between all the living organisms and the all the physical factors forms a stable relationship needing no external input.
Habitat	A particular area within an ecosystem.
Community	All the organisms living in an ecosystem.
Interdependence	The way in which the organisms in an area depend on each other, for food, shelter, protection and so on.
Population	The members of one particular species within an ecosystem.
Abundance	The number of members of one species in an ecosystem.



Remember: Arrows need to point in the direction of energy transfer.

Food chain	The sequence of transfers of matter and energy in the form of food from organism to organism.
Food web	Represents multiple pathways through which energy and matter flow through an ecosystem.
Quadrat	A metal square used to help find the number of small organisms living in an area.
Random sampling	Estimating the population of organisms in an area by randomly dropping a quadrat several times, finding the average number of organisms present and scaling up your answer.
Population size calculation	Population size = number of organisms in quadrat x (total area / quadrat area).

2. Energy transfers	
Biomass	The dry mass of living organisms in an area (habitat) at a particular time.

Trophic levels	The group of organisms within an ecosystem which occupy the same level in a food chain.
Sankey diagrams	Summarises all the energy transfers taking place in a process. Sankey diagrams are drawn to scale - the thicker the line or arrow, the greater the amount of energy involved.
Pyramids of biomass	Represents the mass of organisms at each trophic level.

3. Core practical – quadrats and transects (CP8)	
CP8 – Belt transect	A way to study how the population of a species changes as you move through an area but counting the organisms in a quadrat at regular intervals.
CP8 – Key question	How does the number of daises vary as you move away from the base of tree?
CP8 – Collecting data	Place a quadrat so it is touching the base of a tree and record the number of daisies. Repeat, moving the quadrat 1 m away each time until it is 10 m away. Repeat with three different trees.
CP8 – Calculate averages	Calculate the average number of daisies 1 m away, 2 m away and so on.
CP8 – Results	The number of daisies increases as you move away from the tree, and levels out at about 6 or 7 m.

Remember: Quadrats can be used to estimate the abundance of organisms using random sampling AND to study the change in a population along a line. These are different experiments.

4. Abiotic factors and communities	
Abiotic factor	A non-living factor that influences what can live where.
Important abiotic factors	Temperature, light intensity, rainfall, type of landscape, soil pH, soil nutrients, pollution.
Pollutants	Substances produced by human activities that can poison some or all of the organisms living in an area.

5. Biotic factors and communities

Biotic factor	A living factor that influences what can live where.
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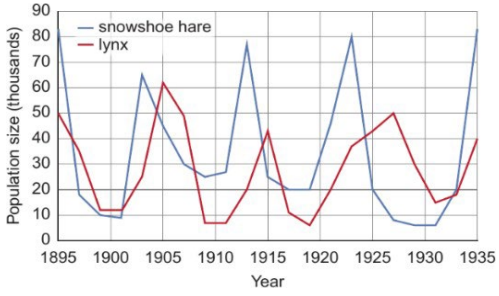
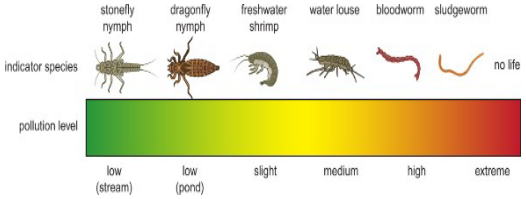
Competition	Often two or more different organisms may compete for the same resource such as food, water or light.
Effects of reducing competition	Reduced competition when a species goes extinct can lead to unpredictable effects on other species with some benefiting from reduced predation, and others benefitting.
Predator-prey cycles	As the number of prey animals increases, the number of predators increase. The predators over- predate the prey leading to a fall in prey numbers which causes the number of predators to go down as there is less food. The number of prey increases again because fewer are being eaten.
Adaptation to abiotic factors	Features of plants and animals that are suited to the abiotic factors where they live.
Changes to abiotic factors	If an abiotic factor changes – such as temperature increasing due to global warming – organisms may no longer be well adapted to where they live and may die out.



6. Assessing pollution

Lichen	A composite organism consisting of a fungus and an alga living in a mutualistic relationship.
Indicator species	An organism whose presence, absence or abundance reflects a specific environmental condition.
Pollution	Something introduced into the environment that is dirty, unclean or has a harmful effect.
Aquatic invertebrates	Water living animals without a backbone. These can be used as indicator species.

⚠ ***Misconception:*** Some students think that blackspot fungus grows in polluted air. This is incorrect, it actually only grows in clean air. It is a **clean air indicator**.



7. Parasitism and mutualism

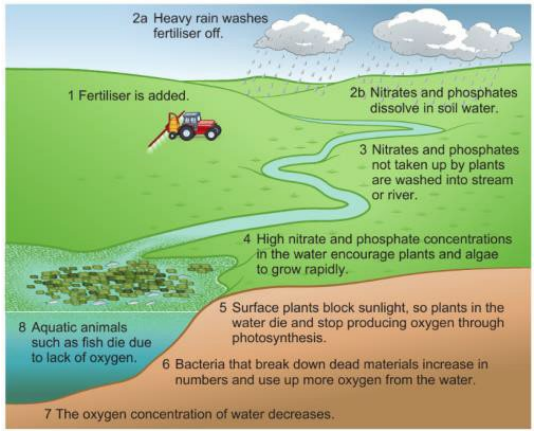
Parasitism	A feeding relationship in which a parasite feeds off its host, causing harm to the host but (normally) not killing it.
Examples of parasites	Fleas and leeches sucking blood, tapeworms living in animals' intestines, mistletoe burrowing its roots into tree branches.
Mutualism	Organisms that live together in a relationship where both benefit.
Examples of mutualism	Cleaner fish that swim into a shark's mouths to feed without being eaten. Algae that live inside coral polyps gaining shelter and providing food.

8. Effect of humans on biodiversity

⚠ ***Misconception:*** Some students think that humans are separate from ecosystems. Humans are animals which affect the environment and non-human species that live in it.

Biodiversity	The number of different species living in an area. High biodiversity is good.
Fish farms	Farms based in water where fish are farmed in pens to reduce the need to catch them in the wild.
Effect of fish farming on biodiversity	The waste produced by the fish sinks to the sea floor, changing the conditions and harming the organisms living there.
Introduced species	Organisms introduced by humans – intentionally or accidentally – into a new ecosystem.
Effect of introduced species on biodiversity	Many introduced species upset natural ecosystems by changing the food web. Introduced species often lack predators that can control their numbers.
Eutrophication	Fertiliser used on farmland gets washed into lakes and rivers by rain. It causes algae to grow out of control and when the algae die, it sinks to the bottom and rots which uses up the oxygen in the water.
Effect of eutrophication on biodiversity	With less oxygen in the water, many species die, and biodiversity is reduced,

⚠ **Misconception:** Biodiversity is not a measure of the total number of one species in an area. This is abundance. Biodiversity tells us the number of different species living in an area.



9. Preserving biodiversity

Importance of biodiversity	Areas with high biodiversity recover more quickly from disasters such as floods and droughts. Many plants and animals are useful for new medicines and products.
Endangered	When a species is at risk becoming extinct, usually because of hunting, or its habitat has been destroyed.
Conservation	When an effort is made to protect rare or endangered species or their habitat.
Importance of conservation	Conservation can make the difference between a species dying out or surviving. It increases **biodiversity**.
Reforestation	Planting trees on deforested areas. It increases biodiversity by increasing the range of habitats in an area.

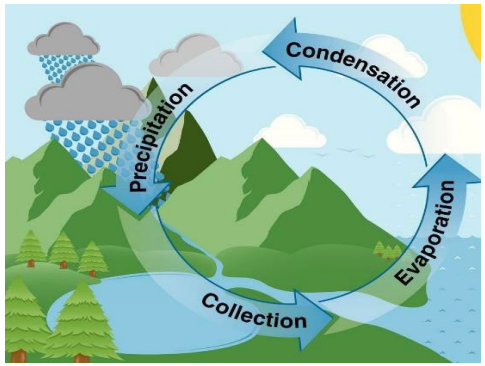
⚠ ***Misconception:*** Students mix up reforestation and afforestation. Reforestation is planting trees in an area of forest that has previously been cut down.

Captive breeding programmes	Breeding animals in zoos – where they are protected from danger – in order to be able to release them into the wild.

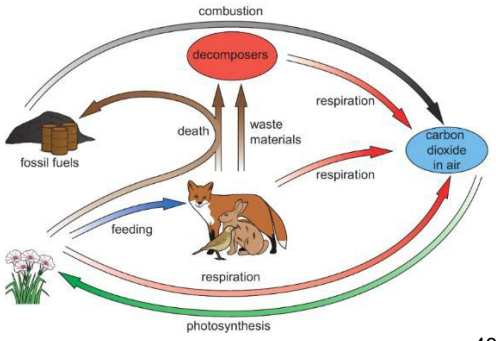
10. Food security	
Food security	The ability of human populations to access food of sufficient quality and quantity.
Yield	The amount of product obtained.
Sustainability	A process or state can be maintained at a certain level for as long as is wanted.
Climate change	A long-term shift in global or regional climate patterns.
Vector	An organism that does not cause disease itself, but which spreads infection by conveying pathogens from one host to another.
Biofuels	A fuel that is produced through contemporary processes from biomass.

11. The water cycle	
Water cycle	The way in water is continuously moved around different parts of the environment.
Water cycle stages	Precipitation, surface run-off and infiltration, evaporation, condensation.
Precipitation	Water falls to the ground as rain, snow and hail.
Surface run- off and infiltration	Water soaks into the ground (infiltration) or runs off into streams and rivers into lakes and oceans.
Evaporation	Water evaporates as water vapour from oceans, lakes and rivers.
Condensation	Water vapour condenses into tiny droplets to form clouds.
Potable Water	Water that is safe for humans to drink
Desalination	Producing potable (drinking water) from salty water, for example by distillation. Useful in areas with low rainfall.

⚠ **Remember:** Plants play a role in the water cycle due to transpiration.



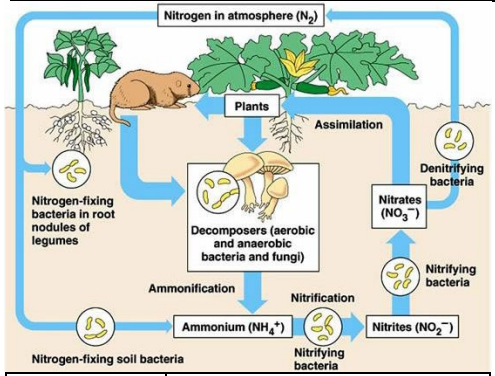
12. Carbon Cycle	
Carbon cycle	The way carbon is continuously moved between different stores in the environment.
Carbon cycle - photosynthesis	Carbon is transferred from the carbon dioxide in the air into plants.
Carbon cycle - feeding	Carbon is transferred from plants into animals, and from animals into other animals.
Carbon cycle - death and excretion	Carbon in waste (urine and faeces) and dead bodies is transferred to decomposers or to fossil fuels.
Carbon cycle - respiration	Plants, animals and decomposers transfer carbon back to the air as carbon dioxide by respiration.



Carbon cycle - combustion	Humans transfer carbon dioxide back to the air by burning fuels.

⚠ **Remember:** Be specific about the form of carbon absorbed, released, or passed on at each stage. E.g. plants absorb **carbon *dioxide*** from the atmosphere. Some of the **carbon** is integrated into plant tissue. This **carbon** is passed to primary consumers. It may be released from the primary consumer as **carbon *dioxide*** in respiration.

13. Nitrogen cycle	
Importance of nitrogen	Nitrogen is used to make amino acids which are used to make the proteins needed for growth and repair.
Nitrogen cycle	The way nitrogen is continuously moved between different stores in the environment.



Nitrogen cycle - nitrogen fixation	Nitrogen in the air is converted to nitrates in the soil by nitrogen fixing bacteria.
Nitrogen cycle - plants	Plants absorb nitrates from the soil and convert them into amino acids and proteins.
Nitrogen cycle - feeding	Animals eat plants (and other animas) transferring nitrogen into them in the form of protein.
Nitrogen cycle - death and excretion	Nitrogen in the form of urea and protein is transferred to decomposers in the soil by death and excretion.
Nitrogen cycle - decomposers	Decomposers convert nitrogen in urea and proteins into nitrates.
Nitrogen cycle - denitrification	Denitrifying bacteria in the soil convert nitrates back into nitrogen gas in the air.

⚠ **Remember:** Plants cannot absorb nitrogen from the air – it is too unreactive. **Nitrogen fixing bacteria** and **nitrifying bacteria** convert nitrogen into useful **nitrates** for the plant.

14. Rates of decomposition	
Preservation	A process that keeps organic things from decomposing.
Methods of preservation	Reducing: temperature, water content (e.g. salting) or oxygen content (e.g. pickling, packaging in nitrogen). Or by irradiating.
Irradiation	The process by which an object is exposed to radiation. Irradiation is sued to kill decomposers.
Compost	A mixture of decayed plants and vegetable waste which is added to the soil to help plants grow.
Soil fertility	The ability of **soil** to sustain agricultural plant growth.
Decay	The breaking down or rotting of organic matter through the action of bacteria, fungi, or other organisms.
Rate of decomposition	The mass lost over a certain period of time.

The mass of a fresh apple was 153 g. The apple was placed in a compost heap. Ten days later its mass was 37 g. Calculate the rate of decomposition of the apple, using the formula:

$$\text{rate of decomposition} = \frac{\text{mass lost}}{\text{number of days}}$$

$$\text{mass lost} = 153 - 37 = 116\,\text{g}$$

$$\text{rate of decomposition} = \frac{116}{10} = 11.6\,\text{g/day}$$

Year 9 Spanish Knowledge Organiser

La vida sana	Healthy life
Para llevar una vida más sana, (no) debes …	To lead a healthier life you should (not) …
beber agua frecuentemente	drink water often
beber alcohol	drink alcohol
beber muchos refrescos	drink a lot of fizzy drinks
comer comida basura	eat junk food
comer fruta y verduras	eat fruit and vegetables
comer menos caramelos	eat fewer sweets
dormir ocho horas al día	sleep eight hours a night
fumar cigarrillos	smoke cigarettes
hacer deporte frecuentemente	do sport often
tomar drogas	take drugs

Describing food

contener	= to contain
contiene	= it contains
contienen	= they contain
mucho/os/a/as = a lot of / lots of	
poco/os/a/as	= little
demasiado/os/a/as	= too many
fibra	= fibre
sal	= salt
grasa	= fat
azúcar	= sugar
vitaminas	= vitamins
proteínas	= protein
carbohidratos	= carbohydrates
minerales	= minerals

Healthy living

duermo 8 horas	= I sleep 8 hours
juego al fútbol	= I play football
practico deportes	= I do sports
voy al gimnasio	= I go to the gym
hago ciclismo	= I do cycling
como mucha fruta	= I eat a lot of fruit
no fumo	= I don't smoke
no bebo alcohol	= I don't drink alcohol
no tomo drogas	= I don't take drugs
evito la comida basura	= I avoid junk food

Key phrases

estoy preocupado/a	= I am worried
estoy gordo/a = I am fat	
perder peso	= to lose weight
pesar	= to weigh
engordar	= to gain weight
adelgazar	= to slim down
para estar en forma	= to be in good shape
para llevar un vida más sana	= to lead a healthier lifestyle
para sentir mejor	= to feel better
para no engordar	= to not put on weight
deberías	= you should
no se debe	= you mustn't

Food/drink items

el pan	= bread
el agua	= water
la manzana	= apple
el plátano	= banana
el pollo	= chicken
la carne	= meat
…de vaca	= beef
…de cerdo	= pork
…de cordero	= lamb
el pescado	= fish
el queso	= cheese
magdalenas	= fairy cakes
el zumo de naranja = orange juice	
los huevos	= eggs
las galletas = biscuits	
los pasteles	= cakes
las gambas	= prawns
un helado	= ice cream
una paella (rice dish)	= paella
las mariscos = seafood	
la sopa	= soup

Verbs of eating

comer	= to eat
desayunar	= to have breakfast
almorzar	= to have lunch
merendar	= to have a snack
cenar = to have dinner	
beber = to drink	

Year 9 Spanish Knowledge Organiser

Present tense

	-ar	-er	-ir
I	o	o	o
you	as	es	es
he/she/you (f)	a	e	e
we	amos	emos	imos
you (pl)	áis	éis	ís
they	an	en	en

Step 1: take your infinitive (hablar)
Step 2: remove the ending (habl)
Step 3: add the new ending on, depending on who is doing the action (hablamos – we speak)

Near Future Tense

ir	to go
voy	I am going
vas	you are going
va	he/she/you(f) is going
vamos	we are going
vais	you (pl) is going
van	they are going

Step 1: take the present tense of 'ir'
Step 2: add 'a'
Step 3: add an infinitive
Eg;
1. voy a jugar = I am going to play
2. vamos a ir = we are going to go

Conjunctions

y	and
también	also
pero	but
además	furthermore
sin embargo	however
aunque	although
porque	because
ya que	as, since

Quantifiers

muy	very
bastante	quite
un poco	a little
mucho	a lot
demasiado	too
tan	so

Frequency words

todos los días	everyday
por la mañana	in the morning
por la tarde	in the afternoon
normalmente	normally
raramente	rarely
de vez en cuando	from time to time
a veces	sometimes
nunca	never
siempre	always

Preterite tense

	-ar	-er / ir
I	-é	-í
You	-aste	-iste
He/she	-ó	-ió
We	-amos	-imos
You (pl)	-asteis	-isteis
they	-aron	-ieron

Step 1: take the infinitive (hablar)
Step 2: remove the ending (habl)
Step 3: add the new ending on, depending on who did the action. (hablé – I spoke)

Irregular Examples:
almorcé = I had for lunch
jugué = I played
fui = I went
hice = I did
fue = it was