

A large, light blue watermark of the Wellington School crest is centered in the background of the page. It features the same lion and 'W' design as the official crest, but in a lighter, semi-transparent color.

Knowledge Organisers

Year 9

Spring 2022

Knowledge Organisers

Some subjects like Design Technology organise the curriculum on a carousel, as such all the organisers for that subject are in the Spring Term booklet.

Contents

An introduction to Knowledge Organisers

Art

Computing

Drama

Design Technology (DT)

English

Geography

History

Mathematics

MFL

Music

PSHE

Religion, Ethics and Philosophy (REP)

Science

*Some subjects have Knowledge Organisers which last two terms or a year, therefore it will be the same as the Autumn Term.

An Introduction to Knowledge Organisers

What is a Knowledge Organiser?

A knowledge organiser is a document, usually one side of A4, occasionally two, that contains key facts and information that children need to have a basic knowledge and understanding of a topic, or in some cases a series of topics.

Students are expected to bring their Knowledge Organiser Booklet to school every day. Students will be issued with a new booklet to bring each term. However, it is important they keep the old booklets to help with revision for end of year exams.

What are the benefits of knowledge organisers?

The main benefit of knowledge organisers is that they give students and parents the 'bigger picture' of a topic or subject area. Some topics can be complicated, so having the essential knowledge, clear diagrams, explanations and key terms on one document can be really helpful.

Research shows that our brains remember things more efficiently when we know the 'bigger picture' and can see the way that nuggets of knowledge within that subject area link together. Making links, essentially, helps information move into our long-term memory.

How can the students use them?

As mentioned earlier, students are expected to bring their Knowledge Organiser Booklet to school everyday. In lessons they can be used in a number of ways, for example, to look up the meaning of key words, spell words correctly and do some additional work if they have finished classwork.

At home knowledge organisers can be used to support homework, independent work and revise for tests and exams. Two quick and easy ways to do this are:

1. Look, cover write, check – look at part of the knowledge organiser, cover it, write as much as you can remember and then check it
2. Word up – Pick out any words you don't understand. Use a dictionary or thesaurus to find the meaning. If they don't help ask your teacher.

The more often you do this the better. YouTube has some clips on them; search 'Mr Garner look, cover, write, and check' and 'Mr Garner word up'

How can parents use them?

- Read through the organiser with your son/daughter – if you don't understand the content then ask them to explain it to you – 'teaching' you helps them to reinforce their learning.
- Test them regularly on the spellings of key words until they are perfect. Get them to make a glossary (list) of key words with definitions or a list of formulae.
- Read sections out to them, missing out key words or phrases that they have to fill in. Miss out more and more until they are word perfect.

How the booklet is organised

The knowledge organisers are in alphabetical order by subject.

YEAR 9 ART 3-D

Knowledge Organiser - Term 1 & 2

3-D work comes in many materials eg

STONE CLAY METAL CARD PAPER WIRE CEMENT WOOD

Its styles and form vary too

BAS RELIEF—protrudes from a flat surface but is shallow

HIGH RELIEF—is deeper and some elements are seen in the round

KINETIC—Contains moving and/or free form pieces

Full round ADDITIVE—is modelling or adding to a base or armature eg clay. **Full round SUBTRACTIVE**—is removing or carving away from material to form sculpture

ASSEMBLAGE— collections of things together to form whole

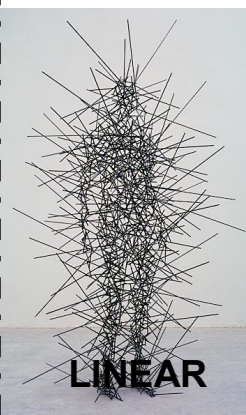
LINEAR— made using linear forms like wire

KEY WORDS

- Manipulate
- Model
- Fix
- Attach
- Armature
- Construct
- Shape
- Form
- Relief
- Full round
- Base
- Cast
- Mould
- Carve

SKILLS

- Manipulate media
- Cut
- Assemble
- 3D/relief
- Observation in drawing
- Creating models
- Developing imagination to create meaningful artworks
- Development from 2D design on paper to 3D construction



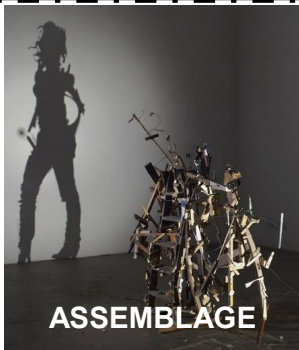
LINEAR



ADDITIVE



SUBTRACTIVE



ASSEMBLAGE



RELIEF



Health & Safety—use of knives and hot glue guns in tasks—be careful—follow instructions

Well Known Sculpture

Artists

- Claes Oldenberg
- Brancusi
- Giacometti
- Anish Kapoor
- Rachel Whiteread
- Tony Cragg
- Katarina Fritsch
- Antony Gormley
- Niki de Saint Phalle

Make sure you have a

PENCIL

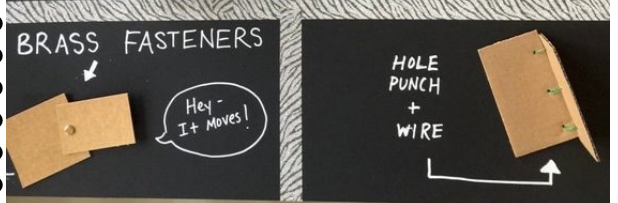
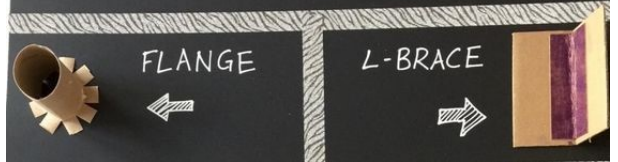
RUBBER

SHARPENER

Build on your drawing skills & techniques with a

2B PENCIL

CARDBOARD Attachments



Year Nine Programming

Data types, structures, string handling and iteration

An **array** is like a variable, but can have more than one item. Think of it as a list. The first item ("Melissa") is item 0. "Liam" is item 5.

Iteration: repeat sections of code as long as a condition is met.

len(array) will give you the number of items in an array.

String handling: Manipulation of string variables:

```
name = 'John'
```

```
name.upper()
```

```
>>> 'JOHN'
```

```
name[0]
```

```
>>> 'J'
```

```
Name[0:2].lower()
```

```
>>> 'jo'
```

Data types: Data used by programming languages must be of a certain type. This means what kind of data it is. *Boolean* data is True or False. *Integers* are whole numbers. *Float* (or real) are any numbers. *Strings* can contain any characters. Data input is a string by default and must be converted before it can be used like another data type.

```
from random import randint

# array data structure
pupils = ["Melissa", "Gabe", "Corey", "Alanah", "Darcy", "Liam"]

# Boolean variable
var_again = True

print("Welcome to the random pupil picker")
input("Press enter to get a random name")

# iteration - repeat the indented code as long as var_again is 'y'
while var_again == True:

    # get a random number between 0 and the number of items in the array - 1
    random_number = randint(0, len(pupils)-1)

    # output the corresponding name
    print("Selected student: " + pupils[random_number])

    print("Pick another pupil? Enter 'y'")
    ans = input()

    # convert answer to lower case
    ans = ans.lower()

    # selection statement (if/else). If the user doesn't enter 'y'...
    if ans.lower() != "y":
        var_again = False

# After the loop
print("Thanks for using the random pupil picker")
```

Boolean variables can be True or False

You can refer to an item in an array by typing the name of the item, followed by its position in square brackets. For example, pupils[0] is 'Melissa'

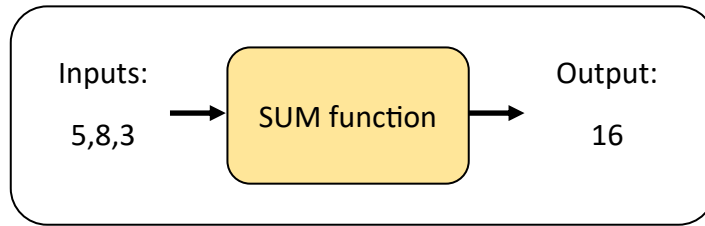
pupils
array

Position	0	1	2	3	4	5
Data	'Melissa'	'Gabe'	'Corey'	'Alanah'	'Darcy'	'Liam'

Computing: Spreadsheet software for data analysis

A range of **functions** can be used to analyse data.

A function can be thought of as a machine that takes in some data and converts it into something else.



	A	B
1	Name	Grade
2	Student 1	6
3	Student 2	8
4	Student 3	8
5	Student 4	3
6	Student 5	8
7	Student 6	6
8	Student 7	5
9	Student 8	8
10	Student 9	9
11	Student 10	9
12	Student 11	7
13	Student 12	7
14	Student 13	8
15	Student 14	7

Here is a list of students and their grades. There are 205 students in the list. The last name is in cell A206. Their grade is in B206.

Functions with a single input

These functions take either a single cell, or range of cells as the input:

- `=AVERAGE(B2: B206)` would find the *mean* grade.
- `=MODE(B2: B206)` would find the most common grade.
- `=MIN(B2: B206)` and `=MAX(B2: B206)` find the lowest and highest grades.
- `=COUNT(B2: B206)` tells you how many cells have numbers in; useful for finding missing data.

Functions with more than one input

These functions have their inputs separated by a comma:

- `=COUNTIF(B2: B206, ">6")` would find the number of grades that met specified criteria. In this case, all grades higher than 6.
- `=IF(B2>3, "Target met", "Target not met")` would check whether the value in C2 is greater than 3. This is a Boolean expression. If the result is *true*, "Target met" is output. If the value is *false*, "Target not met" is output.
- `=VLOOKUP(B2, D2: E5, 2)` would look in range D2:E5 for student 1's grade and return a value from the second column. B2 is between 4 and 7, so Pass is returned.

	A	B	C	D	E
1	Name	Grade		Grade	Description
2	Student 1	<u>6</u>		0	Fail
3	Student 2	8		4	Pass
4	Student 3	8		7	Merit
5	Student 4	3		9	Distinction

Drama Knowledge Organiser: Year 9

Noughts and Crosses

- A dystopian Romeo and Juliet that makes eloquent statements about race relations.
- Non-naturalistic style - synchronisation, ensemble, canon, narration and tableaux.
- Brechtian - Epic theatre including breaking the fourth wall and placards
- Genre - alternative history/ Drama

Borstal

- Creating devised performances based on a youth offending institution in the 1960's England.
- Teacher in role - when a person leads a whole class improvisation
- Monologue - one speech in role as the character you have created
- Spontaneous improvisation - creating context through on the spot character questions.
- Character profiles developing through class workshops

Devising from a Stimulus

- A stimulus is a starting point in drama - a source of inspiration
- Devising from various stimuli such as photograph, text, video, music, poem, prop, costume, historical event or quote.
- Performance is inspired by NOT a direct representation of the stimulus
- Collaboration of creative ideas leads to a good devised performance
- A script is created throughout the process not given before
- Rehearsal techniques explored - hot seating, improvisation and peer assessment.

artaud

- Theatre of cruelty
- Inspired by Surrealism
- Believed in world change through dreams
- Appeals to the irrational mind
- Aims to release the audience's intense emotions through intense tension and suspense
- Plays on fear

KEY WORDS FOR YEAR 9 DRAMA

Devising	Cross-cutting	Atmosphere	Suspense	Tension	Verbatim
Stimulus	Characterisation	Monologues	Ensemble	Non-naturalism	Documentary
Theatre for social change.	Subtext	Theatre of the absurd	Theatre of Cruelty	Audience emotions	Heightened tension

Year 9 Cooking and Nutrition Knowledge Organiser

Hygiene and Safety – The four C's

Food hygiene & safety is about protecting people and minimising the risk.

- Cleaning – e.g. following routine, meeting standards using correct materials, cloths and PPE ,
- Chilling – storing food at appropriate temperatures
- Cooking – making sure food is cooked and served at correct safe temperatures.
- Cross-contamination – avoiding food poisoning.

Food Plating and Presentation

Key Focus

- Create height on the plate.
- Cut meat horizontally.
- Play with textures.
- Use contrasting colours.
- Choose the right plates.
- Serve smaller portion sizes.
- Use edible garnishes and decorations.



Key vocabulary	
Cross Contamination	Process by which bacteria or other microorganisms are unintentionally transferred from one substance or object to another, with harmful effect.
Food Plating	Process of arranging and decorating food to enhance its presentation.
Task analysis	Detailed examination of the given task.
Meal Planning	Thinking ahead about what you'll make for meals and snacks and getting prepared.

Food Preparation Task

Key Skills

- Analyse the task by explaining the key areas for consideration
- Carry out relevant research and analysis related to the task (budget meals/meal planning)
- Identify a range of suitable dishes
- Produce a detailed timeplan



Plan the time plan

Time	Plan of work	Quality and safety checks
10.50	Put chicken pie in oven and cook 20 minutes. Clear up.	Cook for 20 mins and glaze again after 10 minutes.
10.52	Cook lasagne sheets in boiling water.	Cook in roasting tin for 10 mins.
10.55	Glaze chicken pie again. Make sauce for lasagne.	Add cheese to sauce once it is slightly cool.
11.05	Take out chicken pie. Drain lasagne sheets. Add cheese to sauce.	Don't forget chicken pie but keep warm.
11.10	Assemble lasagne - sauce, sheets then veg, then sheets then sauce. Sprinkle with cheese and bake.	Make sure dish is clean before baking. Bake 40 minutes.
11.25	Whisk the cream for the sponge filling and sort the raspberries for decoration.	Don't over whip the cream.
11.35	Peel off the paper from the sponge. Cut in half. Mix half cream with half the raspberries. Spread jam on the cake base then cream mixture then put top on.	Keep working surface clean.
11.45	Decorate cake top with jam, cream and rows of fruit, sprinkle with icing sugar and put in fridge.	Put in fridge to chill. Reheat chicken pie to 72°C.
11.50	Take out lasagne and clean up dish. Serve chicken pie and lasagne then whisked sponge.	Check all dishes well presented and at right temperature.
11.55 - 12.00	Clear up and finish!	



You are asked to dovetail tasks in your Plan of work.
What is dovetailing?
Slotting in tasks between other work. For example, while the sponge is baking, prepare vegetables for the lasagne.

To do
Use the Plan of work and list 4 examples to show how the plan dovetails tasks from one dish to another.

Clear up as you work. It saves using lots of equipment and keeps the preparation area safe and hygienic.

Year 9 Product Design Knowledge Organiser



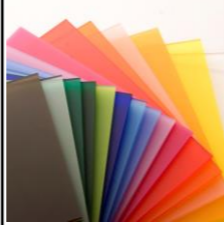
Architecture Light



Key Skills

- Responding to a Design Context
- Analysing & researching information
- Creating a brief & identifying an audience
- Writing a product specification
- Applying Health & Safety procedures and PPE in the workshop environment
- Developing an understanding of basic electronic components.
- Identifying & using specific workshop tools and equipment
- Developing practical skills to create a well finished product.
- Knowledge of timbers, manufactured boards, thermosetting polymers & electrical components
- Evaluating the design & manufacturing process

Tools & Equipment		
 Try square	 Steel rule	 Marking gauge
 Bench vice	 Bench hook	 Tenon saw
 Band saw	 Chisel	 File
 Pillar drill	 Belt & Disc sander	 LED

Thermoplastic polymers are chemically manufactured and can be heated and shaped many times.

Acrylic

 Acrylic is used in sheet form it is lightweight or shatter-resistant. It comes in a variety of colours it can be frosted or transparent. Acrylic is durable and is a good electrical insulator but scratches easily. It is recyclable and can be heat moulded.

Key vocabulary	
Design Context	The circumstances, problem or setting in which a product will be used.
Design Brief	An written outline which explains the aims and objectives of a project.
Specification	A statement that details exactly a products function and the design requirements.
CAD	Computer aided design
CAM	Computer aided manufacture e.g. laser cutter
Finishing	The process of applying a finish to preserve or protect a material & improve aesthetics.
Prototype	A prototype is a model that is built to test to see if it is successful or whether it needs further modification or improvements.
PPE	Personal protective equipment are items
Timber is a natural material with imperfections, knots and grain – always sand with the grain	
Softwood 	From coniferous trees that are evergreen, which are faster to grow and are less expensive than hardwoods. Softwoods are a sustainable material as the resource can be regrown and not depleted. Softwoods are strong and easy to work with.
Manufactured boards are timber produced by gluing wood layers or wood fibres together.	
Medium Density Fibreboard 	Medium Density Fibreboard or also known as MDF is made from wood fibres which are glued together. MDF has a smooth even surface which makes it easier to work than natural timber.

Electrical Components

LED

Light-emitting diodes (LEDs) and lamps produce light when a current flows through them in the forward direction.



Resistor

A resistor is an electrical component that restricts the flow of electric current.



Switch

In electrical engineering, a switch is an electrical component that can disconnect or connect the conducting path in an electrical circuit



Year 9 Product Design Knowledge Organiser



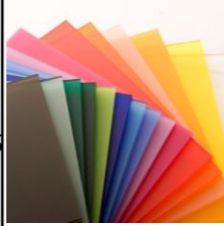
Desk Organiser



Key Skills

- Responding to a Design Context
- Analysing & researching information
- Creating a brief & identifying an audience
- Writing a product specification
- Developing CAD/CAM skills using:
 - Techsoft 2D Design
 - Google SketchUp
 - Serif Draw Plus
- Applying Health & Safety procedures and PPE in the workshop environment
- Identifying & using specific workshop tools and equipment
- Developing practical skills to create lap, housing & dowel joints to join materials
- Using a line bender to manipulate Acrylic
- Knowledge of timbers, manufactured boards, thermosetting polymers & card
- Prototype modelling, finishing & presentation skills
- Evaluating the design & manufacturing process

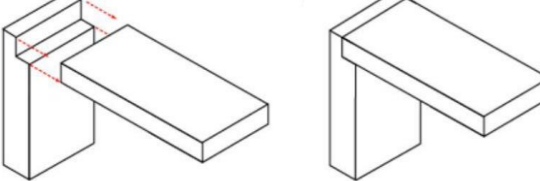
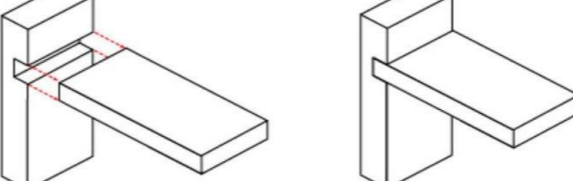
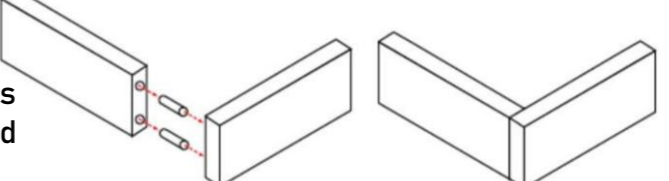
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Medium Density Fibreboard 	Medium Density Fibreboard or also known as MDF is made from wood fibres which are glued together. MDF has a smooth even surface which makes it easier to work than natural timber.

Joining materials – construction techniques

<p>Lap joint A joint in which two pieces of material overlap. This joint can be used to join wood, plastic, or metal.</p> 	<p>Housing joint A housing joint is cut across the grain or width to the thickness of the material partition.</p> 	<p>Dowel joint A dowel joint is very strong and stable. This type of joint is secured with an adhesive.</p> 
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Year 9 Textiles Knowledge Organiser

Hat Design



Key Skills

- Responding to a Design Context
- Analysing existing products
- Identifying a target audience
- Write a product specification
- Demonstrate the ability to apply decorative techniques:
 - Appliqué (including reverse)
 - Computerised embroidery
 - Embroidery stitches (hand & machine)
- Using a sewing machine to complete a range of construction techniques:
 - Seams & hems
 - Applying a facing
 - Using interface
 - Applying components
- Understanding the properties of materials
 - Fleece
 - Felt
 - Polyester
 - Cotton
- Understand CAM using computerised embroidery


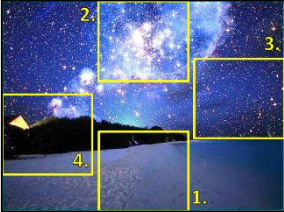


Product features	
Use of woven, knitted & non woven materials	Consideration of a specified target market
Originality	Creative
Components used as decoration	Efficient use of space
A variety of hand embroidery stitches	Components & fastenings
CAD/CAM embroidery	Machine appliqué

Health & safety
Follow teacher instructions
Move slowly around the room do not run
Tie long hair back
Hold scissors or shears correctly when walking around the room.
Only one person operating a sewing machine at one time
Never use a sewing machine unless supervised by a teacher/ technician
Turn off the sewing machine when not in use.
Report any injuries or breakages to the teacher immediately

Key vocabulary	
Components	The parts/materials/threads needed to make a product.
3D features	Use of wadding to make a feature stand up or raised from the backing fabric.
Function	What a product does, how it works and what it will be used for? Is it sensory or educational or both?
CAD/CAM	Computer Aided Design/Computer Aided Manufactured
Target Audience	The person or people most likely to be interested or use your design or product.
Embroidery	Even stitch widths and lengths completed by sewing by hand or machine.
Reverse appliqué	A decorative technique whereby a fabric placed on the back and visible on the front and is sewn in place by hand or machine.
Original	A product that is unique, creative and has functional features.
Appliqué	A decorative technique whereby one material is sewn on top of another by hand or machine.
Design Context Design Brief	The circumstances, problem or setting in which a product will be used. A Design Brief is a written outline which explains the aims and objectives of a project.

KNOWLEDGE ORGANISER: NARRATIVE AND DESCRIPTIVE WRITING

Punctuation	Sentence types, structure and starters	Stylistic Features	Whole Text Structuring Tips
<p>It is absolutely imperative that you include the full range of punctuation. Make a checklist of them before you start writing. Here's some help with the trickier ones:</p> <p>Semi-colons link two sentences instead of 'and' <i>Wildlife scattered in the crushing power of each wave's footprint; confusion ensued as the vision blurred beneath the surface.</i> Simple sentence + semi-colon + simple sentence</p> <p>Colons follow a statement and provide the evidence. <i>Chaotically, the stampede of waves galloped forwards: each crest another wild stride.</i> Statement + colon + explanation/evidence</p> <p>Dashes emphasise a description. <i>Disaster - unquantifiable disaster - ensued.</i> Noun/subject to begin simple sentence + dash + noun phrase + finish sentence</p>	<p>Experiment with beginning sentences in different ways. Don't forget the comma!</p> <ul style="list-style-type: none"> Adverbial 'ly starter Noun without 'the' or 'a' starter Simile starter <i>Like a...</i> Emotion starter <i>Wrought,</i> 2 x or 3 x adjective starter Preposition starter <i>Above...</i> Repeat the same sentence starter for two consecutive sentences <p>Try these sentence structures too:</p> <ul style="list-style-type: none"> Occasional one word sentence Parallel phrasing or isocolon/tricolon: <i>The hills, under siege, armoured themselves against the storm; the wind, heroic, found gaps in their defences.</i> Epistrophe (ending sentences with the same word) <i>It was all gone: the walls had gone, the castle had gone, the power had gone.</i> Anaphora (starting sentences in the same way) <i>A cacophony. A cacophony of abrupt sounds and screams as the sealife took cover from the Herculean sea.</i> Litotes (Beginning sentences with the negative, e.g. No, Nor, Nothing, Never...) Aposiopesis (Ellipsis ... at the end of a sentence for a pause or cliffhanger) Anadiplosis (ending a sentence with a word and starting the next sentence with the same word) <i>The enemy is man. Man must be defeated.</i> 	<p>Always make sure these are used appropriately and are not 'silly':</p> <ul style="list-style-type: none"> Metaphor and extended metaphor; motif Simile Personification - especially for verbs and emotions Classical allusion Alliteration Sibilance Powerful adjectives Powerful verbs Hyperbole (exaggeration) Irony <p>Model Writing <i>Robust waves towered high, preparing to crash onto the rough seas; the crescendo of the waves created a formidable energy everywhere. Everywhere, the sea monster looked apocalyptic as it reached the peak of its very existence. Crepuscular, the formidable, battle-torn sky looked on. Disaster-unquantifiable disaster-ensued. The waves grew intense and bleak in their melancholy; like heaven opening, trying to save humanity from this hellish, torrential scene. Hell.</i></p>	<p>Remember to show that you can vary paragraph length and patterns across the 6-7 paragraphs that you produce</p> <p>Narrative:</p> <ul style="list-style-type: none"> Begin in medias res Begin with extensive description Describe a moment rather than create a lengthy narrative Open and close your narrative with the same line or semantics - cyclical structure <p><i>The clouds barely interrupted the azure sky; its pleasantness was allowed to frame the peaks of the urban landscape. Abandoned and now empty, their greyness reflected their new-found insignificance: no one remained in their daily prison of work and routine. The park - the  opposite - was a hive of activity.</i></p> <p><i>The clouds gradually interrupted the azure sky. The day would soon end. The night would come. The <u>grey prisons</u> of life would eventually reopen their doors, but not yet.</i></p> <ul style="list-style-type: none"> Experiment with beginning consecutive paragraphs with the same opening line One word or one sentence paragraph Analepsis and/or prolepsis (flashforward or flashback) Use a motif or a central symbolic image <p>Description:</p> <ul style="list-style-type: none"> Draw boxes around key aspects of the image and use arrows to make a journey around the image. End where you start and try to zoom in on some very small detail. Use the same opening and closing line or semantics - cyclical structure Experiment with beginning consecutive paragraphs with the same opening line One word or one sentence paragraph Use a motif or a central symbolic image 

Impressive Vocabulary - use Thesaurus.com and Google to help you practise key synonyms. The List is endless but here's a few to help - all can help with metaphor and personification too!

Settings	Emotions	Weather	Movement
<p>a beach - thronging (adj), convivial (adj), boisterous (adj), halcyon (adj), idyllic (adj), balmy (adj)</p> <p>a desert - arid (adj), desolate (v), solitary (adj)</p> <p>an abandoned building - isolated (adj), decrepit (adj), dilapidated (adj), forsaken (adj), idle (adj)</p> <p>a battlefield - armageddon (n), cataclysm (n), bloodshed (n), hostility (n), barbaric (adj), callous (adj), tumultuous (adj)</p> <p>a jungle - labyrinth (n), boscage (n), chaparral (n)</p>	<p>joy - felicity (n), mirth (n), ebullience (n), euphoria/ic (n/adj)</p> <p>fear - anticipate (v), blanch (v), quaver (v), disquieting (adj), appalling (adj), dreadful (adj), menacing (adj), daunting (adj), formidable (adj)</p> <p>anger - antagonism (n), fury (n), infuriation (n), wrath (n), vexed (adj), indignant (adj), irascible (adj), waspish (adj)</p> <p>sadness - sombre (adj), melancholy/ic (n,adj), mournful (adj.), dejection (n), desolation (n), grief (n)</p> <p>anxiety - suspense (n), misery (n), angst(n), trepidation (n), disquiet (n)</p>	<p>Spring - blossom (n/v), thrive (v), prosper (v)</p> <p>Summer - sweltering (adj), humid (adj), sultry (adj), clement (adj)</p> <p>Autumn - harvest (n/v), vibrant (adj), golden (adj), resplendent (adj)</p> <p>Winter - brumal (adj), hyperborean (N / adj), glacial (adj), crepuscular (adj), tenebrous (adj)</p>	<p>running - dynamic (adj), mobile (adj), sprinting (n)</p> <p>resting - slumber (v), lucid (adj), trance (n)</p> <p>frowning - morose (adj), bereaved (n/adj), cheerless (adj)</p> <p>laughter - hilarity (n), rejoicing (n), chortle (n / v)</p> <p>erratic/out of control: frenzied (adj), brutal (adj), intemperate (adj), ferocious (adj), tumultuous (adj), chaotic (adj)</p> <p>powerful: muscular (adj), robust (adj) vehement (adj), herculean (adj)</p>



Year 9 Geography

Unit 2: Contemporary Environmental Issues



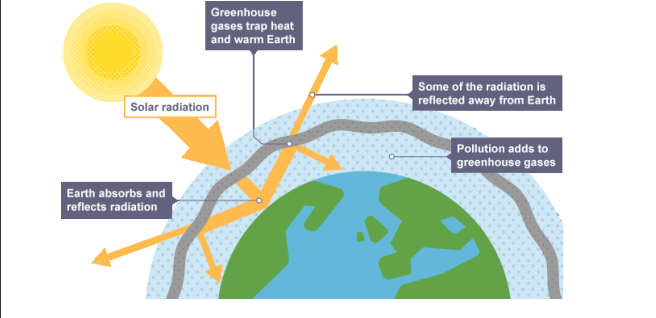
Global warming causes: Deforestation, burning fossil fuels, farming, landfills

Negative impacts of global warming around the world:

- sea level rise will affect 80 million people
- tropical storms will increase in magnitude (strength)
- diseases such as malaria increase,

There are also some **positive impacts** of a warmer climate:

- energy consumption may decrease due to a warmer climate
- longer growing season for agriculture
- frozen regions such as Canada may be able to grow crops



	Definition
Global warming	The gradual increase in the overall temperature of the earth's atmosphere
Climate Change	A long-term change in the earth's climate, especially a change due to an increase in the average atmospheric temperature.
Sustainable Development	Development that meets the needs of the present without limiting the ability of future generations to meet their own needs.
Greenhouse gases	A gas that contributes to the greenhouse effect by absorbing infrared radiation.
Fossil Fuels	A natural fuel such as coal or gas, formed in the geological past from the remains of living organisms.

As our **plastic** consumption is set to skyrocket, it's clear that urgent action is needed. We dump **eight million tonnes of plastic into the sea every year**. It's killing and harming marine life.

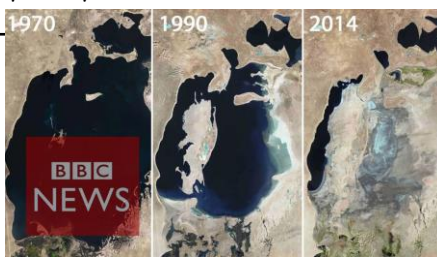
- **Turtles eat plastic bags** mistaking them for jellyfish
- **Seabirds** are found with their **stomachs** full of plastic items
- Plastic debris can get lodged in **coral** and affect the health of reefs
- **Microplastics** are consumed by animals like plankton, passing the problem back up the food chain - to **us**.

Solutions: reuse, reduce, recycle. Stop the use of plastic straws, choose to use reusable cups, use a bag for life.

Clothing Industry Impact:

- Toxic chemicals (e.g. lead and arsenic) are released into rivers
- Water from rivers is diverted into cotton-producing farms
- Loss of tourists to the Aral Sea
- Loss of biodiversity in and around the Aral Sea

Solution:
Eco-fashion industry: swap clothes with friends, reduce the number of new clothes we buy, consider where the clothes you buy were made.



How to achieve environmental sustainability:

1. Choose to reuse, reduce and recycle your waste.
2. Reduce the amount of electricity you use.
3. Choose to walk/cycle/use public transport instead of travelling by car.
4. Eat less meat.
5. Buy new clothes less often. Try to find out where and how the clothes you do buy were produced.
6. Plant a tree or donate to plant a tree.
7. Pass the message on!



Year 9 Geography

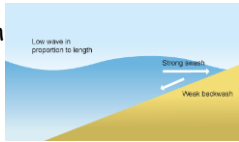
Unit 3: Coastal Landscapes

KEYWORDS



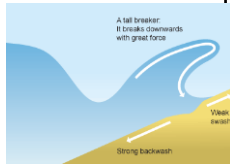
Constructive wave

Powerful swash
Weaker backwash
Long wave length
Low wave height
Gentle beach



Destructive wave

Weak swash
Strong backwash
Short wave length
High wave height
Steep beach



Types of Erosion:

- Attrition - when rocks/pebbles collide and chip away
- Abrasion - the sandpapering effect of the material rubbing against a cliff face
- Solution - when rock dissolves due to a reaction between the rock and sea
- Hydraulic Action - when water is forced into cracks into the cliff face, compressing air inside which in turn makes the crack wider.

Mass Movement - the downward movement of the land due to the pull of gravity. This usually occurs when the ground is saturated by water, is unstable or during a storm surge.



Transportation:

- Saltation - the bouncing motion of pebbles
- Traction - the rolling motion of rocks
- Solution - the dissolved load within the body of water
- Suspension - fine sediment is suspended within the flow of the water

Deposition

When the flow of the water falls and so material is dropped off along the coastline.

Erosion

Definition

The wearing away and removal of material by a moving force, such as a breaking wave.

Transportation

The movement of eroded material. The size and weight of the material affects how it moves.

Deposition

Occurs when material being transported by the sea is dropped due to the sea losing energy.

Soft Engineering

Managing erosion by working with natural processes to help restore beaches and coastal ecosystems.

Hard Engineering

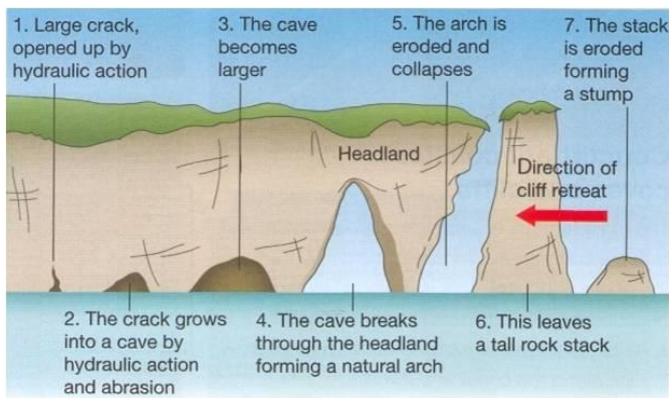
A coastal management technique used to protect coasts by absorbing the energy of waves, preventing erosion and flooding. They are highly visible man-made structures used to stop or disrupt natural processes.



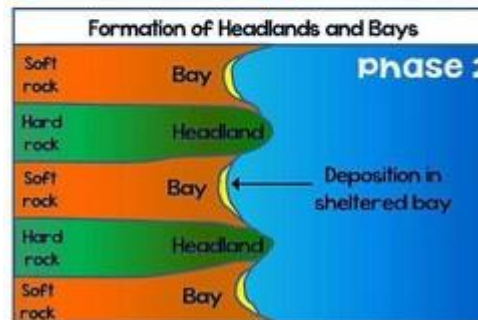
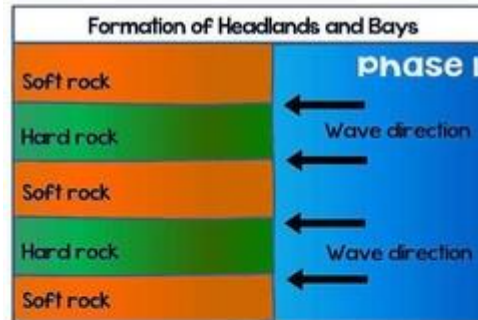
Longshore Drift

This is the zigzag motion of sediment. Sediment is pushed onto the beach at an angle and returns to sea perpendicular to the coastline due to gravity. When the coastline changes direction a spit will form.

Erosion of a headland



Formation of a Bay





Wellington History

Year 9 HT 3 Knowledge Organiser

How did the rise of dictatorships during the twentieth century impact the lives of the people?



✓ **How did the rise of dictatorships during the twentieth century impact the lives of the people?**

○ **Stop, think and link: Power and Democracy and WW1**

○ **Change and continuity**

❖ **Want to explore further?**

Series: Hitler's Circle of Evil

Film: Hitler The Rise of Evil

Documentary:

https://www.youtube.com/watch?v=RnrPqoQw_D8

<https://www.bbc.co.uk/bitesize/clips/zs4vr82>

https://www.bbc.co.uk/history/historic_figures/mussolini_benito.shtml

<https://www.bbc.co.uk/bitesize/topics/zsfbng8>

Key Questions

- How did the peace process work after WW1?
- What problems did countries face after the Great War?
- How did problems after the Great War lead to an increase in totalitarian governments?
- What did Fascism develop in Italy?
- How did Stalin become leader of the Soviet Union?
- How did Hitler consolidate his power and turn Germany into a dictatorship?
- What was life like for Germans living under Hitler's rule?
- What was life like for Italians in fascist Italy?
- What was like live for those living in the Soviet Union?

Keywords

Armistice: an agreement made by opposing sides in a war to stop fighting for a certain time; a truce

Tyrant: a cruel and oppressive ruler

Totalitarianism: a system of government that is centralized and dictatorial and requires complete subservience to the state.

Dictatorship: form of government in which one person or a small group possesses absolute power

Democracy: government by the people; especially : rule of the majority

Fascism: a far-right form of government in which most of the country's power is held by one ruler.

Communism: What is the simple definition of communism? Communism is a political and economic ideology that positions itself in opposition to liberal democracy and capitalism

Nationalism: identification with one's own nation and support for its interests

Purge: to remove (a group of people considered undesirable) from an organization or place in an abrupt or violent way

Police state: a country in which the government uses the police to severely limit people's freedom

Key events and Key People

- Nov 11th 1919: WW1 ends
- June 28th 1919: Treaty of Versailles signed
- 27th October 1922: The Blackshirts march on Rome
- 21st Jan 1924 – Vladimir Lenin dies
- January 30th 1933: Hitler becomes Chancellor
- June 30th 1934: The Night of the Long Knives
- August 2nd 1934: Death of President Hindenburg
- 30th April 1945: Hitler commits suicide
- 28 April 1949: Benito Mussolini is shot and dies
- 5th March 1953: Stalin dies after suffering a stroke



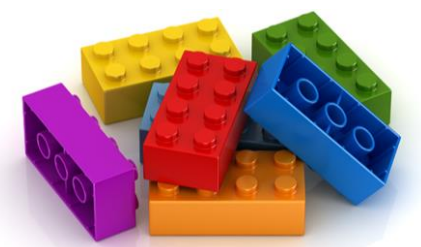


Wellington History

Year 9 HT 4 Knowledge Organiser

Why was the Second World War so significant?

Who was to blame for the Holocaust?



- ✓ What and why? You will learn about the damage war can create to millions of lives.
- Stop, think and link: How would the end of WWI have helped to cause WWII?
- ❖ Significance Assessment – Why was the dropping of the Atomic Bombs significant?
- ❖ **Want to explore further?**
 Book: Woeful Second World War by Terry Deary
 Book: My Story Wartime Princess by Valerie Wilding
 Book: My Secret War Diary by Marcia Williams
 Website: <https://www.bbc.co.uk/teach/class-clips-video/history-ks2-world-war-two/zjnyscw>
 Website:

Key Questions

- How did Hitler's foreign policy cause World War 2?
- What was it like living in Britain during World War 2?
- What was it like living in Germany during World War 2?
- Was the Second World War a global war?
- What was Hitler's Final Solution?
- Who was to blame for the Holocaust?
- Why did the war end?

Keywords

- Air Raid**
An attack in which bombs are dropped from aircraft
- Axis Powers**
Name given to Germany, Italy, Japan
- Allied Powers**
Name given to Britain, France, USA and USSR
- Blitz**
Bombing Raid
- Blitzkrieg**
Lightning War
- Civilians**
Non-Combatants in war
- Concentration Camps**
Large prison camps for confinement and persecution of prisoners
- D-Day**
Allied attack on Western Europe
- Evacuation**
Leaving your home
- Holocaust**
Mass murder of Jews in occupied Europe
- Liberate**
To set free
- Rationing**
Fixed amounts of food and goods



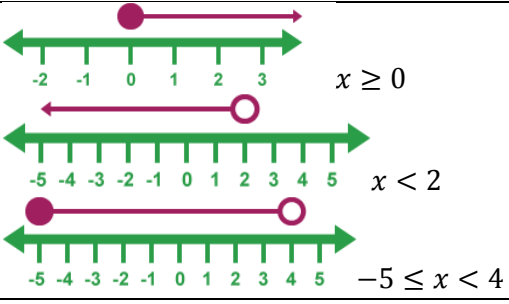
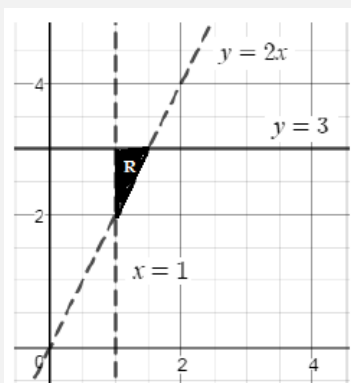
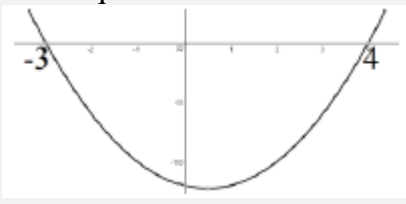
Key events and Key People

- 1939** Hitler invades Poland on 1 September. Britain and France declare war on Germany two days later.
- 1940** German 'Blitzkrieg' overwhelms Belgium, Holland and France.
- 1941** Hitler begins Operation Barbarossa - the invasion of Russia. Japan attacks Pearl Harbour, and the US enters the war.
- 1942** Mass murder of Jewish people at Auschwitz and the Extermination camps begins.
- 1943** Surrender at Stalingrad marks Germany's first major defeat in Russia.
- 1944** Soviet offensive gathers pace in Eastern Europe. German troops begin retreats. D Day: The Allied invasion of France. Paris is liberated in August.
- 1945** Russians reach Berlin: Hitler commits suicide and Germany surrenders on 7 May. After atomic bombs are dropped on Hiroshima and Nagasaki, Japan surrenders on 14 August.

Year 9: Equations


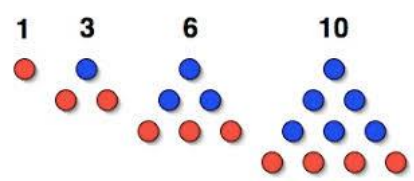
Topic/Skill	Definition/Tips	Example
1. Solve	To find the answer /value of something Use inverse operations on both sides of the equation (balancing method) until you find the value for the letter.	Solve $2x - 3 = 7$ Add 3 on both sides $2x = 10$ Divide by 2 on both sides $x = 5$ Solve $3x + 1 = 5x - 3$ Subtract 3x (the smallest amount of x) from both sides $1 = 2x - 3$ Add 3 on both sides $4 = 2x$ Divide by 2 on both sides $2 = x$
2. Inverse	Opposite	The inverse of addition is subtraction. The inverse of multiplication is division.
3. Rearranging Formulae	Use inverse operations on both sides of the formula (balancing method) until you find the expression for the letter.	Make x the subject of $y = \frac{2x-1}{z}$ Multiply both sides by z $yz = 2x - 1$ Add 1 to both sides $yz + 1 = 2x$ Divide by 2 on both sides $\frac{yz + 1}{2} = x$ We now have x as the subject.
4. Writing Formulae	Substitute letters for words in the question.	Bob charges £3 per window and a £5 call out charge. $C = 3N + 5$ Where N=number of windows and C=cost
5. Substitution	Replace letters with numbers. Be careful of $5x^2$. You need to square first, then multiply by 5.	$a = 3, b = 2$ and $c = 5$. Find: 1. $2a = 2 \times 3 = 6$ 2. $3a - 2b = 3 \times 3 - 2 \times 2 = 5$ 3. $7b^2 - 5 = 7 \times 2^2 - 5 = 23$

Year 9: Inequalities

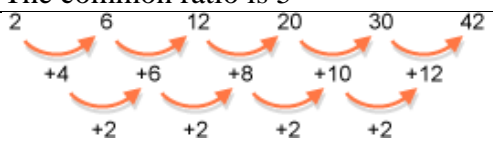
Topic/Skill	Definition/Tips	Example
1. Inequality	An inequality says that two values are not equal . $a \neq b$ means that a is not equal to b.	$7 \neq 3$ $x \neq 0$
2. Inequality symbols	$x > 2$ means x is greater than 2 $x < 3$ means x is less than 3 $x \geq 1$ means x is greater than or equal to 1 $x \leq 6$ means x is less than or equal to 6	State the integers that satisfy $-2 < x \leq 4$. -1, 0, 1, 2, 3, 4
3. Inequalities on a Number Line	Inequalities can be shown on a number line. Open circles are used for numbers that are less than or greater than ($<$ or $>$) Closed circles are used for numbers that are less than or equal or greater than or equal (\leq or \geq)	
4. Solving Inequalities	To find the range of answers/values Solve like an equation. Use inverse operations on both sides of the equation (balancing method) until the unknown is on its own.	Solve $2x - 3 \leq 7$ Add 3 on both sides $2x \leq 10$ Divide by 2 on both sides $x \leq 5$
4. Graphical Inequalities	Inequalities can be represented on a coordinate grid. If the inequality is strict ($x > 2$) then use a dotted line . If the inequality is not strict ($x \leq 6$) then use a solid line . Shade the region which satisfies all the inequalities.	Shade the region that satisfies: $y > 2x, x > 1$ and $y \leq 3$ 
5. Quadratic Inequalities	Sketch the quadratic graph of the inequality. If the expression is $>$ or \geq then the answer will be above the x-axis . If the expression is $<$ or \leq then the answer will be below the x-axis . Look carefully at the inequality symbol in the question.	Solve the inequality $x^2 - x - 12 < 0$ Sketch the quadratic:  The required region is below the x-axis, so the final answer is:

	Look carefully if the quadratic is a positive or negative parabola .	$-3 < x < 4$ <p>If the question had been > 0, the answer would have been:</p> $x < -3 \text{ or } x > 4$
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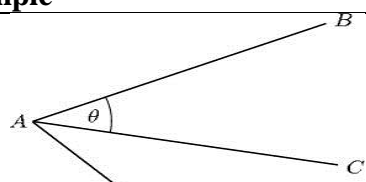
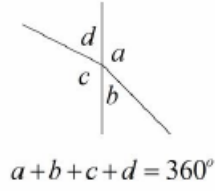
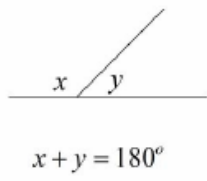
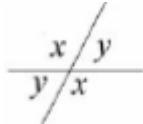
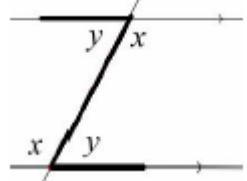
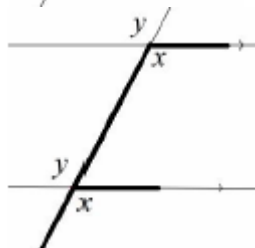
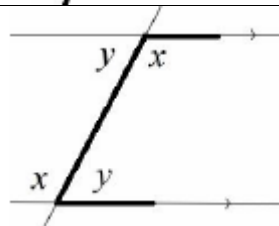
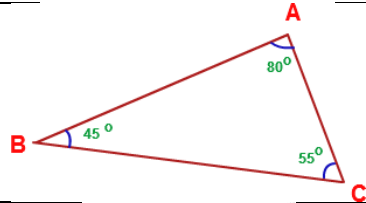
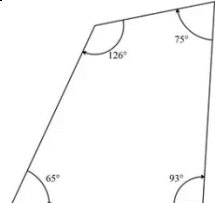
Year 9F: Sequences

Topic/Skill	Definition/Tips	Example
1. Linear Sequence	A number pattern with a common difference .	2, 5, 8, 11... is a linear sequence
2. Term	Each value in a sequence is called a term.	In the sequence 2, 5, 8, 11..., 8 is the third term of the sequence.
3. Term-to-term rule	A rule which allows you to find the next term in a sequence if you know the previous term .	First term is 2. Term-to-term rule is 'add 3' Sequence is: 2, 5, 8, 11...
4. nth term	A rule which allows you to calculate the term that is in the nth position of the sequence. Also known as the 'position-to-term' rule. n refers to the position of a term in a sequence.	nth term is $3n - 1$ The 100 th term is $3 \times 100 - 1 = 299$
5. Finding the nth term of a linear sequence	1. Find the difference . 2. Multiply that by n . 3. Substitute $n = 1$ to find out what number you need to add or subtract to get the first number in the sequence .	Find the nth term of: 3, 7, 11, 15... 1. Difference is +4 2. Start with $4n$ 3. $4 \times 1 = 4$, so we need to subtract 1 to get 3. nth term = $4n - 1$
6. Fibonacci type sequences	A sequence where the next number is found by adding up the previous two terms	The Fibonacci sequence is: 1,1,2,3,5,8,13,21,34 ... An example of a Fibonacci-type sequence is: 4, 7, 11, 18, 29 ...
7. Geometric Sequence	A sequence of numbers where each term is found by multiplying the previous one by a number called the common ratio, r .	An example of a geometric sequence is: 2, 10, 50, 250 ... The common ratio is 5 Another example of a geometric sequence is: 81, -27, 9, -3, 1 ... The common ratio is $-\frac{1}{3}$
8. Quadratic Sequence	A sequence of numbers where the second difference is constant . A quadratic sequence will have a n^2 term.	
9. Triangular numbers	The sequence which comes from a pattern of dots that form a triangle. 1, 3, 6, 10, 15, 21 ...	


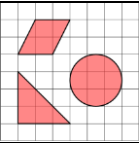

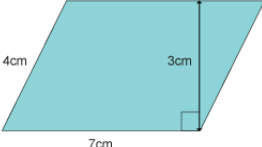
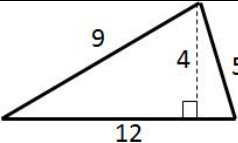
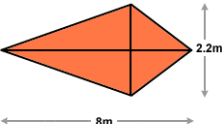
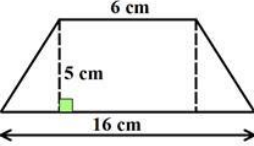
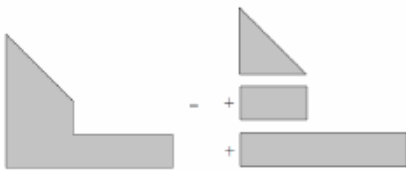
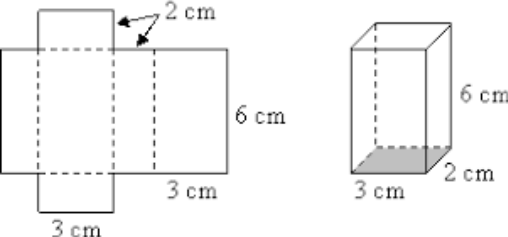
Year 9H: Sequences

Topic/Skill	Definition/Tips	Example
1. Linear Sequence	A number pattern with a common difference .	2, 5, 8, 11... is a linear sequence
2. Term	Each value in a sequence is called a term.	In the sequence 2, 5, 8, 11..., 8 is the third term of the sequence.
3. Term-to-term rule	A rule which allows you to find the next term in a sequence if you know the previous term .	First term is 2. Term-to-term rule is 'add 3' Sequence is: 2, 5, 8, 11...
4. nth term	A rule which allows you to calculate the term that is in the nth position of the sequence. Also known as the 'position-to-term' rule. n refers to the position of a term in a sequence.	nth term is $3n - 1$ The 100 th term is $3 \times 100 - 1 = 299$
5. Finding the nth term of a linear sequence	1. Find the difference . 2. Multiply that by n . 3. Substitute $n = 1$ to find out what number you need to add or subtract to get the first number in the sequence .	Find the nth term of: 3, 7, 11, 15... 1. Difference is +4 2. Start with $4n$ 3. $4 \times 1 = 4$, so we need to subtract 1 to get 3. nth term = $4n - 1$
6. Fibonacci type sequences	A sequence where the next number is found by adding up the previous two terms	The Fibonacci sequence is: 1,1,2,3,5,8,13,21,34 ... An example of a Fibonacci-type sequence is: 4, 7, 11, 18, 29 ...
7. Geometric Sequence	A sequence of numbers where each term is found by multiplying the previous one by a number called the common ratio, r .	An example of a geometric sequence is: 2, 10, 50, 250 ... The common ratio is 5
8. Quadratic Sequence	A sequence of numbers where the second difference is constant . A quadratic sequence will have a n^2 term.	
10. nth term of a quadratic sequence	1. Find the first and second differences. 2. Halve the second difference and multiply this by n^2 . 3. Substitute $n = 1, 2, 3, 4 \dots$ into your expression so far. 4. Subtract this set of numbers from the corresponding terms in the sequence from the question. 5. Find the nth term of this set of numbers. 6. Combine the nth terms to find the overall nth term of the quadratic sequence. Substitute values in to check your nth term works for the sequence.	Find the nth term of: 4, 7, 14, 25, 40.. Answer: Second difference = +4 \rightarrow nth term = $2n^2$ Sequence: 4, 7, 14, 25, 40 $2n^2$ 2, 8, 18, 32, 50 Difference: 2, -1, -4, -7, -10 Nth term of this set of numbers is $-3n + 5$ Overall nth term: $2n^2 - 3n + 5$

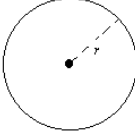
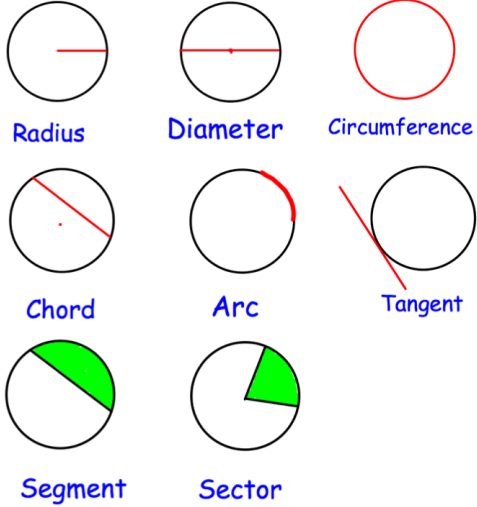
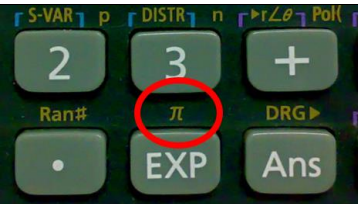
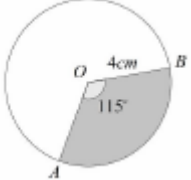
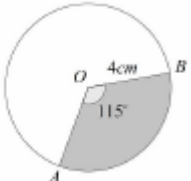
Year 9: Angles

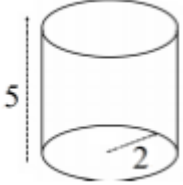
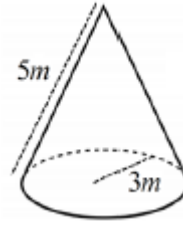
Topic/Skill	Definition/Tips	Example
1. Angle Notation	Can use one lower-case letters, eg. θ or x Can use three upper-case letters, eg. BAC	
2. Angles at a Point	Angles around a point add up to 360°.	
3. Angles on a Straight Line	Angles around a point on a straight line add up to 180°.	
4. Opposite Angles	Vertically opposite angles are equal.	
5. Alternate Angles	Alternate angles are equal. They look like Z angles.	
6. Corresponding Angles	Corresponding angles are equal. (Angles in the same place around the point)	
7. Co-Interior Angles	Co-Interior angles add up to 180°. They look like C angles.	
8. Angles in a Triangle	Angles in a triangle add up to 180°.	
9. Angles in a Quadrilateral	Angles in a quadrilateral add up to 360°.	

Year 9: Perimeter and Area

Topic/Skill	Definition/Tips	Example
1. Perimeter	The total distance around the outside of a shape. Units include: <i>mm, cm, m</i> etc.	<p>8 cm</p>  <p>5 cm</p> <p>$P = 8 + 5 + 8 + 5 = 26cm$</p>
2. Area	The amount of space inside a shape. Units include: mm^2, cm^2, m^2	
3. Area of a Rectangle	Length x Width	 <p>$A = 36cm^2$</p>
4. Area of a Parallelogram	Base x Perpendicular Height Not the slant height.	 <p>$A = 21cm^2$</p>
5. Area of a Triangle	Base x Height $\div 2$	 <p>$A = 24cm^2$</p>
6. Area of a Kite	Split in to two triangles and use the method above.	 <p>$A = 8.8m^2$</p>
7. Area of a Trapezium	$\frac{(a + b)}{2} \times h$ <p>“Half the sum of the parallel side, times the height between them. That is how you calculate the area of a trapezium”</p>	 <p>$A = 55cm^2$</p>
8. Compound Shape	A shape made up of a combination of other known shapes put together.	
9. Surface Area	The surface area of a 3D shape is the total area of the outside faces.	 <p>$2 \times 3 \times 2 = 12$ $2 \times 6 \times 2 = 24$ $3 \times 6 \times 2 = 36$ Total Surface Area is $72cm^2$</p>

Year 9: Circumference and Area

Topic/Skill	Definition/Tips	Example
1. Circle	A circle is the locus of all points equidistant from a central point.	
2. Parts of a Circle	<p>Radius – the distance from the centre of a circle to the edge</p> <p>Diameter – the total distance across the width of a circle through the centre.</p> <p>Circumference – the total distance around the outside of a circle</p> <p>Chord – a straight line whose end points lie on a circle</p> <p>Tangent – a straight line which touches a circle at exactly one point</p> <p>Arc – a part of the circumference of a circle</p> <p>Sector – the region of a circle enclosed by two radii and their intercepted arc</p> <p>Segment – the region bounded by a chord and the arc created by the chord</p>	<p>Parts of a Circle</p> 
3. Area of a Circle	$A = \pi r^2$ which means 'pi x radius squared'.	If the radius was 5cm, then: $A = \pi \times 5^2 = 78.5cm^2$
4. Circumference of a Circle	$C = \pi d$ which means 'pi x diameter'	If the radius was 5cm, then: $C = \pi \times 10 = 31.4cm$
5. π ('pi')	Pi is the circumference of a circle divided by the diameter. $\pi \approx 3.14$	
6. Arc Length of a Sector	The arc length is part of the circumference. Take the angle given as a fraction over 360° and multiply by the circumference .	<p>Arc Length = $\frac{115}{360} \times \pi \times 8 = 8.03cm$</p> 
7. Area of a Sector	The area of a sector is part of the total area. Take the angle given as a fraction over 360° and multiply by the area .	<p>Area = $\frac{115}{360} \times \pi \times 4^2 = 16.1cm^2$</p> 

8. Surface Area of a Cylinder	<p>Curved Surface Area = πdh or $2\pi rh$</p> <p>Total SA = $2\pi r^2 + \pi dh$ or $2\pi r^2 + 2\pi rh$</p>	 <p>$Total SA = 2\pi(2)^2 + \pi(4)(5) = 28\pi$</p>
9. Surface Area of a Cone	<p>Curved Surface Area = πrl where $l = \text{slant height}$</p> <p>Total SA = $\pi rl + \pi r^2$</p> <p>You may need to use Pythagoras' Theorem to find the slant height</p>	 <p>$Total SA = \pi(3)(5) + \pi(3)^2 = 24\pi$</p>
10. Surface Area of a Sphere	<p>$SA = 4\pi r^2$</p> <p>Look out for hemispheres – halve the SA of a sphere and add on a circle (πr^2)</p>	<p>Find the surface area of a sphere with radius 3cm.</p> <p>$SA = 4\pi(3)^2 = 36\pi cm^2$</p>

Year 9 French Knowledge Organiser HT3

Les détails personnels Personal details

le prénom	first name
le nom de famille	surname
le surnom	nickname
la profession	profession
la nationalité	nationality
la date de naissance	date of birth
la résidence	place of residence
les passe-temps	pastimes/hobbies
marié(e)	married
célibataire	single
divorcé(e)	divorced

Quand j'étais petit(e)... When I was little...
Quand j'étais jeune... When I was young...

Imperfect tense

J'adorais...	I used to love...
J'avais...	I used to have...
J'étais...	I used to be...
Je faisais...	I used to do/make...
Je jouais...	I used to play...
Je portais...	I used to wear...
C'était...	It was...

Les adjectifs

bavard(e)	talkative
égoïste	selfish
généreux/généreuse	generous
intelligent(e)	intelligent
jaloux/jalouse	jealous
fidèle	loyal, faithful
marrant(e)	funny
mignon/mignonne	cute
paresseux/paresseuse	lazy
riche	rich
sérieux//sérieuse	serious
stupide	stupid
sympa	nice
têtu(e)	stubborn
timide	shy

Adjectives

Les vêtements Clothes

des bottes	Boots
un collant	a pair of tights
un collier	a necklace
une écharpe	a scarf
une mini-jupe	a mini-skirt
un pantalon	trousers
en laine	woollen
en or	(made of) gold
en plastique	(made of) plastic
en satin	(made of) satin

Intensifiers

Vraiment	Really
Très	Very
Assez	Quite
Un peu	A little bit

Les copains/copines

mon meilleur copain
ma meilleure copine
mon petit copain
ma petite copine
mes potes

Friends

my best friend (m)
my best friend (f)
my boyfriend
my girlfriend
my mates

Me, my family and friends (Expo 3 Module 4)

Les yeux et les cheveux

J'ai	I have
Les yeux bleus	Blue eyes
Les yeux marron	Brown eyes
Les yeux gris	Grey eyes
Les yeux verts	Green eyes
Les cheveux courts	Short hair
Les cheveux longs	Long hair
Les cheveux mi- longs	Mid-length hair
Les cheveux frisés	Curly hair
Les cheveux blonds	Blonde hair
Les cheveux bruns	Brown hair
Les cheveux noirs	Black hair
Les cheveux roux	Red/ginger

Passé composé

J'ai	I have
Il a	He has
Elle a	She has
apporté	brought
bu	drank/drunk
crié	shouted
fait une promenade	been/went for a walk
lu	read
parlé	talked/spoke(n)
préparé	prepared
pris	taken
volé	stole(n)
vu	saw/seen
regardé	watched, looked
Je suis/Il est/Elle est	I/He/She
allé(e)	went
resté(e)	stayed

Les métiers

Jobs

l'acteur	actor
l'actrice	actress
l'artiste	artist
l'avocat	lawyer
le danseur	dancer(m)
la danseuse	dancer (f)
le/la domestique	servant (m/f)
le jockey	jockey
le joueur de tennis/rugby	tennis/rugby player (m)
la joueuse de tennis/rugby	tennis/rugby player (f)
le vendeur	salesman
la vendeuse	saleswoman

Possessive Adjectives

Mon	My (masc)
Ma	My (fem)
Mes	My (plr)
Ton	Your (Masc)
Ta	Your (fem)
Tes	Your (plr)
Son	His/her (masc)
Sa	His/her (fem)
Ses	His/Her (plr)

Year 9 French Knowledge Organiser Unit 4

Les maladies

J'ai mal...
au dos.
au ventre.
au pied.
au bras.
à la tête.
à la gorge.
à la main.
à la jambe.
à l'oreille.
aux dents.
J'ai mal au cœur

Illnesses

I've got
backache.
stomach ache.
a bad foot.
a bad arm.
a headache.
a sore throat.
a bad hand.
a bad leg.
earache.
toothache.
I feel sick.

Les symptômes

J'ai chaud.
J'ai froid.
J'ai soif.
J'ai faim.
J'ai la grippe.
Je suis fatigué(e)
Je suis enrhumé
Je suis malade.
J'ai de la fièvre

Symptoms

I'm hot
I'm cold.
I'm thirsty.
I'm hungry.
I've got flu.
I'm tired.
I've got a cold
I'm ill
I've got a
temperature

La forme

Je mange beaucoup de fruits/des légumes.
Je ne fais pas assez d'exercice.
Je bois beaucoup d'eau.
Je vais à la gym.
Je fume.
bon pour la santé
mauvais pour la santé

Fitness

I eat a lot of fruit/vegetables
I don't do enough exercise.
I drink lots of water.
I go to the gym.
I smoke.
good for your health
bad for your health

Les conseils

Mangez moins gras !
Mangez moins de sucreries !
Buvez beaucoup d'eau !
Dormez huit heures par nuit !
Évitez le stress !
Faites de l'exercice !
Ne fumez pas !

Advice

Eat less fatty food !
Eat less sweet food!
Drink a lot of water !
Sleep eight hours a night!
Avoid stress !
Do some exercise !
Don't smoke !

Key verbs

fumer	to smoke
manger	to eat
boire	to drink
promener	to walk
marcher	to walk
pratiquer (un sport)	to practise (a sport)

meal times

le petit déjeuner	breakfast
le déjeuner	lunch
le dîner	dinner
en-cas,/casse-croûte	a snack
un repas	a meal

Food and eating out

(Expo 3 Vert Module 3)

Frequency words/How often?

Souvent	Often
Quelquefois	Sometimes
Parfois	Sometimes
Normalement	Normally
De temps en temps	From time to time
Tous les weekends	Every weekend
Une/ deux fois par semaine	Once/twice a week
Ne...jamais	never
Ne...plus	no more/no longer

Il faut... you should...
Il ne faut pas ..you shouldn't
Je dois... I need to/must...
Je voudrais I would like to
Je veux... I want to...

plus	more
moins	less

<u>Les activités</u>	<u>Activities</u>
le canoë-kayak	canoeing
le canyoning	canyoning
le judo	judo
le kickboxing	kickboxing
le ski	skiing
le musculation	weightlifting
la natation	swimming
la salsa	salsa dancing
la voile	sailing
l'aérobic	aerobics
l'équitation	horse-riding
l'escalade	rock climbing
le VTT	mountain biking
le basket	basketball
le foot	football
les sports aquatiques	water sports
les sports d'hiver	winter sports

<u>La nourriture</u>	<u>Food</u>
le pain	bread
le beurre	butter
le poulet	chicken
une banane	a banana
les bonbons	sweets
les champignons	mushrooms
un paquet de chips	a packet of crisps
les chips	crisps
la dinde	turkey
les frites	chips
le fromage	cheese
les fruits	fruit
les fruits de mer	seafood
les légumes	vegetables
les petits pois	peas
une pomme	an apple
les sucreries	sweet things
un gâteau	a cake
une glace	an ice cream
le poisson	fish
la viande	meat
l'eau	water
un jus d'orange	an orange juice
le jus de fruit	fruit juice
le lait	milk
le vin	wine
la bière	beer

Year 9 German Knowledge Organiser: Half Term 3

Was trägst du gern?

Welches Kleidungsstück trägst du immer/ nie ?

Ich trage gern....
 Ich trage nicht gern....
 Ich trage immer/ nie....
 einen Rock.
 einen Kapuzenpullover.
 einen Mantel.
 eine Hose.
 eine Jacke.
 ein Cap.
 ein T-shirt.
 ein Hemd.
 ein Kleid.
 Jeans.
 Turnschuhe.
 Stiefel.

What do you like wearing ?

What item of clothing do you always/ never wear ?

I like to wear...
 I do not like to wear...
 I always/ never wear...
 a skirt
 a hooded top.
 a coat.
 trousers.
 a jacket.
 a cap.
 a tee-shirt.
 a shirt.
 a dress.
 Jeans.
 trainers.
 boots.

Wo kaufst du lieber deine Klamotten?

Wo gehst du am liebsten shoppen?

Klamotten (pl)
 die Kleidung
 Ich gehe am liebsten....shoppen.
 Ich gehe nicht gern... shoppen.
 Ich kaufe lieber meine Klamotten... auf dem Flohmarkt.
 im Einkaufszentrum.
 im Internet.
 im Boutiquen.
 in Designerläden.
 in großen Städten.
 in kleinen Läden.
 in Secondhandläden.
 Meine Eltern kaufen alle meine Klamotten.

Where do you prefer to buy your clothes?

Where do you most like to go shopping?

clothes (colloquial)
 clothing
 Most of all I like shopping...
 I don't like shopping...
 I prefer to buy my clothes... at the flea market.
 in the shopping centre.
 in the internet.
 in boutiques.
 in designer shops.
 in big cities.
 in small shops.
 in second hand shops.
 My parents buy all of my clothes.

Opinion Adverbs

Rule: ADD to the VERB.

Ich trage **gern** Jeans.
I like to wear jeans.

Ich trage **lieber** einen Rock.
I prefer to wear a skirt.

Ich trage am liebsten Ohringe.
I like to wear earrings most/best.

Adverbs of frequency

Rule: ADD to the VERB.

Ich trage **nie** Jeans.
 Ich trage **immer** Hose.

oft *often*
 immer *always*
 ab un zu *now & again*
 nie *never*

Connectives:

und *and*
 denn *because*
 oder *or*
 aber *but*

Mein Modestil ist

lässig *relaxed*
 furchtbar *terrible*
 alternativ *alternative*
 romantisch *romantic*
 sportlich *sporty*

Describing clothes.

Add the endings to the colours.

Ich trage	einen blauen	Rock.
	eine blaue	Hose.
	ein blaues	T-shirt.
	blaue	Stiefel.

bunt *colourful* gestreift *striped*
 golden *gold* kariert *checked*
 kurz *short* lang *long*

Refer to other people in your work.

Tragen = to wear

Ich trage Wir tragen
 Du trägst Ihr tragt
 Er/ Sie trägt Sie/ sie tragen

Qualifiers

sehr very
wirklich quite
echt really
zu too

Use different tenses.

PAST	PRESENT	FUTURE
Ich habe ...getragen	Ich trage	Ich werde ...tragen
Ich habe ...gekauft	Ich kaufe	Ich werde ...kaufen
Ich habe ...gefunden	Ich finde	Ich werde ...finden
Ich bin ...gegangen	Ich gehe	Ich werde ...gehen

Use time expressions.

PAST	PRESENT	FUTURE
Letztes Jahr	Heute	Nächstes Jahr
Letzten Sommer	Diesen Sommer	Nächsten Sommer
Letzte Woche	Diese Woche	Nächste Woche

INFINITIVE	PAST	PRESENT	FUTURE
SPIELEN = to play	Ich habe....gespielt	Ich spiele	Ich werde....spielen
MACHEN = to do	Ich habe...gemacht	Ich mache	Ich werde...machen
WOHNEN = to live	Ich habe...gewohnt	Ich wohne	Ich werde..wohnen
HÖREN = to listen	Ich habe...gehört	Ich höre	Ich werde...hören
GUCKEN= to look at	Ich habe..geguckt	Ich gucke	Ich werde...gucken
ARBEITEN = to work	Ich habe...gearbeitet	Ich arbeite	Ich werde...arbeiten
Zeit VERBRINGEN mit = to spend time with..	Ich habe Zeit mit... verbracht	Ich verbringe Zeit mit	Ich werde Zeit mit...verbringen
LESEN = to read	Ich habe...gelesen	Ich lese	Ich werde...lesen
SEHEN = to watch	Ich habe...gesehen	Ich sehe	Ich werde...sehen
ESSEN = to eat	Ich habe..gegessen	Ich esse	Ich werde...essen
TRINKEN = to drink	Ich habe...getrunken	Ich trinke	Ich werde..trinken
FINDEN = to find	Ich habe es...gefunden	Ich finde es	Ich werde es...finden
HELFEN = to help	Ich habe...geholfen	Ich helfe	Ich werde...helfen
Sport TREIBEN = to do sport	Ich habe Sport getrieben	Ich treibe Sport	Ich werde Sport treiben
GEHEN = to go	Ich bin ...gegangen	Ich gehe	Ich werde... gehen
AUFWACHEN = to wake up	Ich bin ...aufgewacht	Ich wache...auf	Ich werde...aufwachen
AUFSTEHEN = to get up	Ich bin ...aufgestanden	Ich stehe..auf	Ich werde...aufstehen
SEIN = to be	Ich war	Ich bin	Ich werde...sein
HABEN = to have	Ich hatte	Ich habe	Ich werde ...haben
GEBEN = to give (there were/is/will be)	Es gab	Es gibt	Es wird... geben

Year 9 German Knowledge Organiser: Half Term 4

Was für Fernsehsendungen siehst du gern ?

Ich liebe..., weil sie (spannend) sind.
 Dokumentarsendungen.
 Krimis.
 die Nachrichten.
 Reality-TV-Serien.
 Sportsendungen.
 Zeichentrickfilme.

Was willst du heute Abend sehen ?

Ich will sehen, da ich (Krimis) mag.

 Abenteuerfilme.
 Bollywoodfilme.
 fremdsprachige Filme.
 Horrorfilme.
 romantische Komödien.
 Science-Fiction-Filme.

What kind of TV programmes do you like watching ?

I love....., because they are (exciting).
 documentaries.
 crime/ detective dramas.
 the news.
 reality TV shows.
 sports programmes.
 cartoons.

What do you want to watch this evening ?

I want to watch, because I like (crime/detective shows).
 adventure films.
 bollywood films.
 foreign language films.
 horrorfilms.
 romantic comedies
 Science-fiction films.

Was für Musik horst du (nicht) gern?

Wer ist dein Lieblingssänger/ deine Lieblingssängerin?

Wann/ Wie/ Wo hörst du Musik?

Was hast du als letztes gehört?

Wann bist du zuletzt auf ein Konzert gegangen?

Ich höre (nicht) gern ...
 Ich höre lieber/ am liebsten..
 Dance-Musik.
 Deutschrapp.
 Hip-Hop.
 Pop.
 Rockmusik.
 Schlager.
 Volksmusik.

What sort of music do you (not) like listening to?

Who is your favourite singer?

When/ How/ Where do you listen to music?

What was the last thing you listened to?

When did you last go to a concert?

I (do not) like to listen to..
 I prefer/ most like to listen to..
 dance music.
 German rap.
 hip hop
 pop music.
 rock music.
 German pop.
 folk music,

Opinions

Für mich sind (Horrorfilme) zu
 Ich finde (Horrorfilme)..
 blöd
 faszinierend
 furchtbar
 gruselig
 interessant
 kindisch
 kompliziert
 langweilig
 lustig
 nervig
 romantisch
 schrecklich
 spannend
 unrealistisch
 unterhaltsam

For me, (horrorfilms) are too..
 I find (horrorfilms)..
 rubbish
 fascinating
 awful
 scary
 interesting
 childish
 complicated
 boring
 funny
 annoying
 romantic
 terrible
 exciting
 unrealistic
 entertaining

(Hip-Hop) hat einen tollen Rhythmus
 Ich finde (Deutschrapp)
 beliebt
 entspannend
 laut
 lebendig
 melodisch
 rhythmisch
 Die Melodie ist..
 Die Texte sind ..

(Hip-hop) has a great rhythm.
 I find (German rap)..
 popular
 relaxing
 loud
 lively, upbeat
 tuneful
 rhythmic
 the melody, tune is..
 the lyrics are..

VERBS IN 3 TENSES

PAST	PRESENT	FUTURE
Ich habe ...gesehen.	Ich sehe	Ich werde...sehen.
Ich habe...gehört.	Ich höre	Ich werde...hören.
Ich habe es...gefunden.	Ich finde es...	Ich werde es.. finden.
Ich bin...gegangen.	Ich gehe	Ich werde...gehen.
Es war	Es ist	Es wird...sein.

Wie oft benutzt du das Internet ?

Ich benutze das Internet...
eine Stunde pro Tag.
zwei Stunden pro Tag.
nie

Was machst du im Internet ?

Ich spiele Computerspiele.
Ich kaufe Klamotten/ Geschenke.
Ich chatte mit Freunden/ der Familie.
Ich lade Musik herunter.
Ich benutze soziale Medien.

How often do you use the internet ?

I use the internet..
one hour a day.
two hours a day.
never.

What do you do in the internet ?

I play computer games.
I buy clothes/ presents.
I chat with friends/ family.
I download music.
I use social media.

Opinions

Ich finde das
praktisch

Ich denke, dass

Ich glaube, dass

Ein Vorteil ist, dass

Ein Nachteil ist, dass

Meine Eltern denken, dass

Meine Mutter glaubt, dass

I find that
practical.

I think that

I believe that

An advantage is that

A disadvantage is that

My parents think that

My mother believes that

Word order with dass

Dass sends the **verb** to the **end** of the sentence.

Ich glaube, **dass** das Internet praktisch **ist**.

Talking about nowadays (Heutzutage) and then (damals)

Damals

Es gab keine Computer/ Handys.

Ich hatte kein Smartphone.

Ich hörte Musik im Radio.

Ich ging ins Internetcafé.

Ich las Zeitschriften.

Heutzutage

Es gibt fast überall Computer und Handys.

Es gibt viele Smartphones.

Ich höre Musik auf dem Handy.

Ich habe einen Computer zu Hause.

Ich lese Blogs im Internet.

Back then

There were no computers/ mobiles.

I didn't have a smartphone.

I listened to music on the radio.

I went to the internet café.

I read magazines.

Nowadays

There are computers and mobiles almost everywhere.

There are lots of smartphones.

I listen to music on my mobile phone.

I have a computer at home.

I read blogs in the internet.

Connectives:

und and
denn because
oder or
aber aber



These do **NOT** change
the word order.

Ich benutze das Internet **und** ich chatte mit Freunden.

weil because
da because/ as
dass that
obwohl although



These send the **VERB** to
the **end of the**
sentence.

Ich lade Musik herunter, **da** es praktisch **ist**.

USE VERBS IN ALL 3 TENSES

PAST	PRESENT	FUTURE
Ich habe...gespielt.	Ich spiele	Ich werde...spielen.
Ich habe...benutzt.	Ich benutze	Ich werde...benutzen.
Ich habe...gekauft.	Ich kaufe	Ich werde...kaufen.
Ich habe..heruntergeladen.	Ich lade... herunter.	Ich werde..herunterladen.

OPINIONS IN ALL 3 TENSES

PAST	PRESENT	FUTURE
Es war	Es ist	Es wird...sein
Sie waren	Sie sind	Sie werden..sein

Year 9: Songwriting

KEYWORDS

- 1- **Chord:** 2 or more notes played simultaneously.
- 2- **Chord Progression:** Movement from chord to chord.
- 3- **Cadence:** the two chords at the end of a musical phrase.
- 4- **Riff:** short repeated phrase in popular music.
- 5- **Melody:** the main tune of a song.
- 6- **Phrase:** a short musical passage; a musical sentence.
- 7- **Bass:** the lowest part of a piece, often providing harmonic support.
- 8- **Key:** group of pitches, or scale, that form the basis of a piece.
- 9- **Modulation:** Change from one key to another.
- 10- **Sequence:** the repetition of a musical phrase at a higher or lower pitch than the original.
- 11- **Harmony:** parts that play together simultaneously create harmony. Often accompanying or secondary parts to a melody.

COMPOSING BASS LINES

ROOTS AND 5THS CAN MAKE THE BASS LINE MORE INTERESTING

Oh Suzana in C major pentatonic

MAJOR CHORD PROGRESSIONS

I	ii	iii	IV	V	vi	vii ^o
Major	Minor	Minor	Major	Major	Minor	Diminished
A	B	C#	D	E	F#	G#
B	C#	D#	E	F#	G#	A#
C	D	E	F	G	A	B
D	E	F#	G	A	B	C#
E	F#	G#	A	B	C#	D#
F	G	A	Bb	C	D	E
G	A	B	C	D	E	F#

4 Rules for Chord Progressions

1. Start and end on chord I
2. The primary/major chords are strong (I, IV & V)
3. The minor chords add some interest and variety (but avoid using iii)
4. NEVER use chord vii (diminished)

3 hints for Basslines

1. Bass them around the root (bottom) note of the chord
2. Use other notes of the chords for interest
3. Add some rhythm for character

5 characteristics of a good melody

A Good Melody...

1. Starts and ends on the same note (C)
2. Moves mainly by step
3. Has a smooth contour/shape
4. Has 2 or 4 bar phrases
5. Uses similar short motifs to give it a clear character

Unit 1: WRL

Year 9

Skills

- Reflect on the knowledge and skills needed for setting realistic targets and personal goals.
- Work individually and with others to negotiate, plan and take action.
- Analyse and reflect upon action taken and progress made.
- To develop skills of discussion and research skills
- Develop key skills of presentation, resourcefulness & reflection.

Knowledge

- To aid our GCSE options decisions.
- To develop an awareness about different types of work, including employment, self-employment and voluntary work; about the range of opportunities in learning and work and changing patterns of employment (local, national, European and global).
- Reflect upon the skills and qualities in relation to employers' needs.
- Organise and produce a personal profile and understand the variety of different jobs available to them.
- Understand rights as employees and why they exist
- Describe the key features of a payslip and the tax system.



Unit 2: Sex Education

Year 9

Skills

- Engage with and reflect on different ideas, opinions and beliefs to help develop personal opinion.
- Can express and explain opinions through discussion and written assessments.
- Develop empathy with the situations others may find themselves in
- develop confidence by discussing/action planning how to resolve CSE scenario's.

Knowledge

Be aware of current teenage pregnancy statistics

Develop awareness of the different methods of contraceptives

Gain knowledge and understanding about STIs and the dangers of them

Eliminate myths about STIs

Gain knowledge and understanding about HIV & AIDS

Explain what is meant by the term 'consent' (regarding the law) and what it means within healthy relationships.

Understand what child sexual exploitation is and our vulnerability to it.





Y9: Unit 2 Christianity

Christianity remains the main religious tradition in Great Britain. During the completion of this unit you will consider a variety of different aspects of Christianity including; its origins, important teachings, figures, its views on modern ethical problems that people with faith must face and key philosophical aspects that must be accepted if you are to be deemed a “Christian” today.

Knowledge Organiser

Religions

Lesson 1

What are the basics of Christianity?

What are some of the basic beliefs and practices of Christianity (including views on God)?

Why do you think Christianity has become the biggest religion in the world?

Lesson 4

Who was Jesus?

Can you identify important events in the life of Jesus?

Why Jesus is important to Christians today?

Was Jesus really who he said he was?

Lesson 7

The Ten commandments – are they important now?

Which of the 10 commandments do you think people should still follow today?

*“We don’t need the Ten Commandments anymore”
Two arguments for and two against.*

Ethics

Lesson 2

Why would God allow evil?

Can you give examples of moral and natural evil?

“God doesn’t exist because if he did, he wouldn’t let evil happen” Can you give two reasons that agree and two to disagree?

Lesson 5

Euthanasia – should it be accepted in GB?

What is the law on Euthanasia in the UK and why is it such a controversial topic?

Why might someone want to access Euthanasia?

“Euthanasia is never acceptable” Can you give arguments for and arguments against?

Lesson 8

Abortion – is it ever the right thing to do?

Can you explain different laws towards abortion around the world?

How would a Christian view the act of an abortion?

Do you think abortion is morally acceptable?

Philosophy

Lesson 3

The God debate – is it all possible?

Can you give considered arguments to suggest God does exist?

Can you compare this to an atheists views?

Lesson 6

Heaven & Hell – realistic?

Can you describe what heaven and hell are? Is reward or punishment after death fair?

Do you think the Christian belief in an afterlife is realistic? Why?

Lesson 9

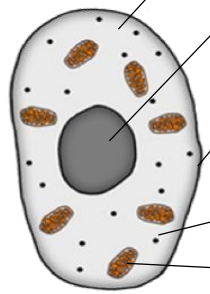
Did God build the world in 7 days?

What is the fundamental Christian view on the creation story?

Why do some Christians not believe this story word for word?

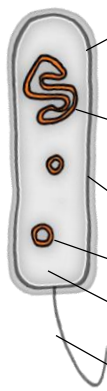
Can Christians believe in the big bang theory? Does it work when you add God?

Following these 9 lessons pupils will be assessed and feedback will be given in exercise books.



cytoplasm	<i>site of chemical reactions in the cell</i>	gel like substance containing enzymes to catalyse the reactions
nucleus	<i>contains genetic material</i>	controls the activities of the cell and codes for proteins
cell membrane	<i>semi permeable</i>	controls the movement of substances in and out of the cell
ribosome	<i>site of protein synthesis</i>	mRNA is translated to an amino acid chain
mitochondrion	<i>site of respiration</i>	where energy is released for the cell to function

animal cell



cell membrane	<i>site of chemical reactions in the cell</i>	gel like substance containing enzymes to catalyse the reactions
bacterial DNA	<i>not in nucleus floats in the cytoplasm</i>	controls the function of the cell. Can be found as chromosomal DNA and plasmid DNA (small rings).
cell wall	<i>NOT made of cellulose</i>	supports and strengthens the cell
cytoplasm	<i>semi permeable</i>	controls the movement of substances in and out of the cell
flagella	<i>whip like tail</i>	allows the bacterial cell to move
ribosome	<i>site of protein synthesis</i>	mRNA is translated to an amino acid chain

Eukaryotes complex organisms

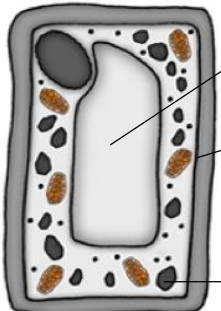
SCIENCE BIOLOGY: B1 - Cells (Part 1)

contains all the parts of animal cells plus extras

plant cell

Bacterial cells are much smaller than plant and animal cells

Prokaryotes simpler organisms



permanent vacuole	<i>contains cell sap</i>	keeps cell turgid, contains sugars and salts in solution
cell wall	<i>made of cellulose</i>	supports and strengthens the cell
chloroplast	<i>site of photosynthesis</i>	contains chlorophyll, absorbs light energy

Specialised cells

egg		<i>fertilised by a sperm</i>	nutrients in the cytoplasm, haploid nucleus and changes in the cell membrane after fertilisation
sperm		<i>fertilise an egg</i>	streamlined with a long tail acrosome containing enzymes large number of mitochondria, haploid nucleus
Ciliated epithelial cell		<i>push and move mucus</i>	Thin layer of moving hairs on the surface of the cells called cilia.

PREFIXES

Prefix	Multiple	Standard form
centi (cm)	1 cm = 0.01 m	$\times 10^{-2}$
milli (mm)	1 mm = 0.001 m	$\times 10^{-3}$
micro (µm)	1 µm = 0.000 001 m	$\times 10^{-6}$
nano (nm)	1nm = 0.000 000 001 m	$\times 10^{-9}$
pico (pm)	1pm = 0.000 000 000 001m	$\times 10^{-12}$

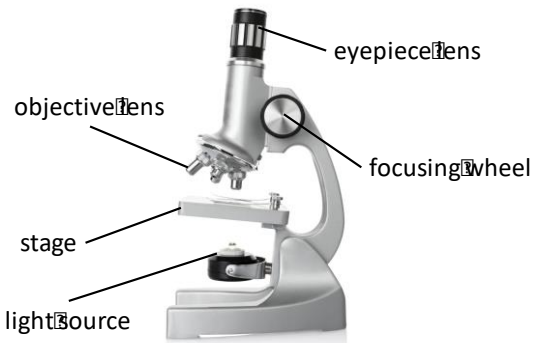
decreasing size and scale

Microscopy

$$\text{magnification} = \frac{\text{size of image}}{\text{real size of the object}}$$

Estimates can be useful when you only have a sample of what you are counting e.g. the number of red blood cells in a blood sample

Many of the structures found in cells were not able to be seen before the development of electron microscopes e.g. ribosomes

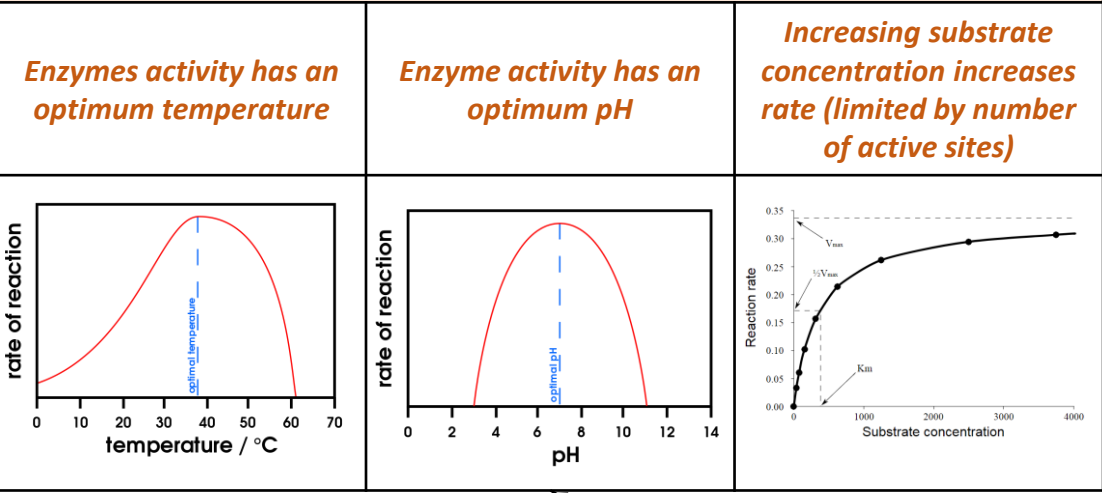


Feature	Light (optical) microscope	Electron microscope
Radiation used	Light rays	Electron beams
Max magnification	~ 1500 times	~ 2 000 000 times
Resolution	200nm	0.2nm
Size of microscope	Small and portable	Very large and not portable
Cost	~£100 for a school one	Several £100,000 to £1 million plus

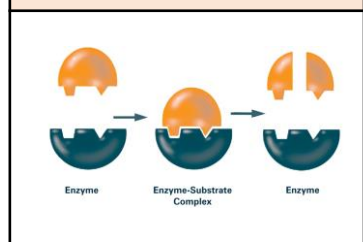
Enzymes catalyse (increase the rate of) specific reactions in living organisms.

The rate of a reaction can be measured by how fast reactants are used up or by how fast products are formed.

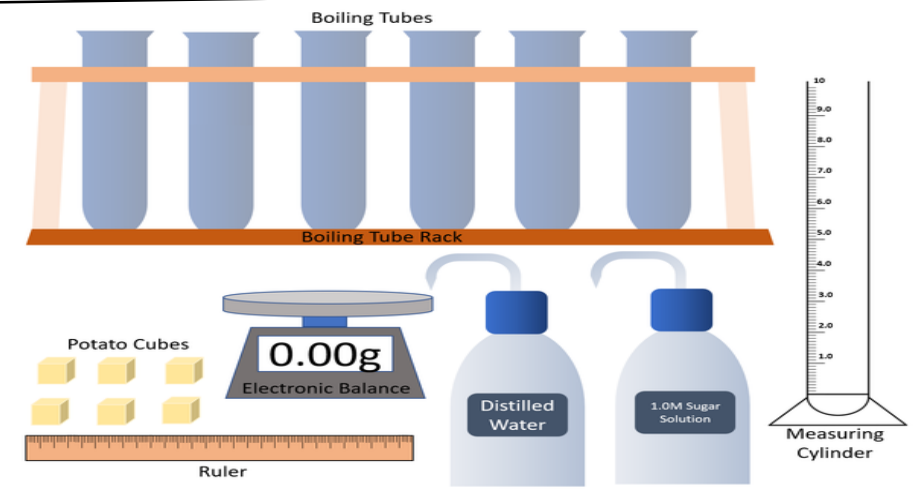
The activity of enzymes is affected by changes in temperature, pH and substrate concentration



The 'lock and key theory' is a simplified model to explain enzyme action



Enzymes catalyse specific reactions in living organisms due to the shape of their active site.



Calculate percentage gain/loss of mass in osmosis.

$$\% \text{ change in mass} = \frac{(\text{final mass} - \text{initial mass})}{\text{initial mass}} \times 100$$

The greater the difference in concentrations the faster the rate of diffusion.

Digestive enzymes speed up the conversion of large insoluble molecules (food) into small soluble molecules that can be absorbed into the bloodstream.

Large changes in temperature or pH can stop the enzyme from working (denature).

<i>Temperature too high</i>	<i>pH too high or too low</i>
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Enzyme changes shape (denatures) the substrate no longer fits the active site.

Enzymes

**SCIENCE
BIOLOGY: B1 -
Cells (Part 2)**

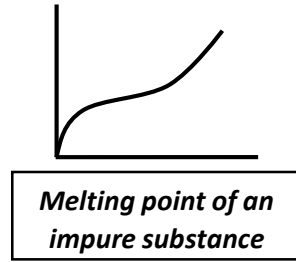
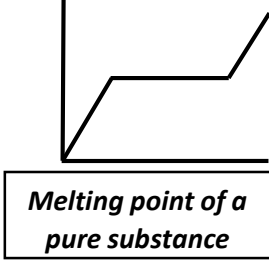
Osmosis

Transport in cells

Carbohydrases (e.g. amylase)		<i>Made in salivary glands, pancreas, small intestine</i>	Break down carbohydrates to simple sugar (e.g. amylase breaks down starch to glucose).
Proteases		<i>Made in stomach, pancreas</i>	Break down protein to amino acids.
Lipases		<i>Made in pancreas (works in small intestine)</i>	Break down lipids (fats) to glycerol and fatty acids.

The products of digestion are used to build new carbohydrates, lipids and proteins. Some glucose is used for respiration.

Diffusion <i>No</i> energy required	<i>Movement of particles in a solution or gas from a higher to a lower concentration</i>	E.g. O ₂ and CO ₂ in gas exchange, urea in kidneys. Factors that affect the rate are concentration, temperature and surface area.
Osmosis <i>No</i> energy required	<i>Movement of water from a dilute solution to a more concentrated solution</i>	E.g. Plants absorb water from the soil by osmosis through their root hair cells. Plants use water for several vital processes including photosynthesis and transporting minerals.
Active transport <i>ENERGY</i> required	<i>Movement of particles from a dilute solution to a more concentrated solution</i>	E.g. movement of mineral ions into roots of plants and the movement of glucose into the small intestines.



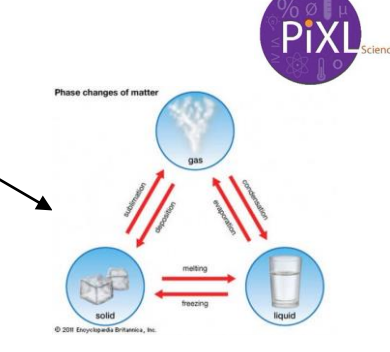
Pure substances
A pure substance is a single element or compound, not mixed with any other substance.
Pure substances melt and boil at specific temperatures. Heating graphs can be used to distinguish pure substances from impure.

Solid, liquid, gas
Melting and freezing happen at melting point, boiling and condensing happen at boiling point.

SOLID **LIQUID** **GAS**

The amount of energy needed for a state change depends on the strength of forces between particles in the substance.

s	solid
l	liquid
g	gas



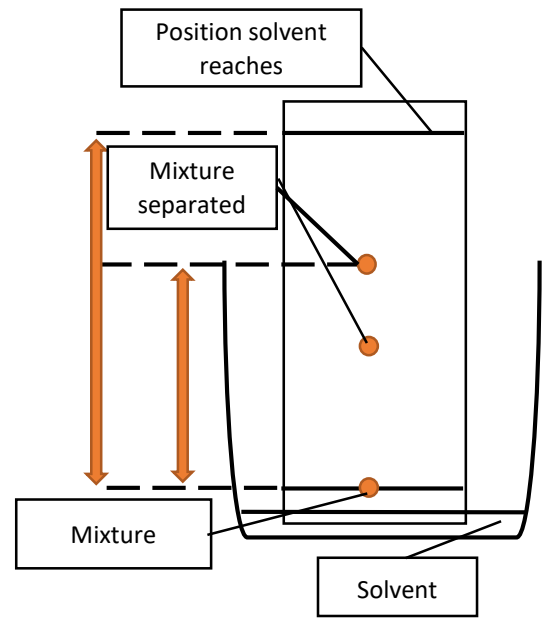
States of matter

Energy and movement
Gas particles have higher levels of energy than liquids and solids

Gas particles move more than the other states of matter, with solids moving the least due to their tightly packed arrangement. Solid particles can only vibrate around their fixed positions.

SCIENCE: CHEMISTRY – C2 Separating mixtures (Part 1)

Method of separating substances



Chromatography

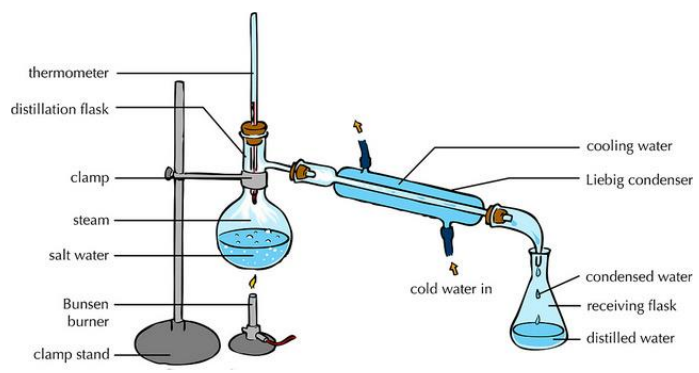
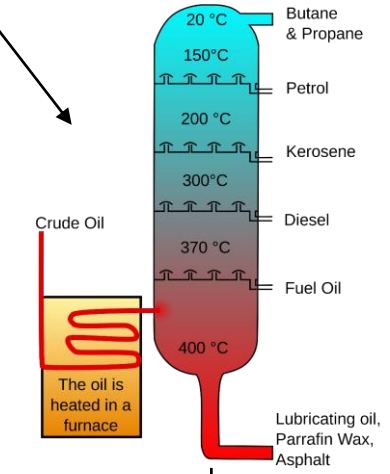
Chromatography	Can be used to separate mixtures and help identify substances.	Involves a mobile phase (e.g. water or ethanol) and a stationary phase (e.g. chromatography paper).
R_f Values	The ratio of the distance moved by a compound to the distance moved by solvent.	$R_f = \frac{\text{distance moved by substance}}{\text{distance moved by solvent}}$
Pure substances	The compounds in a mixture separate into different spots.	This depends on the solvent used. A pure substance will produce a single spot in all solvents whereas an impure substance will produce multiple spots.

Fractional distillation

Fractions	The hydrocarbons in crude oil can be split into fractions	Each fraction contains molecules with a similar number of carbon atoms in them. The process used to do this is called fractional distillation.
Fractional distillation	Crude oil is heated and hydrocarbons boil and condense at certain temperatures	This is due to the different lengths of hydrocarbon chains.

Simple distillation

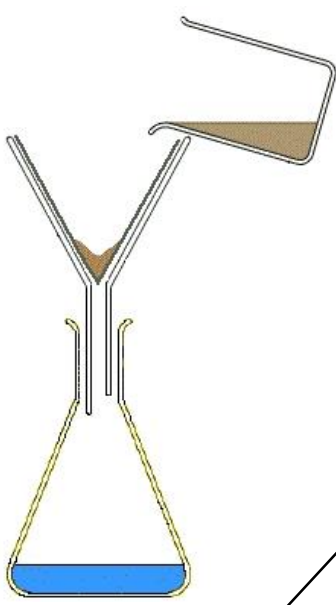
Distillation	Used to separate a mixture of liquids	During distillation, the mixture gets heated causing one liquid at a time to evaporate and then condense in the Liebig condenser.
Boiling points	Each of the liquids in the mixture will have a different boiling point	This enables the liquids to be separated. Distillation can also be used to analyse purity of a substance as pure substances have a sharp boiling point.



Using fractions
Fractions can be processed to produce fuels and feedstock for petrochemical industry
We depend on many of these fuels; petrol, diesel and kerosene.
Many useful materials are made by the petrochemical industry; solvents, lubricants and polymers.

The filtrate is the liquid that moves through the filter paper and collects underneath

The residue is the insoluble solid that collects in the filter paper.



Filtration

This technique separates substances that are insoluble in a solvent from those that are soluble

An example is sand in water; the sand will collect in the filter paper and the water will move through the it.

Potable water	<i>Water of an appropriate quality is essential for life</i>	Human drinking water should have low levels of dissolved salts and microbes. This is called potable water.
UK water	<i>Rain provides water with low levels of dissolved substances</i>	This water collects in the ground/lakes/streams. To make potable water an appropriate source is chosen, which is then passed through filter beds and then sterilised.
Desalination	<i>Needs to occur if fresh water is limited and salty/sea water is needed for drinking</i>	This can be achieved by distillation or by using large membranes e.g. reverse osmosis. These processes require large amounts of energy.

Sterilising agents include chlorine, ozone and UV light.

Filtration

Methods of separating substances

SCIENCE: CHEMISTRY – C2 Separating mixtures (Part 2)

Potable water

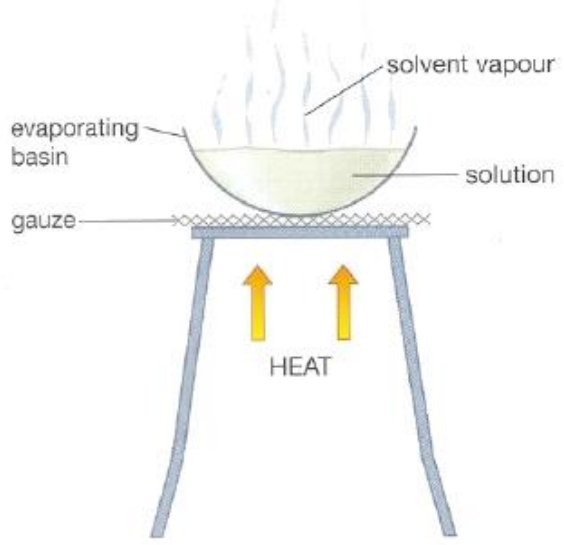
Using water	<i>Water used for chemical analysis must not contain any dissolved salts</i>	Water used for this purpose must be treated in order to be suitable.
Producing potable water	<i>There are 4 main steps to producing potable water</i>	<ol style="list-style-type: none"> 1. Choosing appropriate source of fresh water 2. Sedimentation 3. Passing the water through filter beds 4. Chlorination

Crystallisation

Crystallisation

This technique separates a soluble substance from a solvent by evaporation

An example is the crystallisation of sodium chloride from a salt solution.

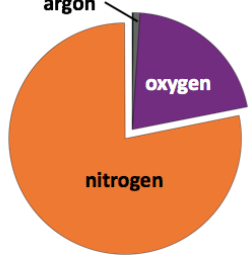


Purifying substances

Waste water treatment

Waste water	<i>Produced from urban lifestyles and industrial processes</i>	These require treatment before used in the environment. Sewage needs the organic matter and harmful microbes removed.
Sewage treatment	<i>Includes many stages</i>	<ul style="list-style-type: none"> - Screening and grit removal - Sedimentation to produce sludge and effluent (liquid waste or sewage). - Anaerobic digestion of sludge - Aerobic biological treatment of effluent.





Gas	Percentage
Nitrogen	~80%
Oxygen	~20%
Argon	0.93%
Carbon dioxide	0.04%

Proportions of gases in the atmosphere

Algae and plants	<i>These produced the oxygen that is now in the atmosphere, through photosynthesis.</i>	carbon dioxide + water → glucose + oxygen $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$
Oxygen in the atmosphere	<i>First produced by algae 2.7 billion years ago.</i>	Over the next billion years plants evolved to gradually produce more oxygen. This gradually increased to a level that enabled animals to evolve.

How oxygen increased

The Earth's early atmosphere

Earth and atmospheric science

SCIENCE: CHEMISTRY – C8 Earth Science (Part 1)

Earth and atmospheric science

How carbon dioxide decreased

Reducing carbon dioxide in the atmosphere	<i>Algae and plants</i>	These gradually reduced the carbon dioxide levels in the atmosphere by absorbing it for photosynthesis.
Formation of sedimentary rocks and fossil fuels	<i>These are made out of the remains of biological matter, formed over millions of years</i>	Remains of biological matter falls to the bottom of oceans. Over millions of years layers of sediment settled on top of them and the huge pressures turned them into coal, oil, natural gas and sedimentary rocks. The sedimentary rocks contain carbon dioxide from the biological matter.

Volcano activity 1 st Billion years	<i>Billions of years ago there was intense volcanic activity</i>	This released gases (mainly CO ₂) that formed to early atmosphere and water vapour that condensed to form the oceans.
Other gases	<i>Released from volcanic eruptions</i>	Nitrogen was also released, gradually building up in the atmosphere. Small proportions of ammonia and methane also produced.
Reducing carbon dioxide in the atmosphere	<i>When the water vapour condensed, the oceans formed and the carbon dioxide dissolved into it</i>	This formed carbonate precipitates, forming sediments. This reduced the levels of carbon dioxide in the atmosphere.

Greenhouse gases

Carbon dioxide, water vapour and methane	<i>Examples of greenhouse gases that maintain temperatures on Earth in order to support life</i>
The greenhouse effect	<i>Radiation from the Sun enters the Earth's atmosphere and reflects off of the Earth. Some of this radiation is re-radiated back by the atmosphere (including carbon dioxide, methane and water vapour) to the Earth, warming up the global temperature.</i>

Human activities and greenhouse gases

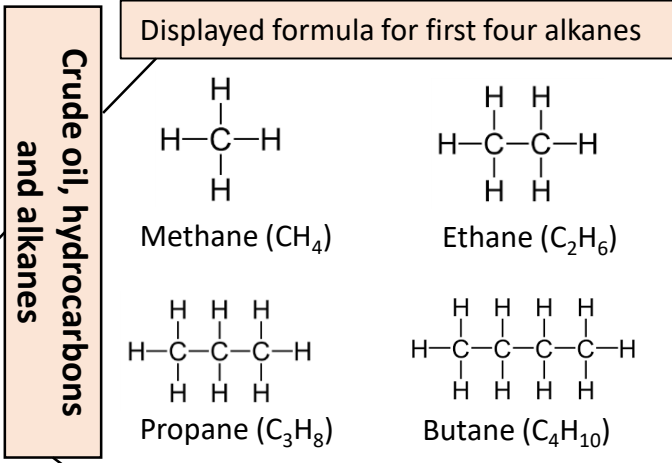
Carbon dioxide	<i>Human activities that increase carbon dioxide levels include burning fossil fuels and deforestation.</i>
Methane	<i>Human activities that increase methane levels include raising livestock (for food) and using landfills (the decay of organic matter released methane).</i>
Climate change	<i>There is evidence to suggest that human activities will cause the Earth's atmospheric temperature to increase and cause climate change.</i>

The total amount of greenhouse gases emitted over the full life cycle of a product/event. This can be reduced by reducing emissions of carbon dioxide and methane.

Effects of climate change
Rising sea levels
Extreme weather events such as severe storms
Change in amount and distribution of rainfall
Changes to distribution of wildlife species with some becoming extinct

Testing for oxygen	<i>Glowing splint</i>	Re-lights the splint in the presence of oxygen.
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Carbon dioxide concentration	<i>There is a correlation between atmospheric carbon dioxide levels, fossil fuel usage and global temperature change</i>	There are errors with these measurements due to the location they were taken and the historical accuracy before scientific methods became more robust.
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Fractions	<i>The hydrocarbons in crude oil can be split into fractions</i>	Each fraction contains molecules with a similar number of carbon atoms in them. The process used to do this is called fractional distillation.
Using fractions	<i>Fractions can be processed to produce fuels and feedstock for petrochemical industry</i>	We depend on many of these fuels; petrol, diesel and kerosene. Many useful materials are made by the petrochemical industry; solvents, lubricants and polymers.

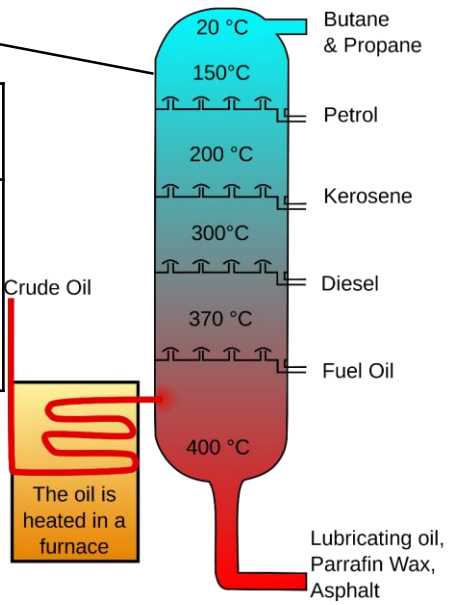
Crude oil	<i>A finite resource</i>	Consisting mainly of plankton that was buried in the mud, crude oil is the remains of ancient biomass.
Hydrocarbons	<i>These make up the majority of the compounds in crude oil</i>	These compounds are made up of hydrogen and carbon only.
General formula for alkanes	C_nH_{2n+2}	For example: C ₂ H ₆ C ₆ H ₁₄

Carbon compounds as fuels and feedstock

SCIENCE: CHEMISTRY – C8 Fuels (Part 2)

Fractional distillation and petrochemicals

Hydrocarbon chains	<i>In oil</i>	Hydrocarbon chains in crude oil come in lots of different lengths.
	<i>Boiling points</i>	The boiling point of the chain depends on its length. During fractional distillation, they boil and separate at different temperatures due to this.

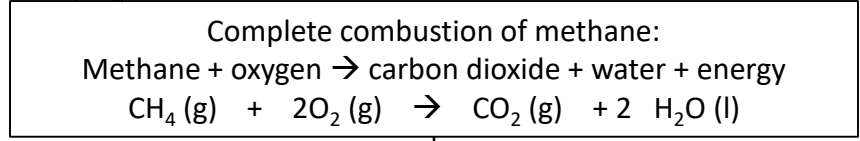


Cracking	<i>The breaking down of long chain hydrocarbons into smaller, more useful chains</i>	The smaller chains are more useful. Cracking can be done by various methods including catalytic cracking and steam cracking.
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Sulfur dioxide	<i>Released from burning hydrocarbons with sulfur impurities in</i>	Sulfur dioxide dissolves in rain water to form acid rain. This damages plant life and can make water habitats acidic. Acid rain can also weather limestone and sandstone structures. It can make soil acidic and affect crop growth
Oxides of nitrogen	<i>Oxygen and nitrogen react from the air under high temperatures inside engines</i>	As pollutants, oxides of nitrogen cause acid rain and are also classified as greenhouse gases. Can cause respiratory problems.

Fuels

Combustion	During the complete combustion of hydrocarbons, the carbon and hydrogen in the fuels are oxidised, releasing carbon dioxide, water and energy.
Incomplete combustion	During the incomplete combustion of hydrocarbons, there is not enough oxygen available for complete combustion. The products of the reaction is carbon monoxide, carbon and water.



Hydrogen fuel	<i>Hydrogen reacts with oxygen in the engine as a fuel for the vehicle</i>	Advantages: - Water is the product - No greenhouse gases released - Renewable Disadvantages: - Expensive to buy - Difficult to re-fuel
Fossil fuels	<i>Crude oil, natural gas and coal</i>	Petrol, kerosene and diesel oil are non-renewable. Methane is found in natural gas and is also non-renewable.

Boiling point (temperature at which liquid boils)	<i>As the hydrocarbon chain length increases, boiling point increases.</i>
Viscosity (how easily it flows)	<i>As the hydrocarbon chain length increases, viscosity increases.</i>
Flammability (how easily it burns)	<i>As the hydrocarbon chain length increases, flammability decreases.</i>

Incomplete combustion issues	<i>Carbon monoxide is an odourless, toxic gas that can kill</i>	Soot (carbon) is also produced that builds up in the atmosphere and can cause global dimming. This reduces the amount of sunlight that reaches the Earth and can alter rainfall patterns.
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Science – Physics: P2 Motion

A **quantity** tells us how much of something there is.

A **scalar** quantity is a quantity with just a **magnitude** (size).

A **vector** quantity is a quantity with both a **magnitude** and a **direction**.

Examples of scalar quantities	Examples of vector quantities
Speed Mass Distance Energy Time	Displacement (distance in a straight line) Force Weight Velocity Acceleration Momentum

The **speed** of an object tells us how quickly an object travels a certain distance.

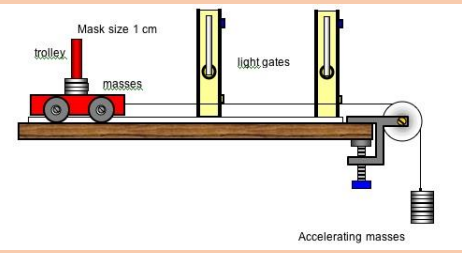
The **average speed** tells us the how quickly an object has completed a whole journey.

The **instantaneous speed** tells us the how quickly an object has travelled **at a specific point** in the journey.

Speed is calculated using the following formula:

$$\text{speed (m/s)} = \frac{\text{distance travelled (m)}}{\text{time taken (s)}}$$

- Some typical speeds include:
- | | | |
|--|----------------------------------|-------------------------|
| Airliners – 250m/s | Ferry – 18m/s | |
| Speed limit in town centres – 10.5m/s | High speed trains – 90m/s | |
| Commuter trains – 55m/s | Cycling – 6m/s | Sound – 330m/s |
| Motorway speed limit – 31m/s | Stong wind – 15m/s | Walking – 1.4m/s |

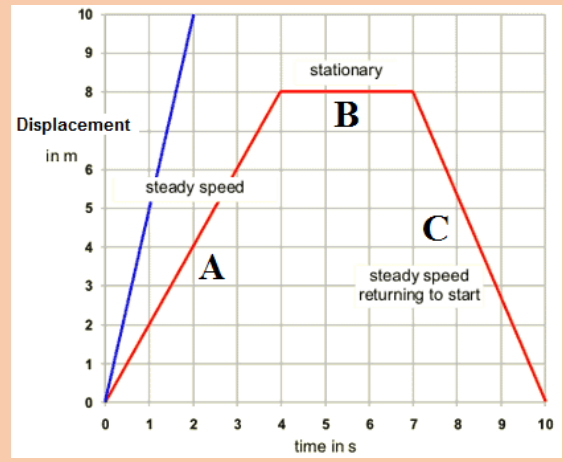


Light gates can be used in a lab to measure the time taken for an object to travel.

Light gates are **more accurate** than using a stopwatch as a computer records the time and isn't affected by **reaction times**.

- Light gates** are used in the following way:
- the object passes through the first light gate and starts the timer
 - when it passes through the second light gate, the timer stops
 - the computer works out the difference between the two times from the light gates

Distance/time graphs show us how objects move throughout a journey.



Horizontal lines mean the object is **stationary (not moving)**.

Straight, sloping lines mean the object is travelling at a **constant speed**.

The steeper the sloping line, **the faster the object is travelling**.

We can calculate the speed of the object by working out the **gradient** of the line.

Worked example:
 In the graph what is the speed of the red object at point A?
 Step 1: Find the change in distance on the graph = 8m
 Step 2: Find the change in time on the graph = 4s
 Step 3: Carry out the speed calculation = 8 ÷ 4 = **2m/s**

Science Physics – P1 Maths in Science

In Science, all scientists use **SI units** to measure certain quantities.

Quantity	SI unit	Abbreviation
Distance	metre	m
Mass	gram	g
Time	second	s
Current	ampere	A
Temperature	kelvin	K
Concentration	mole	mol
Frequency	hertz	Hz
Force	newton	N
Energy	joule	J
Power	watt	W
Pressure	pascal	Pa
Electric charge	coulomb	C
Potential difference	volt	V
Electric resistance	ohm	Ω
Magnetic flux density	tesla	T

We use multiples and sub-multiples of SI units if quantities are very large or very small.

