



Year 8

Student Planner and Knowledge Navigators

2023-24 Cycle 3

Full Name:	Advisory:
Advisor:	Head of Year:

Wednesday Morning Meeting: Behaviour Curriculum and Cognitive Science

Behaviour Curriculum Brain Dump

Behaviour Curriculum: Retrieval Practice

- | | |
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| 1. _____ | 4. _____ |
| 2. _____ | 5. _____ |
| 3. _____ | 6. _____ |

Cognitive Science Brain Dump

Personal Reflection: How will I apply what I have learnt in today's session?

Revision Space

Wednesday Morning Meeting: Behaviour Curriculum and Cognitive Science

Behaviour Curriculum Brain Dump

Behaviour Curriculum: Retrieval Practice

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Cognitive Science Brain Dump

Personal Reflection: How will I apply what I have learnt in today's session?

Revision Space

Design Technology Knowledge Navigator

Key Terms	
1. Customer	A person who will buy OR use your product.
2. Client	A person or company asking you to work for them.
3. Design Brief	A guide for a project given to you by the client.
4. Ore	The solid material which metal is taken from.
5. Ferrous Metal	A metal which contains iron.
6. Non-Ferrous Metal	A metal which does not contain iron.
7. Alloy	A metal made from 2 or more metals to improve its properties.
8. Pewter	Alloy metal which will melt at low temperatures. Contains many metals including Tin & Copper.
9. Mould	A hollow container designed for casting.
10. Casting	The process of using the mould to pour molten metal inside and create a shape when the metal has cooled.
11. Sprue Hole	The gap where the metal enters the mould.
12. Sprue	The metal which is left over from moulding which takes the shape of the sprue hole.
13. Hearth	The base of the furnace in the workshop used for heating metal.

6 Rs	
R Reduce	Minimise the amount of material and energy used in the production or use of the product.
R Recycle	Take an existing product that has become waste and reprocess the material to use in a new product.
R Reuse	Take an existing product that's become waste and use the material or parts for another purpose, without processing it.
R Repair	When a product breaks down or doesn't function properly, you should be able to fix it.
R Refuse	Don't use or buy a product if you think you don't need it or if it is bad for the environment.
R Rethink	Ask if we can sustain our current way of life and the way we design and make. Come up with new solutions.



Key Terms	
Health and Safety	A set of rules and regulations enforced to keep people safe in the chosen environment.
Hazard	A risk of harm or injury.
Precaution	A measure taken to minimise the chance of harm or injury.
Pillar Drill	A drill mounted on a column or pillar. It is used to drill holes in wood, metal and plastics. You must clamp your work.
Dowel	A hardwood rod made of lamin with a circular profile.
Sand Paper	Made from Aluminium Oxide comes in a variety of grades.
Isometric Drawing	A drawing with vertical lines and lines at 30degrees from the horizontal.
Manufactured Board	Large sheets of processed wood such as plywood and MDF.

Key Terms	
Polymer	Technical term for what we commonly call plastics.
Molecule	A group of atoms bonded together.
Polymer Chain	A chain of molecules found in all polymers.
Thermoframing	A polymer which can be reheated and reformed repeatedly.
Cross links	Connections between polymer chains.
Thermosetting	A polymer which cannot be reheated and reformed.
Raw material	The natural material from which a product is made.
Extracting oil	Drilling into the earth to remove oil.
Fractional distillation	Separating oil into different parts, including what is needed to make polymers.
Moulding	Turning a polymer into a product shape.
Stock Form	How we buy polymers/plastics to use to make products at school e.g. sheet, tubular, square profile.
PVA	Glue used to join linoleum or paper/board together.
Epoxy Resin	Glue used to join linoleum/metal/polymers together.
Solvent Cement	Glue used to join polymers together.
Contact Adhesive	Glue used to join linoleum/metal/polymers together.

Tuesday Morning Meeting: Maths Masterclass

Maths Masterclass: Retrieval Practice

1. _____	4. _____
2. _____	5. _____
3. _____	6. _____

Maths Masterclass: Application Practice

I Do	You Do

Maths Masterclass: Application Practice

1. _____	4. _____
2. _____	5. _____
3. _____	6. _____

Maths Masterclass: Diagnostic Question

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Behaviour Curriculum Brain Dump

Behaviour Curriculum: Retrieval Practice

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Cognitive Science Brain Dump

Personal Reflection: How will I apply what I have learnt in today's session?

Equipment for Cooking	
	14. Piping Bag Used to apply various liquid-based food to other foods – batter or icing. Part of shaping and moulding
	15. Palette Knife Used to smooth or lift different types of foods or decorative foods, such as smoothing butter cream icing
	16. Baking Tray Used to cook or bake food items. Different types of trays are available


17. The Eatwell Guide

the eatwell plate



Fruit and Veg
Dairy and Alternatives
Carbohydrates
Oils and Spreads
Protein

18. Heat Transfer



Conduction – direct heat - frying
Convection – heat rising through liquid or air - boiling
Radiation – heat from light ray transfer – bba/grilling

Key Terms	
1 Health and Safety	Rules you should follow in the kitchen to keep you safe while cooking and preparing food.
2 Cross-contamination	When bacteria from raw meat is spread onto vegetables . Puts people at risk of food poisoning. Avoided by using different equipment to prepare and cook raw meat and vegetables.
3 The Eatwell Guide	The main source of nutritional information in the diet – five food groups: Fruit and vegetables, carbohydrates, protein, dairy and alternatives, oils and spreads. Gives food portion information to people.
4 Nutritional Values	The amount of nutrients – both macro (big) and micro (small) – that a given dish provides you with.
5 Micronutrients	Nutrients such as vitamins and minerals, including calcium, vitamin A, B, C, D, E and K.
6 Sensory Analysis	Using the senses – sound, texture, aesthetics, hearing, smell and umami – to decide how successful a dish is.
7 Heat Transfer	When heat is transferred from the source of heat to the food. Conduction, convection and radiation – frying = conduction, boiling = convection, grilling = radiation.
8 Fermentation	Micro-organisms – such as yeast – breaking down the carbohydrates in food into alcohol substances. We use different amounts of fermentation for different foods.
9 Method	The steps that are written down about how to make the dish.
10 Ingredients	The different food products that are needed to make a dish.
11 Food Evaluation	The process of analysing food products to determine their sensory, nutritional, and safety properties.
12 Balanced Diet	Eating a variety of foods to get all the nutrients in the right proportions and quantities to be healthy.
13 Composite Meal	A food/dish made from different food groups, e.g. pizza, spaghetti bolognese.

Quote of the day

'It's never too late to be what you might've been.' — George Eliot

What have you learnt from today's session? Write down at least three facts below.

- 1.
- 2.
- 3.
- 4.
- 5.

Review of Mastery Next Step:




Did you achieve your mastery next step from Monday? If so, how did you achieve it?
If not, why not?

Monday Morning Meeting - Cycle 3 Week 13


Mastery Next Step




Word of the Week:
Definition

Word of the Week:
Use in a sentence

		
Filled with hot water to wash equipment.	Folding knife – small knife used to generally cut veg and meat.	Used to cut food product on to protect work surface. Red for meat, white for veg.

Hygiene and Safety in the kitchen
Personal rules:
 • Wash your hands for 20 seconds
 • Tie your hair back
 • Wear an apron
 • Remove jewellery



		
Used for frying, boiling or other types of cooking using a saucepan. Top of the oven.	The top section of the oven (if it's a double oven).	Used for drying equipment.

Protein

- Lean beef (1.5 per 100g)
- Chicken (1.5 per 100g)
- White fish (1.5 per 100g)
- Turkey (1.5 per 100g)
- Tuna (1.5 per 100g)
- Milk (1.5 per 100g)
- High protein milk (1.5 per 100g)
- Eggs (1.5 per 100g)
- Cheese (1.5 per 100g)
- High protein yoghurt (1.5 per 100g)
- Tofu (1.5 per 100g)
- Legumes (1.5 per 100g)
- Plant milk (1.5 per 100g)

Simple Carbohydrates

- White bread
- White rice
- White pasta
- White sugar
- White flour
- White margarine
- White oil
- White vinegar
- White salt
- White yeast
- White baking powder
- White bicarbonate of soda
- White cream
- White butter
- White margarine
- White oil
- White vinegar
- White salt
- White yeast
- White baking powder
- White bicarbonate of soda
- White cream
- White butter

Fats

- Butter
- Margarine
- Oil
- Yogurt
- Cheese
- Ice cream
- Chocolate
- Cake
- Biscuits
- Crackers
- Bread
- Pasta
- Rice
- Wheat
- Flour
- Sugar
- Salt
- Yeast
- Baking powder
- Bicarbonate of soda
- Cream
- Butter

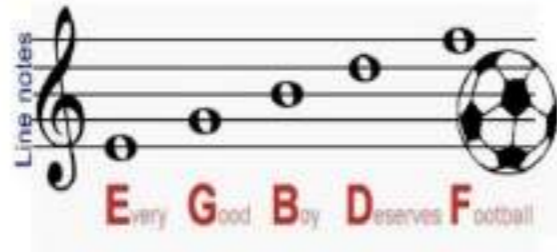
Key Terms	
1	Fruits and vegetables 1st and largest food group. All fruits and vegetables – does not include potatoes. This is the one we should have the most of.
2	Carbohydrates 2nd largest food group has two main categories: Starchy are slow-release energy – foods like potatoes, whole grains. Sugary are fast-release energy – foods such as sweets, juice, white bread.
3	Protein 3rd largest food group. All forms of meat, includes eggs and other animal products – bacon and sausages. Non animal sources: beans, pulses, nuts, lentils.
4	Dairy and alternatives 4th largest food group. Cheese, milk, cream from animals. Alternatives are options that are made from plant products as opposed to animal products, such as soya milk.
5	Fats and spreads 5th and last food group – Olive oil, margarine, for example, are in this group.
6	The Eatwell Guide Food created by government to advise on healthy diet and what food should be consumed in each proportion. Can advise on food groups as an overall diet for daily or weekly planning.
7	Macronutrients The main and biggest (macro = big) nutrients we need each day for our bodies to function.
8	Carbohydrates - macronutrient Its main function is to give us energy to perform daily activities.
9	Proteins - macronutrient A macronutrient. Its main function is to help the body build muscles and repair body cells.
10	Fats - macronutrient A macronutrient. Its main function is to help protect organs from damage by providing a cushion.
11	Cross contamination A spread of harmful microorganisms from one thing to another. For example, if kitchen environment is not kept clean or unhygienic preparation of food.
12	Hazard A hazard is any source of potential damage, harm or adverse health effects on something or someone. Basically, a hazard is the potential for harm.
13	Seasonality Seasonality of food refers to the times of the year when a given type of food is at its peak, either in terms of harvest or its flavour.

Key Definitions		
1.	Notation	A series or system of written symbols used to represent elements in music.
2.	Clef	Any of several symbols placed at the left hand end of a staff, indicating the pitch of the notes written on it.
3.	Treble Clef	A symbol found at the beginning of a staff to indicate how the notes on that staff should be read.
4.	Staff	A set of five parallel lines on which a note is written to indicate its pitch.
5.	Ledger Line	A ledger line is used in musical notation to notate pitches above or below the lines and spaces of the regular musical staff.
6.	Accidental	A sign seen before a note on the staff that raises or lowers the pitch of a note.
7.	Semitone	The smallest interval used in classical Western music, equal to a twelfth of an octave or half a tone.
8.	Whole Tone	The distance of two semitones between two notes.
9.	Enharmonic	Relating to or denoting notes which are the same in pitch (in modern tuning) though bearing different names.

The Notes in the Spaces on the Staff



The Notes on the Lines of the Staff



Exploring Chords and Melodies

A-Musical Elements-Key Definitions			B-The parts of a Ukulele		
8.	Ukulele	A small four-stringed guitar of Hawaiian origin.	10.	Body	The main part of the instrument.
9.	Chord	A group of (typically three or more) notes sounded together, as a basis of harmony.		Soundhole	The opening in the body of the instrument.
10.	Sequence	A particular order in which related things follow each other.		Bridge	The part of the instrument that supports the strings.
11.	Tempo	The speed of a piece of music.		Tuning Keys	The keys used to adjust the tension of the strings.
12.	Technique	A skilful or efficient way of doing or achieving something.		Frets	The raised strips on the neck of the instrument.
13.	Ensemble	To perform music to an audience as part of a group.		Nut	The part of the neck that supports the strings at the head.
14.	Performance	The act of entertaining an audience by singing or playing a piece of music on a music instrument.		Neck	The long part of the instrument that holds the strings.
15.	Rhythm	Patterns of long and short sounds played within a steady beat.		Head	The part of the instrument at the end of the neck.
16.	Pitch	The highness or lowness of sound.	11.	The ukulele has four strings tuned to the notes G C E A (Greedy Cats Eat Ants).	

C-Chords on the Ukulele							
Chord Name	Notes in the Chord	Position on the instrument	Diagram	Chord Name	Notes in the Chord	Position on the instrument	Diagram
12.	C Major	A string, 3 rd fret		14.	G Major	C string 2 nd fret, E string 3 rd fret & A string 2 nd fret	
13.	A minor	G string, 2 nd fret		15.	F Major	G string fret 2 & E string fret 1	

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Maths Masterclass: Application Practice

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Maths Masterclass: Diagnostic Question

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
Cognitive Science Brain Dump

Personal Reflection: How will I apply what I have learnt in today's session?

Music Knowledge Navigator


KS3 Music-Knowledge Navigator


Exploring Rhythmic Notation

A-Musical Elements-Key Definitions			B-Note Names, Symbols, Duration & Rests				
1.	Pulse	Pulse is a steady beat like a ticking clock, or your heartbeat and it provides the basis for rhythmic structure in music.	Note	Name	Duration	Rest	
2.	Rhythm	An aspect, characteristic or feature that makes up a piece of music.	11.		Semibreve	4 beats	
3.	Element	The length of a sound – long/short	12.		Minim	2 beats	
4.	Dynamics	The varying levels of volume within a piece of music.	13.		Crotchet	1 beat	
5.	Solo	To perform music to an audience by yourself.	14.		Quaver	1/2 beat	
6.	Ensemble	To perform music to an audience as part of a group.	15.		Semiquaver	1/4 beat	
7.	Performance	The act of entertaining an audience by singing or playing a piece of music on a music instrument					

C-Dynamics Symbols			
	Symbol	Italian	English
16.	<i>pp</i>	<i>pianissimo</i>	Very quiet
17.	<i>p</i>	<i>piano</i>	Quiet
18.	<i>mf</i>	<i>mezzo forte</i>	Moderately loud
19.	<i>f</i>	<i>forte</i>	Loud
20.	<i>ff</i>	<i>fortissimo</i>	Very loud
21.		<i>crescendo</i>	Gradually getting louder

Introduction to Keyboard Skills

A-Musical Elements-Key Definitions			B-Numbering Our Fingers	
1.	Keyboard	A musical instrument that consists of a row of keys that increase in pitch across the instrument.	8. 	
2.	Octave	A series or scale of eight notes e.g. C to C.		
3.	Accuracy	The quality or state of being correct or precise.		
4.	Semibreve	A note having the time value of 4 beats represented by a ring with no stem.		
5.	Solo	To perform music to an audience by yourself.	9. The musical alphabet starts on the note C.	
6.	Ensemble	To perform music to an audience as part of a group.	10. The notes within the musical alphabet are C D E F G A and B.	
7.	Performance	The act of entertaining an audience by singing or playing a piece of music on a music instrument		

D-The Notes on a Keyboard	
11.	
12.	C is always the white note situated to the left of the set of two black keys.
13.	Middle C is the C note found directly in the middle of the keyboard.

Quote of the day

“Twenty years from now you’ll be more disappointed by the things you did not do than the ones you did.” — Mark Twain

What have you learnt from today’s session? Write down at least three facts below.

- 1.
- 2.
- 3.
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- 5.

Review of Mastery Next Step:

Did you achieve your mastery next step from Monday? If so, how did you achieve it?
If not, why not?

Revision: Advice and Guidance

One of the best revision techniques is Look, Cover, Write, Check. The process is outlined below.

1. Look at the first bullet point or sentence.
2. Read it through three to five times.
3. Cover the page so that you can no longer see it.
4. Write it out exactly (word for word) as it appears in your knowledge navigator from memory.
5. Check what you wrote. Tick if correct, change if incorrect.
6. Repeat.
7. When you get it 100% correct then move on to the next chunk of information.

Remember

If information retrieved (remembered) often enough then it will gradually form part of our long term memory. Then we will never forget it.

This process is hard. If it isn’t hard then it isn’t working.

Knowledge Organiser: Computer Crime & Cyber Security

Summary

Malware is a general term that describes lots of different programs that try to do something unwanted to your computer. Malware is made to stop your device from running properly and sometimes to steal your information.

Anti-malware software is designed to find and stop malware from damaging your computer or a network. To protect your computer you need to install anti-malware software and run regular scans.

When you are online you need to watch out for phishing and spam emails and protect your private information. Phishing emails are trying to trick someone into giving out information over email. Spam emails can contain malware.

Smartphones and mobile devices allow for photos, videos and your location to be shared instantly on the internet. Be careful what you get up to in public as anyone might have a smartphone pointed at you. Do not post photos or videos of other people online without their permission.

Phishing emails are trying to trick someone into giving out information over email.

What to look out for in a phishing email

The greeting is not personalised

Poor spelling and grammar

Forged link

Sense of urgency

Request for personal information

The sender’s address is often a variation on a genuine address

Spam emails offer all kinds of things like money and prizes and can contain malware too.

Ways to reduce spam:

Use a spam filter - most email clients try to stop spam from reaching you by using a spam filter.

Do not give your email address out – if you don’t trust the website or if supplying your email address is optional, don’t give it to them.

Keep an eye out for tick boxes – when you sign up to a website, it might try to sign you up to its newsletter.

Key Vocabulary

Backup	A copy of important files that is kept separately in case your original files are lost or damaged.
Chat room	Accessed on the internet, users can meet to chat in real-time, messages are typed out but voice chat rooms exist too.
Copyright	A set of rights that prevents people copying and distributing a piece of work without the copyright holder’s permission.
Data	Values, typically letters or numbers.
File sharing	The act of sharing files over the internet.
Firewall	An application that prevents unauthorised connections to and from the internet.
Hack	Gaining unauthorised access to a computer.
Information	Data that has meaning, not just a number or a letter.
Licence	A legal agreement between the company who published the software and the end user covering areas such as copyright.
Malware	Malicious software created to damage or gain illegal access to computer systems.

Staying safe online

Never disclose your name telephone number address or school

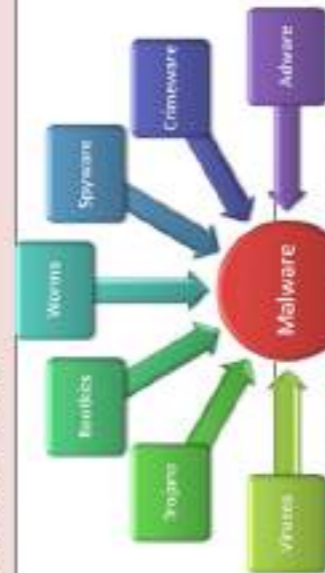
It’s wise not to share your location. Especially on websites and apps that are accessible by anyone.

Never accept someone as a ‘friend’ on social media simply because they claim to know another friend of yours.
Always be cautious about what you say online.

Visit these websites for advice

ChildLine
0800 1111

Webwise



Malware is software that can harm devices
Typical actions of malware include deleting or modifying files.

Spyware—secretly monitors user actions, e.g. key presses, and sends information to the hacker. Some spyware can even use your webcam without your knowledge.

Viruses—spreads through normal programs and might slow down your device or change your applications and documents.

Worms—spread from device to device and copy themselves hundreds of times. A worm might copy itself onto your email account and then send a copy to all of your email contacts!

Trojan horse—pretends it will be a useful and safe program, when actually it will try to attack your device.

Adware—displays adverts while it is running; some can serve as spyware, gathering information about you from your hard drive, the web sites you visit, or your keystrokes.

Unit 6 Probability and Statistics

PROBABILITY	
probability	the likelihood or chance of something happening it is given on a scale between 0 (impossible) and 1 (certain), and can be a fraction, decimal, or sometimes a percentage
theoretical probability	the probability of something in theory
relative frequency	the probability of something worked out from real life data, also called empirical probability
experiment (in probability)	when a number of trials are conducted to determine the probability of an event
event	one possible outcome in a probability experiment, e.g. getting a 6 on a die
expectation	what you predict will happen in a probability experiment, you multiply the probability by the number of trials

LIKELIHOOD VOCABULARY	
impossible	when there is no chance – it will not happen an outcome with a probability of 0
unlikely	when it will probably not happen an outcome with a probability between 0 and 0.5
even	when there is an equal chance of something happening or not happening an outcome with a probability of 0.5
likely	when it will probably happen an outcome with a probability between 0.5 and 1
certain	when it is inevitable – it will definitely happen an outcome with a probability of 1
fair	when all outcomes are equally likely
bias	when something is not fair

PROBABILITY NOTATION	
$P(A)$ =	the probability of an event A =
$P(A')$ =	the probability that event A will not occur – the complement of A

REPRESENTING PROBABILITIES	
sample space	the set of all possible outcomes of an experiment
probability tree	a diagram shaped like a tree used to display a sample space by using one branch for each possible outcome

SYSTEMATIC LISTING	
product rule for counting	if there are x ways of doing something and y ways of doing something else, then there are xy ways of performing both (the product of the two numbers)

AVERAGES AND SPREAD	
mean	add up all the amounts, and then divide the total by the number of amounts
mode	the value which occurs the most
median	the middle value. Method: put the data in numerical order, cross off from the beginning and end until you find the middle value. If there are two middle values, find half-way between them
range	largest value – smallest value the spread of the data

DISPLAYING CATEGORICAL DATA	
data	a collection of information a set of numbers giving information about a context
frequency	the number of times an event or a value occurs
frequency table	usually a tally, showing the totals of data collect data using this before displaying it in a chart
bar chart	the height of the bars represents the frequency (y-axis), x-axis is the thing we are measuring, there are gaps between bars, all bars are equal width and axes are labelled
comparative / dual bar chart	a bar chart showing data side by side good for comparing data
pictogram	each picture represents a set frequency it has a key to tell you what each picture is worth

PIE CHARTS	
how to draw	the size of the sector of the circle represents the frequency Steps: divide 360 by the total frequency, this is the value of one unit multiply this by each individual frequency to get the angle size for that section draw the pie chart using your protractor, always measure from the line you just drew, starting from zero on your scale
example	England is the largest sector so has the highest frequency

Section 7	
Tanakh	Jewish holy scripture, made up of three other texts: Torah, Nevi'im, Ketuvim.
Old Testament	First 27 books of the Christian Bible, written by prophets centuries before Jesus.
Hannah	A key figure in the Tanakh and Old Testament who had prayers answered by God and gave birth to a key prophet: Samuel.
King Hezekiah	A key figure in the Tanakh and Old Testament who had prayers answered by God and lived 15 years extra instead of facing death as he feared.

Section 8	
Analogy	A story with deep, metaphorical meaning.
Design argument	Argument for God's existence, which is that science leads us to see the complexity of the universe, suggesting it must all have an intelligent, powerful designer.

Section 9	
William Paley	English philosopher who used an analogy of a watch to suggest because a watch is so intricate that we know it must have a watchmaker, it is logical to think the universe, which is also intricate, must it have a maker: God.
Richard Dawkins	Modern biologist and philosopher who claims that Paley's watchmaker argument is flawed because there is lots of evidence of bad or poor design in nature.

Section 10	
Charles Darwin	Founder of the theory of evolution in the 19 th century.
Evolution	A theory which suggests all life develops over millions of years to better survive in its environment, including human life.
Imago Dei	A Christian concept that God created all of mankind in His image.

Section 11	
Fundamentalist Creationist	Those who believe God is the Creator as is literally told in scripture (e.g. Genesis)
Genesis	First chapter of the Bible, suggesting "in the beginning God created the heavens and the earth" in 6 days.

Section 12	
Liberalist Creationist	Those who believe God is the Creator but combine this with belief in scientific theory (e.g. God is the omniscient designer of evolution).
Big Bang theory	The leading scientific theory for the universe having formed 14 billion years ago.

Section 13	
Free will	The belief that we have complete freedom over our actions and choices in life.
Determinist	The belief that our actions and choices are guided by our genetics, surroundings, etc.

Section 1	
Epistemology	The study of knowledge.
Reason	One way of gaining knowledge; this is knowledge gain through our thought alone
Intuition	One way of gaining knowledge; this is the unexplained feeling that something is true

Section 2	
Authority	One way of gaining knowledge; this is truth given to us from someone in power
Revelation	One way of gaining knowledge; this is truth given to us from a divine being (e.g. God)
Experience	One way of gaining knowledge; this is truth we gain from our senses (e.g. touch).
Faith	One way of gaining knowledge; this is truth we believe without much if any evidence

Section 3	
Religious experience	An experience believed to be spiritual or caused by God in some way; Albert Einstein said this is the "strongest and the noblest driving force behind scientific research".
Visions	When one sees or hears something divine (God, an angel, a prophet, etc).
Miracles	An event that breaks the laws of nature; it being unexplainable makes it an act of God

Section 4	
Numinous	A profound and overwhelming experience of something greater than ourselves
Ineffable	Describes something which cannot be explained using words.

Section 5	
Omnipotent	Means all-powerful; Jesus is said to be the incarnation (human-form of God) and so his miracles, like feeding 5,000 people, are possible down to his omnipotence.
Tawhid	Islamic concept of the oneness of God; Prophet Muhammad is claimed to have asked Allah to split the moon to prove to non-believers that Allah is the One God.

Section 6	
David Hume	Scottish philosopher who criticised the validity of miracles, saying they have few witnesses and the evidence is never strong enough to cast no doubt.
Maurice Wiles	English philosopher who criticised the validity of miracles and prayers as he pointed out that God does not use miracles to stop suffering around the world.

Unit 7: Number

INDEX NOTATION

$a = b^n$
a is the power
b is the base
n is the index

INDEX LAWS: MULTIPLICATION AND DIVISION

when the **base** is the same, we use the following laws when multiplying and dividing

multiplying	add the powers e.g. $a^m \times a^n = a^{m+n}$
dividing	subtract the powers e.g. $a^m \div a^n = a^{m-n}$
raising a power by another power	multiply the powers e.g. $(a^m)^n = a^{mn}$

SQUARES AND ROOTS

index	tells us how many times to use the number in a repeated multiplication
root (fractional index)	the inverse of an index

POSITIVE INTEGER POWERS

square numbers	the answer when you multiply a number by itself: n^2 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144...
cube numbers	the answer when you multiply a number by itself, and then by itself again: n^3 1, 8, 27, 64, 125, 216, 343, 512, 729, 1000...
powers of 10	10^n 10, 100, 1000, 10 000, 100 000...

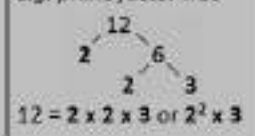
Pythagoras's Theorem

Pythagoras' theorem	a relationship between the 3 sides on a right angled triangle
Pythagoras' theorem	$a^2 + b^2 = c^2$ 'c' is always the hypotenuse

STANDARD FORM: NOTATION

notation	allows us to write very large or very small numbers without lots of zeros numbers written in the form $A \times 10^n$ 'A' is between 1 and 10 'n' is any integer
'n' is positive	large number (≥ 1)
'n' is negative	small number (< 1)




MULTIPLES, FACTORS AND PRIME NUMBERS

multiple	the result of multiplying a number by an integer, e.g. the 3 rd multiple of 7 is 21
lowest common multiple (LCM)	the lowest common number in the multiplication tables of two or more different numbers
factor	a quantity which divides equally into a number, e.g. factors of 8 are 1, 2, 4 and 8
highest common factor (HCF)	the highest factor which belongs to two or more numbers
prime number	an integer greater than 1 that has exactly two factors, 1 and itself 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31...
prime factor	a factor of a number which is also prime
decomposition	to break something down
product of prime factors (prime factorisation)	a set of prime factors which multiply to give a number e.g. prime factor tree 
unique factorisation theorem	the fundamental theorem of arithmetic Each integer can be written as a unique product of prime factors. This is why 1 is not a prime number.

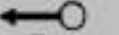



SETS

set	a collection of items with one of each member
{ }	brackets are written at the start and end when listing elements in the set
U	the universal set: everything we are interested in
∈	'element of a set' or member of a set (a value in the set)
∉	'not an element of a set'
∅	the 'empty set'
n(A)	the number of elements in a set A

VENN DIAGRAMS

Venn diagram	a diagram using circles or other shapes, to show the relationship between sets
set	a collection of items with one of each member
the intersection	$(A \cap B)$ in A and in B 
the union	$(A \cup B)$ in A or in B or in both 
the complement	A' not in A 

Unit 8: Algebra

INEQUALITIES	
where two expressions are not equal in value	
strict	< less than  > greater than 
non-strict	≤ less than or equal to  ≥ greater than or equal to 

ALGEBRAIC NOTATION	
like terms	terms which are the same apart from their numerical coefficients: they are the same variable and have the same power
collect like terms	you can add or subtract like terms using the coefficients
simplifying algebraic fractions	factorise the numerator and denominator and cancel common factors, sometimes requires factorisation

INSTRUCTIONS: GENERAL	
evaluate	find the value of
form	to write or produce
substitute	replacing letters with numbers to calculate the numerical value
simplify	to reduce to its simplest form
expand	multiply terms inside a bracket by those outside the bracket, remove the brackets using the grid method

FACTORISING	
factorise	finding the factors of an expression the reverse of expand, it is when we write an expression using brackets, use reverse grid
factor	a quantity which divides equally into a number, e.g. factors of 8 are 1, 2, 4 and 8
factorising a general quadratic	quadratic: $x^2 + bx + c$, factorised form: $(x + ?)(x + ?)$ '?' are two numbers whose product is 'c' and sum is 'b', split the middle term and put into a reverse grid to find the brackets
difference of two squares	quadratic: $a^2 - b^2$ factorised form: $(a - b)(a + b)$ square root each number from the original expression

Links to: LAWS OF INDICES	
When the base is the same, we use the following rules:	
multiplying	add the powers e.g. $x^a \times x^b = x^{a+b}$
dividing	subtract the powers e.g. $x^a \div x^b = x^{a-b}$
raising indices to other indices	multiply the powers. e.g. $(x^a)^b = x^{a \times b}$

INSTRUCTIONS: EQUATIONS	
solve	find the value of an unknown or variable, use inverse operations and the balancing method
rearrange	changing the subject of a formula sometimes called transposing use inverse operations and the balancing method, like when we solve an equation
inverse	the opposite
balance an equation	do the same to both sides of the "=" use to solve an equation, or rearrange a formula
subject of an equation	a single unknown or variable that everything else is equal to
solution of an equation	a value we can put in place of a variable that makes the equation true
order of operations	the laws regarding the order in which to calculate, used in algebra too brackets, other, multiply and divide, add and subtract

SEQUENCES	
linear sequences	a sequence where the difference between terms increases or decreases by the same amount each time also known as an arithmetic sequence use DINO to find the nth term to generate a sequence substitute values of 'n' in, e.g. 2nd term, n=2 algebraically: $x_n = an + b$
common difference	the amount we add or subtract each time in a linear sequence
quadratic sequences	a sequence of numbers with an n^2 in the position to term rule (nth term) the second difference between consecutive terms is constant algebraically: $x_n = an^2 + bn + c$
geometric sequences	a sequence of numbers where each term is found by multiplying the previous one by a number called the common ratio 'r' algebraically: $x_n = ar^{n-1}$ increasing: the ratio is an integer, decreasing: the ratio is a fraction
common ratio (r)	the amount we multiply by each time in a geometric sequence, can be a fraction

LINEAR SEQUENCES links to: LINEAR GRAPHS	
$y = mx + c$	the general equation of a linear graph m is the gradient c is the y-intercept

Section 8	
Tibetan Buddhism	A branch of Buddhism that comes from Tibet (between India and China).
Prayer wheel	Item of Tibetan Buddhist worship; they are spun to repeat mantras with.
Prayer flag	Item of Tibetan Buddhist worship; mantras are said as it moves with the wind
Wheel of Life	A concept that there are six realms of life one's self can exist in.

Section 9	
Realm of the gods	Made up of those in power and wealth, mistaking this for true satisfaction.
Realm of the hungry ghosts	Made up of those who are never satisfied and always crave/desire.
Realm of humans	Made up of those who suffer the unavoidable norms of life; Buddha said this was the best realm as this is where enlightenment can be best achieved

Section 10	
Realm of the jealous gods	Made up of those who are mistakenly jealous of those in power and wealth.
Realm of the animals	Made up of those who act on instinct and self-interest predominantly.
Realm of hell	Made up of those who suffer and inflict suffering on others as a result.

Section 11	
Eightfold path	Buddha's eight ways to live to overcome suffering and gain good karma in life:
Middle way	Another way Buddha described the eightfold path, as it's a path of moderation.

Section 12	
Right view	Focus on clearly understanding the Buddha's teachings.
Right speech	Focus speaking truthfully, helpfully and peacefully to others.
Right action	Focus on acting to generate love, kindness and peace in yourself and in others.
Right livelihood	Focus on making a living which avoids any form of harm to others, animals, nature, etc.

Section 13	
Right mindfulness	Focus on being in tune with your emotions and thoughts so you live truthfully and do what is best for you and others around you.
Right effort	Focus on working hard on improving oneself – avoid laziness and taking the easy way out.
Right intention	Focus on why we act; how might our emotional impulses/thoughts be misleading us?
Right concentration	Focus on clearing the mind and stilling the body. In the end, this will lead to no need to focus; complete clarity.

Section 1	
Anicca	Buddhist teaching of impermanence; nothing lasts forever and all things change.
Tahna	Buddhist term for 'desire' or 'craving'; attachments are the cause of all suffering.
Dukkha	Buddha's first noble truth (of four), that suffering exists and is inevitable.

Section 2	
"He who is envious of others shall not have peace of mind."	Teaching of the Buddha
"A wise personal is characterised by his actions."	Teaching of the Buddha

Section 3	
Bhikkhu	A Buddhist monk (male); devotee to a life of strict Buddhist teachings.
Bkhikkuni	A Buddhist nun (female); devotee to a life of strict Buddhist teachings.
Monastery	A place where Buddhist monks/nuns live to devote their life to Buddhism.
Lay Buddhist	A Buddhist who is not ordained as a monk or nun; they live according to Buddha's teachings and values yet not strictly like those who are ordained.




Section 4	
Five Precepts	Five principles which all Buddhists seek to live by, as instructed by the Buddha.
1 st Precept	Refrain from killing
2 nd Precept	Refrain from stealing
3 rd Precept	Refrain from lying
4 th Precept	Refrain from harming others
5 th Precept	Refrain from intoxicating the mind (i.e. ingesting things that alter the mind)



Section 5	
Samsara	The cycle of rebirth; Buddhists believe a non-physical self continues after our death.
Moksha	The belief that our non-physical self can escape the cycle of rebirth (samsara).

Section 6	
Nirvana	A state where our non-physical self is totally enlightened and no longer reborn; Buddha had said "nirvana is the greatest of joys".
Karma	The result of actions in life; this affects the rebirth that will be experienced after death
Dhamma	Means 'cosmic law' in Eastern religions; the Buddha's way to overcome suffering

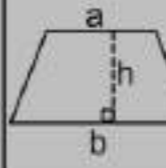
Section 7	
Four Noble Truths	Buddha's four key beliefs about life and how suffering is part of it.
1 st truth (Dukkha)	Suffering exists
2 nd truth (Samudaya)	Suffering comes from attachments, cravings and desires
3 rd truth (Nirodha)	Removing attachments, cravings and desires removes suffering
4 th truth (Magga)	The eightfold path will lead to enlightenment and away from suffering

Unit 9: 2D Geometry

CONSTRUCTING TRIANGLES		
there are three ways to be able to construct a triangle		
side, angle, side	use a ruler and protractor, draw one side, then measure the angle and mark it, measure second side and join them	
angle, side, angle	use a ruler and protractor, draw one side, then measure both angles from each end and mark them, draw lines through the marks until they meet	
side, side, side	use a ruler and compass, draw one side, open compass to length of the second side and draw an arc, open compass to length of third side and draw an arc, join where they meet	


CONSTRUCTIONS		
construct	to build or make an accurate drawing using a ruler and protractor or compass	
angle bisector	cut an angle exactly in half	
perpendicular bisector of a line segment	cut a line exactly in half, making a right angle	

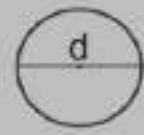

CONSTRUCTIONS VOCABULARY	
point	a defined location in space
line segment	a part of a line (mathematical language for 'line')
parallel lines	lines with the same gradient they never meet they are always the same distance apart
perpendicular lines	lines are perpendicular when they meet or intersect at a right angle (90°)
bisect	cut exactly in half

AREA		
area of a trapezium	$A = \frac{1}{2}(a + b)h$ area = half the sum of the parallel sides, multiplied by the distance between them	

ANGLES IN PARALLEL LINES	
alternate angles	are equal a pair of angles on opposite sides of the transversal, inside the parallel lines
corresponding angles	are equal a pair of angles on the same side of the transversal in the same position of the intersection
co-interior angles	add to 180° a pair of angles on the same side of the transversal, inside the parallel lines

UNITS		
unit	a standard amount used to measure something	
metric units	an international system of units based on 10s, 100s and 1000s	
metric length/area conversions	1cm = 10mm 1m = 100cm 1km = 1000m	1cm ² = 100mm ² 1m ² = 100,00cm ² 1km ² = 1,000,000m ²
metric capacity conversions	1 litre = 1000ml	
metric mass conversions	1kg = 1000g 1 tonne = 1000kg	

COMPOUND SHAPES		
compound shape	a shape made up of a combination of other known shapes put together	
area of a compound shape	split it up into known shapes calculate the area of each shape add together	
perimeter of a compound shape	find all the lengths around the outside of the shape and add them up	

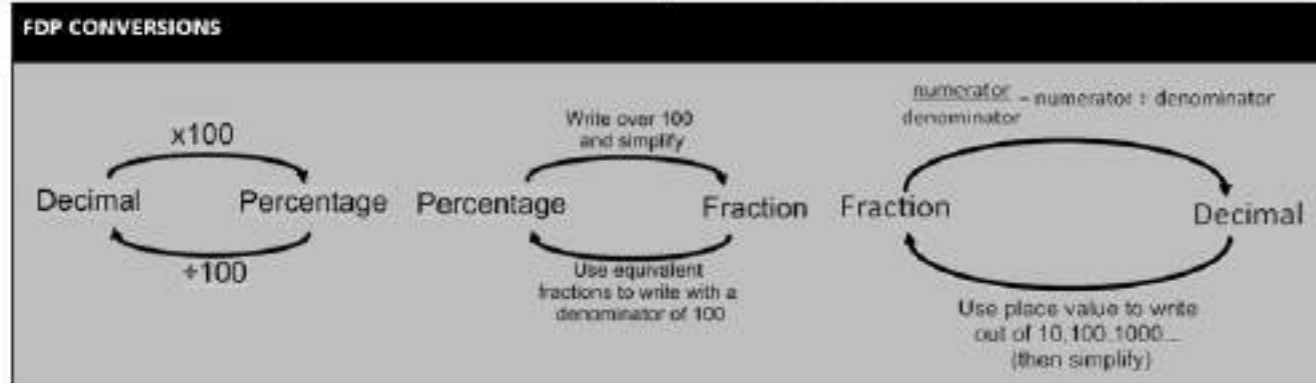
CIRCLE CALCULATIONS		
circumference of a circle	circumference = pi x diameter $C = \pi d$ OR $C = 2\pi r$	
circle area	area = pi x radius ² $A = \pi r^2$	
Semi-circle area and perimeter	area = $\frac{\pi \times \text{radius}^2}{2}$ perimeter = $\frac{\pi \times \text{diameter}}{2} + \text{diameter}$	


Unit 10 Proportional Reasoning



PERCENTAGE CALCULATIONS	
multiplier	a percentage written as a decimal you can then use multiplication to find the percentage
percentage increase	adding a percentage to the original amount, multiplier method: use 1. ___ and multiply by original
percentage decrease	subtracting a percentage from the original amount, multiplier method: do 100 - % to give 0. ___ and multiply by original
percentage change	the change between the old value and the new value as a percentage, put change in amount over original amount and multiply by 100 to give a percentage change
reverse percentage	working backwards to find 100% use the box method
simple interest	the same amount is added each year, find the percentage, x by years and add on
compound interest	exponential growth, accumulated interest paid on the original amount, each year a larger amount of interest is paid. final total = principal x multiplier ⁿ principal = original / starting amount multiplier = % increase / decrease n = number of time periods (per annum = per year)

COMMON PERCENTAGES	
percentage	parts per 100, symbol %
find 10%	divide by 10 (because 100% ÷ 10 = 10%)
find 1%	divide by 100 (because 100% ÷ 100 = 1%)
find 50%	divide by 2 (because 100% ÷ 2 = 50%)
find 25%	divide by 4 (because 100% ÷ 4 = 25%)
find 75%	add together 50% and 25%

STANDARD UNITS: TIME	
time	how to quantify the passing of events
time conversions	1 minute = 60 seconds 1 hour = 60 minutes
hours to minutes	half an hour = 0.5 hours = 30mins quarter of an hour = 0.25 hours = 15mins



RATIO	
ratio	compares the size of one part to another part
ratio notation	the ratio of A to B is written as A:B
part (share)	a proportion of the original amount
whole	the total amount
proportion	proportion compares the size of one part to the size of the whole
sharing ratios	use a bar model to represent the number of parts, find the value of one part by division, multiply up to find the value of each side of the ratio
given a part, find the whole	use a bar model to represent the number of parts, find the value of one part from one side of the ratio by division, multiply up to find the total value of all parts
bar model example	sharing £20 in a ratio 3:2 

COMPOUND UNITS	
compound units	a measure made up of two other units e.g. miles per hour includes miles and hours
speed	how fast something is moving, the amount of time taken to travel a distance
distance	a measurement of how far from one point to another
time	how to quantify the passing of events
speed formula	$\text{speed} = \text{distance} \div \text{time}$ $\text{distance} = \text{speed} \times \text{time}$ $\text{time} = \text{distance} \div \text{speed}$ 
density	how tightly matter is packed together
mass	the amount of matter in an object
volume	the amount of space an object takes up
density formula	$\text{density} = \text{mass} \div \text{volume}$ $\text{mass} = \text{density} \times \text{volume}$ $\text{volume} = \text{mass} \div \text{density}$ 

Section 7	
Kingdom of God	God's paradise which the Messiah is believed to restore the world to; Christians believe this means going to heaven in the afterlife.
Salvation	The idea of being saved from punishment; Christians believe God became flesh, died and resurrected to guide humanity on how and why to live a good life.

Section 8	
"I am what I am."	An extract from Exodus in the Old Testament; God the Father tells Moses who He is so that Moses understands who is instructing him.
"I am the way, the truth and the life."	An extract from John's gospel; Jesus says this to reassure the disciples on how to live a good life when he has gone.
"I am the resurrection and the life."	An extract from John's gospel; Jesus reassures a woman that those who truly believe in him will be resurrected and gain eternal life.

Section 9	
"He heals all your diseases."	An extract from Psalms in the Old Testament; this represents the Christian belief in God as an omniscient, omnibenevolent and omnipotent Being.
"A virgin shall conceive."	An extract from Isaiah in the Old Testament; this is one of the prophecies about the Messiah to come, which Matthew's gospel confirms is how Jesus was born.

Section 10	
Original sin	A Roman Catholic Church teaching that all of mankind inherits the sin of the Fall.
Baptism	A holy ritual (known as a sacrament by the Roman Catholic Church and Orthodox Church) where a person is cleansed with water to begin their life as a Christian.
Eucharist	A sacrament where bread and wine are believed to become the body and blood of Jesus; it echoes when Jesus had shared bread and wine with his disciples.

Buddhism

Section 11	
Buddha	Meaning 'the awakened one'; Siddhartha Gautama was called this after having achieved enlightenment (total clarity of mind and ability to see the truth of life).
Shaykamuni	Meaning 'wise man of the Shakya clan', this represents Gautama's princely status

Section 12	
Enlightenment	A state of mind where it is clear, free of distraction and able to see truth of life.
Meditation	The act of stilling mind and body to calm both and reach a higher spiritual state.

Section 13	
Puja	Meaning 'worship'; this term is used in Buddhism and in Hinduism too.
Mantra	A word, phrase or syllable repeated over and over to reach a higher spiritual state.
Shrine	A space for worship and devotion; Buddhists place a statue of Buddha at its centre to remind them that Buddha represents the Middle Way and the goal of enlightenment.

✝ Christianity

Section 1	
Abrahamic faiths	The faiths of Judaism, Christianity and Islam which all can trace their origin to prophet Abraham (or Ibrahim in Islam).
Creation	The event where the universe was created; the Bible's first book called Genesis outlines an account of creation.
The Fall	The story of Adam and Eve, God's first created humans, as told in Genesis; both were given free will yet chose to sin, leading mankind to separate from God.

Section 2	
Incarnation	The belief that Jesus was the human form of God.
Gospel	Meaning 'good news'; there are four gospels in the New Testament outlining the life of Jesus.
Salvation	The idea of being saved from punishment in the afterlife; Jesus is considered to be the role-model and guide for this in the lives of Christians.

Section 3	
Omnipotent	Meaning 'all-powerful', this is one part of God's nature according to theists.
Omniscient	Meaning 'all-knowing', this is one part of God's nature according to theists.
Omnibenevolent	Meaning 'all-loving', this is one part of God's nature according to theists.

Section 4	
Old Testament	The first 39 books of the Bible written by many prophets (messengers of God) before the time of Jesus; the Tanakh (Jewish holy scripture) contains them too.
New Testament	The latter 27 books of the Bible containing the gospels and the writings of other Christian scholars (e.g. St. Paul) that lived soon after Jesus' lifetime.
Messiah	Meaning 'saviour' or 'anointed one'; prophecies from the Old Testament gave signs of when the People of God would know the Messiah had come to Earth.

Section 5	
Trinity	Key Christian belief that God is One, yet exists as three Persons (or 'forms').
The Father	One Person of the Trinity; the Creator of the heavens and the earth.
The Son	One Person of the Trinity; the incarnation of God that died for humanity's sake.
The Holy Spirit	One Person of the Trinity; the unseen and ever-present essence of God.

Section 6	
Crucifixion	The mode of punishment popular with the Roman Empire; Jesus died by being nailed to a cross, so now the cross symbolises God's unconditional love for us.
Resurrection	The rising from death; Jesus is believed to have risen from the dead three days after his crucifixion and appeared to his followers (disciples) for forty days.

1.4 - Respiratory System	
Trachea	Windpipe that carries air into the lungs. Splits into two tubes called the bronchi , then smaller tubes called bronchioles .
Alveoli	Small air sacs where gas exchange occurs. Oxygen diffuses into the blood. Carbon dioxide diffuses into the alveoli.
Adaptations of Alveoli for Gas Exchange	Many small alveoli -> give a large surface area . Moist -> allows gases to dissolve . Thin walls -> gases do not have far to travel . Good blood supply -> maintains steep concentration gradient . Sheet of muscle under the ribcage.
Diaphragm	Diaphragm contracts and moves down . Ribs move up and out . Lung volume increases , pressure decreases , air goes in.
Breathing In	Diaphragm relaxes and moves up . Ribs move in and down . Lung volume decreases , pressure increases , air goes out.
Breathing Out	
1.5 - Circulatory System	
Heart	Pumps blood around the body.
Double Circulatory System	One loop pumps blood from the heart to the lungs to be oxygenated . Other loop pumps blood from the heart to the body cells where oxygen is used in respiration .
Blood Vessels	Arteries Carry blood away from the heart. Veins Carry blood towards the heart. Capillaries Connect arteries and veins . Allow substances to be exchanged between the blood and tissues . E.g. oxygen and glucose.
Parts of the Blood	Red blood cells Carry oxygen . White blood cells Fight infections . Kill micro-organisms . Platelets Allow blood to clot and form scabs . Plasma Liquid part of the blood.

1.1 - Skeletal and Muscular Systems	
Skeletal System	Allows movement , holds us upright and protects organs .
Muscular System	Muscles contract and pull on bones to allow movement .
Joint	Where two bones join together . The ends of the bones are covered in cartilage , and synovial fluid lubricates the joint.
Ligament	Elastic tissue that joins two bones together.
Tendon	Inelastic tissue that joins a muscle to a bone .
Antagonistic Muscles	Muscles that work in pairs . When one contracts (shortens), the other relaxes (lengthens).
1.2 - Food Groups	
Carbohydrate	Main source of energy .
Lipids (fats and oils)	Act as a store of energy . Body fat keeps us warm .
Proteins	For growth and repair .
Vitamins & Minerals	Needed in small amounts to maintain health . E.g. calcium for strong bones and teeth , iron for red blood cells .
Water	Needed for chemical reactions in cells and body fluids .
Fibre	Helps food move through the gut . Prevents constipation .
1.3 - Digestive System	
Enzymes	Chemicals that break down food into smaller soluble molecules so that they can be absorbed into the blood .
Mouth	Teeth chew food and mix it with saliva . Saliva contains enzymes that digest carbohydrates .
Oesophagus	Connects the mouth to the stomach .
Stomach	Food is churned in hydrochloric acid which kills bacteria . Enzymes digest proteins .
Small Intestine	Enzymes digest carbohydrates, lipid and proteins . Food is absorbed into the blood .
Large Intestine	Water is absorbed into the blood .
Rectum	Undigested food is compacted and stored as faeces then leaves the body through the anus .

Y8 Science Cycle 1 - Sheet 1

The Body

2.1 - Properties and Uses of Metals	
Copper	Used for electrical wiring -> good conductor of electricity and ductile.
Gold	Used to make jewellery -> shiny and resistant to corrosion.
Steel	Used for buildings, bridges and cars -> very strong. Steel is an alloy of iron.
Aluminium	Used for aeroplanes and overhead cables -> has a low density so it is lightweight.
Titanium	Used for hip replacements -> resistant to corrosion, strong and low density.
2.2 - Reactivity Series (Practice writing metals in order of reactivity)	
Most reactive	Potassium Sodium Calcium Magnesium Aluminium Carbon Zinc Iron Tin Lead Hydrogen Copper Silver Gold Platinum Least reactive

2.3 - Reactions of Metals	
Metal + Acid	metal + acid -> salt + hydrogen Metal will react if it is more reactive than hydrogen. Test for hydrogen gas using a lit splint. Listen for squeaky pop.
Metal + Oxygen	metal + oxygen -> metal oxide Oxidation reaction as metal gains oxygen. metal + water -> metal hydroxide + hydrogen
Metal + Water	Only very reactive metals e.g. group 1 alkali metals. Metal hydroxide produces alkaline solution. Turns universal indicator purple.
Displacement Reaction	A more reactive metal displaces a less reactive metal from its compound.
Rusting	Occurs when iron or steel reacts with both oxygen and water.
2.4 - Extraction and Recycling of Metals	
Ore	A rock that you can extract a metal from.
Extraction using Carbon	Use if the metal is less reactive than carbon. Heat metal oxide with carbon. Carbon displaces metal from its oxide. e.g. carbon + iron oxide -> iron + carbon dioxide.
Extraction using Electrolysis	Use if the metal is more reactive than carbon. Split up metal oxide using an electrical current. e.g. aluminium oxide -> aluminium + oxygen
Advantages of Recycling	Less waste sent to landfill. Less energy used as less mining and extraction required. Conserves ores which are limited resources.

Y8 Science Cycle 1 - Sheet 3 Metals

YEAR 8 GEOGRAPHY – CYCLE 3 – FIELDWORK

BOX 1: THE STAGES OF A FIELDWORK INVESTIGATION	
geographical fieldwork	collecting data to answer key questions (an enquiry/investigation)
1. write question	choose a key question to investigate (to prove or disprove)
2. hypothesis	predict the conclusion of your investigation
3. risk assessment	list the dangers of the fieldwork and how these will be reduced
4. data collection	methodology -> collect information to answer your key question
5. data presentation	present data using maps and graphs -> make it easy to understand
6. analysis	discuss the trends in the data -> suggest reasons for the data
7. conclusion	What did you find out? What is the answer to the key question?
8. evaluation	<ul style="list-style-type: none"> What were the limitations of your investigation (problems)? How could your enquiry be improved? How accurate is the data? -> Are there errors? How reliable is the data? -> Can the results be reproduced? Validity? -> Are the conclusions reliable and representative?
BOX 2: TYPES OF DATA	
human	information about people e.g. cities and tourism
physical	information about natural landscapes e.g. rivers and coasts
primary	information -> collected first-hand e.g. tallies and photographs
secondary	information -> someone else collected -> available to others
quantitative	collecting numerical data
qualitative	collecting written or visual data e.g. photographs and interviews
continuous	data that is measured -> can be any value
discrete	data that is counted -> can only be certain values
BOX 3: TYPES OF SAMPLING	
sampling	collecting a small selection of data
sampling size	<ul style="list-style-type: none"> e.g. interviewing 10 people rather than everyone in the town the amount of data collected, more data -> preferable
1. random	selecting a person to interview or site to measure, at random
2. systematic	<ul style="list-style-type: none"> unbiased -> particular people/places not specifically chosen collecting data in an ordered and regular way
3. stratified	<ul style="list-style-type: none"> e.g. every five metres or every fifth person splitting data collection into groups e.g. interviewing five people from each age range
BOX 4: GEOGRAPHICAL FIELDWORK EQUIPMENT	
anemometer	used to measure wind speed
pH meter	used to measure acidity or alkalinity
callipers	used to measure the dimensions of small objects such as stones
clinometer	used to measure the angle of a slope

light meter	used to measure the amount of light or cloud cover
compass	used to find out a direction
flow meter	used to measure the velocity of moving water
quadrat	used to measure species abundance in a set space
sweep net	used to collect invertebrates
rain gauge	used to measure precipitation levels
trundle wheel	used to measure distance
thermometer	used to measure temperature
decibel counter	used to measure noise levels
BOX 5: DATA COLLECTION TECHNIQUES	
field sketches	field sketches -> qualitative data -> help us to remember the places that have been visited -> 3 steps -> <ol style="list-style-type: none"> write a title that will help to locate the sketch, e.g. 'Site One' draw an outline of the main features of the landscape annotate the field sketch to give more information
Environmental Quality Assessments	used to rate the environment of a place -> different categories -> e.g. pollution, noise, graffiti, amount of green space -> uses a scale from 1 to 5 -> to rank from less good to good <ul style="list-style-type: none"> based on personal judgements -> so data is subjective
questionnaires	asking people questions linked to your investigation -> two types of questions -> open and closed -> <ul style="list-style-type: none"> open questions -> asking the person to give their opinion using their own words closed questions -> asking the person to select their opinion from a list of multiple choice answers
BOX 6: DATA PRESENTATION TECHNIQUES	
line graphs	show how data changes over time or space
divided bar charts	show grouped data as bars -> divided bar charts split up each bar to break the information down further
histograms	similar to bar charts -> but show frequencies
pie charts	show percentages as a circle divided into segments
scatter graphs	show relationships between two sets of data
proportional symbols	symbols added to maps -> show extra data -> the bigger the symbol the bigger the number
pictograms	similar to bar charts -> but they use small pictures or icons to show data instead of bars

BOX 1: UK PHYSICAL LANDSCAPE

landscape	an area of land with distinct features e.g. glaciated landscape
landform	a natural feature e.g. a corrie
altitude	the height above sea level
relief	height difference between highest and lowest point on a landscape
upland	areas of land at higher elevation e.g. mountains
lowland	areas of land at a lower elevation e.g. the mouth of a river
longest river UK	UK → River Severn → Wales and England → 354 km long
highest mountain UK	UK → Ben Nevis → Scotland → 1345 m

BOX 2: GEOLOGICAL TIMESCALE

age of Earth	4600 million years old
bacteria	bacteria begin to produce oxygen → 3600 million years ago
dinosaurs appear	first dinosaurs appear → 240 million years ago
mammals appear	first mammals appear → 200 million years ago
humans appear	first humans appear → Homo sapiens → 300,000 years ago
Carboniferous	period of time → 359.2 to 299 million years ago
Jurassic	period of time → 199.6 to 145.5 million years ago
Quaternary	period of time → 2.6 million years ago to the present day

BOX 3: THE ROCK CYCLE

geology	the geology of an area → e.g. the types of rocks found in an area
igneous rocks	formed from cooled magma e.g. basalt
sedimentary rocks	from compressed fossils and rocks at bottom of ocean e.g. limestone
metamorphic rocks	rocks changed into harder rocks by heat and pressure e.g. marble
weathering	breaking down of rocks in situ (in their original place)
erosion	wearing away of pieces of rock and soil
transportation	moving material from one place to another
deposition	when material is dropped or left behind (e.g. pieces of rock)

BOX 4: GLACIATION KEYWORDS

glacier	a slow moving mass of ice (made from compressed snow)
ice sheet	a large glacier covering large areas of land e.g. the size of a country
glaciologist	scientist → e.g. studies effects of climate change on melting glaciers
glacial	period of time → cooler → last ice age ended 11,700 years ago
interglacial	period of time → warmer → we are currently in a interglacial period
accumulation	more freezing than melting → glacier grows
ablation	more melting than freezing → glacier shrinks
crevasses	huge cracks in a glacier (can be 40 meters deep)

BOX 5: DISTRIBUTION OF GLACIERS

glaciers → ice age	distribution → 20,000 years ago → glaciers covered most of the UK
glaciers → today	distribution → high latitudes and high altitudes e.g. poles and mountains
glaciated landscapes	no longer covered by glaciers anymore → but these areas were once carved/shaped by glaciers during the last ice age → e.g. Lake District

BOX 6: PROCESSES

erosion	-abrasion → rocks scrape like sand paper → makes other rocks smooth -plucking → glacier freezes around rocks → pulls them out of ground
weathering	-freeze-thaw weathering → ice expands in rock cracks, breaks up
transportation	-bulldozing → glacier pushes moraine (rocks) as glacier moves
deposition	-moraine → glacier melts → leaves piles of rocks that were eroded -erratics → large boulders → dropped by melting ice → look out of place

BOX 7: HOW DOES A CORRIE FORM?

glacial landform → a corrie	a corrie → large armchair shaped hollow on mountain side → snow collects in a sheltered hollow on the side of a mountain 1. snow is compacted → air squeezed out → becomes glacier 2. back wall of corrie → gets steeper (by freeze-thaw and plucking) 3. base (bottom) of the corrie → gets deeper (by abrasion) 4. glacier → slides downhill → circular movement → 'rotational slip' 5. less erosion at front of glacier → corrie lip formed 6. after ice age → glacier melts → rain fills corrie → tarn lake forms 7. two corries erode both sides of mountain → creates a sharp edge three corries erode around mountain → creates sharp mountain peak
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BOX 8: ECONOMIC USES OF GLACIATED LANDSCAPES → OPPORTUNITIES ☺

farming	sheep farming on upper slopes → dairy farming on lower slopes
tourism	Lake District → 18 million visitors a year → spend money while on holiday → boosts local economy by £1.46 billion → tourism creates 18,000 jobs

BOX 9: LAND USE CONFLICTS IN GLACIATED LANDSCAPES → CHALLENGES ☹

conflicts and challenges ☹	<ul style="list-style-type: none"> modern farm buildings → ruin beautiful landscape tourism → damage wildlife e.g. littering, trampling vegetation lots of employment only 'seasonal' e.g. not paid all year round wealthy people from elsewhere buy 'holiday homes' → increases house prices → locals struggle to afford to buy a home erosion of footpaths, traffic congestion and noise pollution
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BOX 10: SUSTAINABLE MANAGEMENT + CONSERVATION OF GLACIATED LANDSCAPES ☺

sustainable management and conservation ☺	<ul style="list-style-type: none"> 'Drive Less See More' → campaign to reduce traffic congestion 'Fix the Fells' → project to reduce footpath erosion 10 mph speed limit on Lake Windermere (slows watersports) → safer → reduces noise pollution → protects wildlife
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- Mass and Weight

Mass	Measure of the amount of material something is made up of. Mass is the same on all planets.
Measuring Mass	Use a mass balance.
Units for Mass	Kilograms (kg)
Weight	Measure of the force on something due to gravity. Changes depending on which planet you are on.
Measuring Weight	Use a Newton meter.
Units for Weight	Newtons (N)
Weight	Weight = mass x gravitational field strength (W = m x g)
Gravitational Field Strength	Strength of gravity on a planet. On Earth, g = 10 N/kg.



- Stretching Springs

Formation	Changing the shape of an object – stretching, compressing or bending. Requires at least two forces.
Elastic Formation	The object returns to its original size and shape once the forces are removed.
Plastic Formation	The object does not return to its original size and shape once the forces are removed.
Hooke's Law	The extension of a stretched spring is directly proportional to the force applied to it, up to the limit of proportionality.
Directly proportional	Shown on a graph by the line of best fit being a straight line through the origin. If one variable doubles, the other doubles.
Force – extension graphs	Plot force on the y axis, extension on the x axis. The steeper the line, the stiffer the spring.
Equation	Force = spring constant x extension (F = k x e)

3.3 - Speed, Distance and Time

Equation	speed = distance / time (s = d/t)
Units	speed = m/s distance = m time = s
Typical speed values	Walking = 1.5 m/s, Running = 3 m/s, Cycling = 6 m/s, Car = 25 m/s, Sound (in air) = 330 m/s
Converting Distances	1 m = 100 cm, 1 km = 1000 m
Converting Times	1 minute = 60 s, 1 hour = 60 minutes
Distance – Time Graphs	Straight diagonal line = constant speed Steeper line = faster speed Flat horizontal line = stationary

3.4 - Terminal Velocity for a Sky Diver (Don't draw diagrams)

Stage 1	 Weight is much greater than air resistance. Resultant force acting down. Sky diver accelerates as he falls.
Stage 2	 As sky diver accelerates, air resistance increases. Resultant force is less but still acts down. Sky diver still accelerates but at a slower rate.
Stage 3	 Air resistance is now equal to the weight. Forces are balanced – no resultant force. Sky diver falls at a constant speed known as terminal velocity.
Stage 4	 Air resistance now greater than weight as parachute provides a larger surface area. Resultant force now acts up. Sky diver is still falling but decelerates.
Stage 5	 As sky diver decelerates, air resistance decreases. Forces are balanced again – no resultant force. Sky diver fall at a new slower terminal velocity.

3.1 - Photosynthesis

Photosynthesis	A chemical reaction in which plants use energy to change carbon dioxide and water into glucose and oxygen . It occurs in chloroplasts .
Chlorophyll	Green pigment in chloroplasts. Absorbs light energy required for photosynthesis.
Uses of Glucose	For respiration to release energy . Stored as starch for using later. Making other substances e.g. cellulose , lipids and proteins .
Word Equation	carbon dioxide + water $\xrightarrow{\text{light energy}}$ glucose + oxygen
Symbol Equation	$6 \text{CO}_2 + 6 \text{H}_2\text{O} \xrightarrow{\text{light energy}} \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}_2$
Limiting Factors	A factor that affects the rate of photosynthesis e.g. light intensity , carbon dioxide concentration and temperature .
Investigating Rate	Use pondweed . Count number of bubbles of oxygen produced in given time. More bubbles = faster rate .

3.2 - Testing Leaves for Starch

Starch	Some glucose produced by photosynthesis is stored as starch for later use.
Iodine Solution	Red-brown liquid which turns blue-black in the presence of starch .
Testing Leaves	Heat in boiling water to soften . Heat in boiling ethanol to remove colour from leaves. Wash leaves. Add iodine solution with pipette.
Safety Precautions	Ethanol is highly flammable . Keep away from Bunsen flame.
Variegated Leaves	Green parts – have starch – photosynthesis occurring. Yellow parts – no starch – photosynthesis not occurring.

3.3 – Structure of Leaves

Palisade Tissue	Where most photosynthesis occurs. Palisade cells are tightly packed and contain many chloroplasts .
Spongy Tissue	Cells are loosely packed and there are air spaces which allow carbon dioxide to diffuse throughout the leaf.
Stomata	Little holes in the underside of leaves. Allows carbon dioxide to diffuse into leaf.
Guard Cells	Control opening and closing of the stomata to control water loss .
Xylem Vessels	Transport water and minerals from roots to leaves.
Phloem Vessels	Transport sugars around the plant.

3.4 – Healthy Plant Growth

Root Hair Cells	Absorb water and minerals from the soil. Have root hairs to increase surface area to increase rate of absorption.
Water	Needed for photosynthesis , keeping plant upright and rigid and cooling the plant when water evaporates .
Minerals	Nitrates , magnesium , phosphates and potassium .
Fertilisers	Chemicals containing minerals added to the soil.
Eutrophication	Fertilisers are washed into lakes. Algae grows and blocks sunlight . Other plants die and are broken down by bacteria . Bacteria reduce oxygen levels and other organisms die.
Pesticides	Toxic chemicals sprayed on crops to kill pests e.g. insects and weeds .
Bioaccumulation	Build-up of toxic chemicals as they are passed up a food chain as they cannot be broken down or excreted .

Y8 Science Cycle 2 - Sheet 3

Plants & Photosynthesis

Section 7: What was the Industrial Revolution?		Section 8: Industrial Revolution – changes to work	
c.1750-c.1900	The period of time known in Britain as the industrial revolution	Navy	Nickname for men who worked on the railroads. Pay was high but it was risky and involved long periods away from home
Urbanisation	The population of towns and cities went from 25% of the population in 1700 to 90% by 1890	Domestic system	The system where most people worked at home, making things to sell. This changed to the factory system after 1750.
Laissez-faire	A policy of letting businesses get on with things without the government interfering with laws or guidance	Mill worker	People who worked in the many cotton mills in Britain.
Industrial revolution	The time when there were major changes in how goods were made 1750 – 1900. Goods were now made in factories using steam-powered machines, rather than in homes.	Working class	All the people in society who have to do low-paid work in order to survive. Usually have low or no education.
Capitalism	An economic and political system in which a country's trade and industry are controlled by private owners for profit.	Miner	A person who worked underground in coal mines. Extremely dangerous low-paid work
Section 9: Children and living conditions		Section 10: Abolitionists	
Child labour	A system where children are used for low or no pay work. Usually instead of education.	Abolition	Bringing something to an end by law. In this case, the abolition of slavery made enslaving people a crime.
Apprentice	A child who was taken from his parents or a workhouse to live in a factory where they worked for food and a bed.	Abolitionist	A person who fought to end slavery
Slums	Housing with overcrowding and terrible living conditions. They sprung up in industrial towns and cities.	Sons of Africa	A group of abolitionists who had been enslaved who toured Europe telling the truth about the horrors of slavery
Cholera	A disease which spread around towns and cities because the water was not clean	Sugar Boycott	Refusing to buy sugar until slavery was ended, organised by women abolitionists like Elizabeth Heyrick
Factory Act	Law passed to change the working conditions of people in factories and mills.	Resistance	All the ways enslaved people refused to accept slavery such as working slow, rebellions, escaping.
Section 11: Abolition of slavery		Section 12: Plantations after Abolition	
1807 Slave Trade Act	The law in Britain which made it illegal to buy and sell people in Britain and its colonies.	Apprenticeship	A system introduced to keep labourers on plantations after slavery was abolished
1833 Abolition of Slavery Act	The law in Britain which made it illegal to own enslaved people in Britain and most British colonies.	Indentured labourers from India	Around 50,000 Indian people were taken to the West Indies to work out 5-year contracts on low or no pay which they couldn't leave
The Maroon Wars 1728-39	Wars between British soldiers and enslaved people who had escaped from plantations and set up their own settlements	Lunatic Express	Nickname given to the railway in Kenya which was built by Indian indentured labourers. Many people died from the dangerous work, illness or lion attacks
The Haitian Revolution	Revolution led by Toussaint L'Ouverture which led to enslaved people being freed and Haiti becoming a free nation	Section 13: Legacies of slavery	
Reparations	The money paid to the owners of enslaved people as compensation for their loss of 'property'. The last reparation payment was paid by the British government in 2015		
Cottonopolis	The name given to Manchester in the 1800s when almost 80% of the cotton processed there was grown by enslaved people in the USA		
Civil War	The war between the northern and southern states in the USA. The north won therefore slavery was abolished in the USA		

Year 8 History Cycle 1 Powerful Knowledge 100% sheet

Section 1: Time		Section 2: Medieval Sugar	
Medieval Period	Period after the Romans left from c. 450CE- c.1500CE	Sugar cane	The plant which sugar comes from, originally from Northern India
Early Modern Period	Period from c.1500- c. 1750, also referred to as Tudor and Stuart periods	Islam	Use of sugar spread around the Islamic world in the 7 th and 8 th centuries
Industrial Period	Period of rapid urbanisation when people moved to cities from c. 1750- c.1900	Irrigation	A system of spreading water on crops which led to the growing of sugar in North Africa and Spain
Modern Period	Period which includes both World War I and World War II from c. 1900 – Present	Sotiltee	Elaborate statue made from sugar used as a display of wealth in later medieval England
Section 3: Early Modern Sugar		Section 4: Industrial Sugar	
Plantations	Huge farms for growing crops like sugar and cotton on islands occupied by Portuguese explorers	Slave labour	Work done by people who have been enslaved
West Indies	Islands near America which were colonised by European explorers to grow sugar	Chattel slavery	A system of slavery where a person is believed to be owned by another human being. Their children, grandchildren and so on are also 'owned' from birth.
Indigenous people	The people who lived in the West Indies and America before Europeans colonised these places, killing 90% of them.	Cowrie Shells	Shells which were used as currency (a bit like coins)
Colonise	Moving onto land with the aim of taking it over	Middle Passage	Journey across the Atlantic Ocean which enslaved people were forced to live through for months before being sold onto plantations
Section 5: Sugar plantations		Section 6: Problems with sugar	
Whipping	Used as a punishment for slow work on plantations	Historical narrative	The way a historian tells the story of what happened. What they choose to include or leave out is based on what they judge to be significant.
Runaways	Name given to enslaved people who escaped plantations. They could be maimed or hanged for this crime.	Sugar refineries	Factories where sugar was turned into products like sugar cubes
Indentured labour	Indian workers who signed a contract to work on plantations for 5 years after slavery was abolished. They were often unpaid.	Sugar boom	Huge growth in the processing sugar in Britain in the 19 th and 20 th centuries in factories like Cadburys and Rowntrees
Sugar beet	A plant which could be used to make sugar and could be grown in Europe	Obesity crisis	A third of the world's population is thought to be obese (overweight) which has been linked to the popularity of sugar
Olaudah Equiano	Enslaved man who escaped from slavery and wrote about his experiences to persuade people to support abolition of slavery		

2.1 – Chemical Equations	
Reactants	Substances which react together. Found on left side of equation.
Products	Substances produced in a reaction. Found on right side of equation.
Word Equation	Uses names of substances. e.g. iron + oxygen → iron oxide
Symbol Equation	Uses chemical formulas of substances. e.g. $4\text{Fe} + 3\text{O}_2 \rightarrow 2\text{Fe}_2\text{O}_3$
Balancing Symbol Equations	Must be the same number of atoms of each element on each side of the equation. Balance equations by putting large numbers in front of formulas.
Conservation of Mass	Mass is conserved (stays the same) in a reaction. No atoms are lost or made. Total mass of reactants = total mass of products.
2.2 – Measuring Rate of Reaction	
Rate of Reaction	How quickly a reaction happens. Measure how quickly the reactants are used up or the products are formed.
Gas Syringe Method	Use if a gas is produced. Add reactants to a conical flask. Connect rubber bung and gas syringe. Start stopwatch. Measure volume of gas produced at regular time intervals.
Mass Loss Method	Use if a gas is produced. Add reactants to a conical flask on a mass balance. Start stopwatch. Measure loss of mass at regular time intervals.
Disappearing Cross Method	Use if a solid precipitate is produced which turns mixture from transparent to opaque. Add reactants to a conical flask on paper with a black cross. Start stopwatch. Time how long it takes for cross to disappear.

2.3 – Factors Affecting Rate of Reaction	
Collision Theory	For two particles to react, they must collide and must have sufficient energy to make the collision successful. More frequent collisions = faster rate of reaction.
Temperature	Higher temperature = faster rate of reaction. Particles have more energy so move faster and collide more frequently.
Concentration	Higher concentration = faster rate of reaction. More particles in the same volume so more frequent collisions.
Surface Area	Smaller pieces of solid = larger surface area = faster rate of reaction. More solid particles are exposed so more frequent collisions.
Catalysts	A substance which increases the rate of a reaction but does not get used up in the reaction.
2.4 – Exothermic and Endothermic Reactions	
Exothermic Reactions	Transfers energy to the surroundings. Causes an increase in temperature. Examples – combustion, respiration and neutralisation.
Endothermic Reactions	Takes in energy from the surroundings. Causes a decrease in temperature. Examples – thermal decomposition, photosynthesis and ice packs.
Investigating Reactions	Add reactants to an insulated container to reduce heat loss to the surroundings. Use a thermometer to measure temperature at the start and end of the reaction. Temperature increase = exothermic Temperature decrease = endothermic

Y8 Science Cycle 2 - Sheet 2 Chemical Reactions

1.1 – Circuit Components	
Cell	Energy source for the circuit. Store of chemical energy.
Battery	Two or more cells connected together.
Bulb	Current heats the filament so it gives out light.
Switch	Allows circuit to be switched on (closed) and off (open).
Resistor	Reduces the flow of current by increasing resistance in circuit.
Ammeter	Measures current in a circuit. Connect in series with components.
Voltmeter	Measures potential difference of a component. Connect in parallel around the component.
1.2 – Electrical Circuits	
How do circuits work?	There must be an energy source and a complete circuit for current to flow. Electrons move through wires and transfer energy.
Series circuits	Have one loop. If one component breaks, others switch off. Adding more bulbs makes them dimmer.
Parallel circuits	Have more than one loop. If one component breaks, components in other loops stay on. Adding more bulbs in other loops has no effect on brightness.
Current	Rate of flow of charge. Measured in amps (A).
Potential difference (P.D.)	The energy transferred per unit charge. Measured in volts (V).
Resistance	A measure of how hard it is for current to pass through a component. Measured in ohms (Ω).
Equation	Potential Difference = Current x Resistance. $V = I \times R$.

1.3 – Magnets	
Bar magnet	A permanent magnet with a north pole and a south pole. Like poles repel. Unlike poles attract.
Magnetic field around a bar magnet	Field lines go from north to south. Field is strongest at the poles. Field gets weaker further away from the magnet.
Investigating a magnetic field	Use iron filings or a plotting compass.
Magnetic materials	Iron, nickel, cobalt and steel (an alloy of iron).
Temporary magnets	Magnetic materials behave like magnets when placed in a magnetic field. Iron is soft and loses magnetism easily after. Steel is hard and keeps magnetism longer.
Compass	Contains a tiny bar magnet. Points towards Earth's north pole.
Earth's magnetic field	Created by moving iron in the Earth's core.
1.4 – Electromagnets	
Solenoid	A long coil of wire.
Electromagnet	Created by passing a current through a solenoid. Behaves like a bar magnet but you can switch it on and off.
How to increase the strength of an electromagnet	Increase the current. Increase the number of coils. Use a soft iron core.
Uses of electromagnets	Sorting metals for recycling, moving objects in scrapyards, electric motors, levitating trains, relay circuits.

Y8 Science Cycle 2 - Sheet 1 Electricity & Magnetism

¿Qué haces en tu tiempo libre? (What do you do in your free time?) [What you do in your time free?] ¿Qué hiciste la semana pasada? (What did you do last week?) [What you did the week past?] ¿Qué vas a hacer el fin de semana que viene? (What are you going to do next weekend?) [What you are going to do the end of week that co-		
Time phrase	Verb (activity)	“because” Reason
	juego al fútbol (I play football) [I play to the football] leo libros / anime (I read books / anime) salgo con mis amigos (I go out with my friends) aprendo idiomas extranjeros (I learn foreign languages) [I learn languages foreigners]	es entretenido (it's entertaining) es guay (it's cool) soy activo/a (I am active) soy sociable (I am sociable)
Normalmente (Normally)		*me relaja (it relaxes me) [me it relaxes] *me interesa (it interests me) [me it interests]
La semana pasada (Last week) [The week past]	jugué al rugby (I played rugby) [I played to the rugby] toqué música en una banda (I played music in a band)	porque dado que ya que visto que
Ayer (Yesterday)	hice trucos en mi bici (I did tricks on my bike)	
Mañana (Tomorrow)	voy a bailar (I am going to dance)	*me hace sentir feliz (it makes me feel happy) [me it makes to feel happy]
El fin de semana que viene (Next weekend) [The end of week that comes]	voy a dibujar (I am going to draw) voy a jugar al críquet (I am going to play cricket) [I am going to play to the cricket] voy a cantar (I am going to sing)	*me apasiona (I am passionate about it) [me it makes passionate]

¿Qué te apasiona? (What are you passionate about?) [What you it makes passionate?]					
STAR phrase	Opinion	Infinitive verb phrase	“but”	Opinion	Infinitive verb phrase
<p>*Diría que (I would say that)</p> <p>*Tengo que decir que (I have to say that)</p>	<p>mi pasión es (my passion is)</p> <p>soy fanático/a de (I am a big fan of) [I am fanatic of]</p> <p>me apasiona I am passionate about [me it makes passionate]</p>	<p>jugar al fútbol (playing football) [to play to the football]</p> <p>jugar al rugby (playing rugby) [to play to the rugby]</p> <p>leer libros / anime (reading books / anime) [to read books / anime]</p> <p>bailar (dancing) [to dance]</p> <p>tocar música en una banda (playing music in a band) [to play music in a band]</p> <p>dibujar (drawing) [to draw]</p>	<p>pero (but)</p>	<p>no me interesa (I am not interested in)</p> <p>me aburre (it bores me) [me it bores]</p>	<p>jugar al baloncesto (playing basketball) [to play to the basketball]</p> <p>jugar al críquet (playing cricket) [to play to the cricket]</p> <p>cantar (singing) [to sing]</p> <p>hacer trucos en mi bici (doing tricks on my bike) [to do tricks on my bike]</p> <p>pintar (painting) [to paint]</p> <p>aprender idiomas extranjeros (learning foreign languages) [to learn languages foreigners]</p>

2.3 – Acid Rain	
Acid Rain	More acidic than normal rain. Caused by sulphur dioxide and nitrogen oxides released when burning fossil fuels.
Sulphur Dioxide	Sulphur impurities in fossil fuels react with oxygen to make sulphur dioxide.
Nitrogen Oxides	Heat from combustion causes nitrogen in air to react with oxygen to form nitrogen oxides.
Clouds	Gases react with water vapour in clouds. Sulphur dioxide forms sulphuric acid. Nitrogen oxides form nitric acid.
Effects	Kills trees, makes lakes acidic, weathers stone buildings, breathing problems, corrosion/rusting of metal.
Prevention	Burn fewer fossil fuels. Use technology to clean polluting gases.
Mitigation	Add alkali to lakes to neutralise the water.
2.4 – Earth’s Atmosphere & Carbon Cycle	
Composition	78% nitrogen, 21% oxygen, 1% other gases (argon and carbon dioxide).
Volcanoes	Volcanoes erupt and release carbon dioxide.
Oceans	Carbon dioxide dissolves in the oceans.
Photosynthesis	Plants take in carbon dioxide and release oxygen.
Respiration	All living organisms take in oxygen and release carbon dioxide.
Decomposers	Micro-organisms break down dead organisms. Releases carbon dioxide.
Burning fossil fuels	Releases carbon dioxide.

2.1 – Fuels & Combustion	
Fuel	Substance that can be burnt to transfer energy by heating. E.g. fossil fuels, wood, hydrogen.
Combustion	Burning. Requires fuel, heat and oxygen. Releases energy – exothermic reaction. Oxidation reaction.
Complete Combustion	Occurs when plenty of oxygen available. Produces carbon dioxide and water only.
Incomplete Combustion	fuel + oxygen -> carbon dioxide + water Occurs when not enough oxygen available. Produces carbon dioxide, water, carbon monoxide and carbon particles (soot).
Carbon Dioxide	Causes global warming. Turns limewater cloudy.
Carbon Monoxide	Toxic gas which reduces the amount of oxygen that red blood cells can carry.
Carbon Particles (Soot)	Cause breathing difficulties and global dimming.
2.2 - Global Warming	
Greenhouse Effect	Greenhouse gases (carbon dioxide, methane and water vapour) trap heat in Earth’s atmosphere.
Increase in Greenhouse Gases	Carbon dioxide – burning fossil fuels and deforestation. Methane – cows and paddy fields.
Global Warming	Greenhouse gas layer getting thicker. More heat trapped. Increases Earth’s temperature. Causes climate change.
Effects	Polar ice caps melt -> loss of habitats and sea levels rise which causes flooding. Storms and droughts.
Prevention	Burn fewer fossil fuels – use alternatives. Less deforestation. Plant more trees.

4.1 – Genetic Information

Organisation of Genetic Information	Cells have a nucleus -> contains pairs of chromosomes -> made up of DNA which stores genetic information.
Chromosomes	Structures made up of long threads of DNA coiled up. Human body cells contain 46 chromosomes organised in 23 pairs.
DNA	Deoxyribonucleic acid. Molecule made up of two long strands arranged in a spiral. Double helix structure.
Genes	Short section of DNA. Contains information which controls a characteristic.
Discovery of DNA	Franklin produced images of DNA using x-ray crystallography. Watson and Crick used these images to make a model of DNA.

4.2 - Inheritance

Gametes	Sex cells. Contain half a set of chromosomes – one from each pair. Sperm and egg in animals. Pollen and ovule in plants.
Sperm Cell	Male gamete. Produced in testes. Human sperm contain 23 chromosomes.
Egg Cell	Female gamete. Produced in ovaries. Human eggs contain 23 chromosomes.
Fertilisation	Nucleus of sperm and egg cell fuse together. Zygote formed which divides repeatedly to form an embryo. Human zygote contains 46 chromosomes.
Sexual Reproduction	Two parents. Offspring are not identical to each other or parents due to inheriting a mixture of DNA from mother and father.
Asexual Reproduction	One parent. Offspring are genetically identical to each other and parent. Produces clones.

4.3 – Variation & Evolution

Species	Organisms of the same species can breed together to produce fertile offspring.
Variation	Differences in characteristics between organisms of the same species.
Inherited Variation	Variation caused by inheriting genes from your parents or by random genetic mutations.
Environmental Variation	Variation caused by your surroundings. E.g. diet, education and lifestyle.
Theory of Evolution	All today's species have evolved from simple life forms that first started to develop over 3 billion years ago.
Natural Selection	Charles Darwin's theory. Organisms with the most suitable characteristics are more likely to survive and reproduce and pass on the genes for these characteristics to their offspring.

4.4 - Extinction

Extinct Species	No more organisms of that species are left anywhere in the world. E.g. dinosaurs, dodos, woolly mammoths, quaggas.
Causes of extinction	New predator, new disease, destruction of habitat, competition for food, flooding, drought, volcano eruption, asteroid, temperature change, ice age.
Endangered Species	Only a small population of the species left in the world. E.g. red squirrel, black rhino, Asian elephant.

4.5 – Selective Breeding

Process	Breed organisms with desirable traits. Select offspring with desirable traits and breed. Keep repeating process.
Desirable characteristics	Animals – quality meat, large eggs, lots of milk, strong. Plants – resistance to disease, large fruit or flowers.
Advantages	Higher yield, higher profit for farmers / breeders.
Disadvantages	Inbreeding can cause genetic problems e.g. short nose dogs.

**Y8 Science Cycle 3 - Sheet 4
Genetics**

¿Qué llevas normalmente? (What do you wear normally?) [What you wear normally?]

Time phrase	Verb	Noun (Clothes)	Adjective (Colour)**	Connective	Adjective
Normalmente [Normally]	llevo [I wear]	un jersey (a jumper) un vestido (a dress)	rojo (red) morado (purple) negro (black) marrón (brown)	porque (no) es (because it is (not))	cómodo (comfortable) precioso (lovely) guay (cool)
		una camiseta (a T-shirt) una falda (a skirt)	blanca (white) amarilla (yellow) verde (green) naranja (orange)		cómoda (comfortable) preciosa (lovely) fea (ugly)
Los fines de semana [At weekends]	voy a llevar [I am going to wear]	unos pantalones (some trousers) unos vaqueros (some jeans)	rosas (pink) [pinks] grises (grey) [greys]	porque son (because they are)	cómodos (comfortable) preciosos (lovely) guay (cool) preciosos (lovely) feos (ugly) incómodos (uncomfortable)
		unas botas (some boots) unas zapatillas de deporte (some trainers)	blancas (white) [whites] negras (black) [blacks] marrones (brown) [browns]		porque (no) están de moda (because they are (not) fashionable)
Esta noche [Tonight]	no voy a llevar [I am not going to wear]				

Spanish Knowledge Navigator

¿Dónde te gustaría ir? (Where would you like to go?) [Where you it would please to go?]

Opinion + infinitive	Noun (Place)	“which is located”	Preposition	Noun (Place)
Me gustaría ir <i>(I would like to go)</i> <i>[Me it would please to go]</i>	al centro comercial <i>(to the shopping centre)</i> <i>[to the centre commercial]</i>	que está <i>(which is located)</i>	detrás <i>(behind)</i>	del museo <i>(the museum)</i> <i>[of the museum]</i>
	al supermercado <i>(to the supermarket)</i>		delante <i>(in front of)</i>	del parque temático <i>(the theme park)</i> <i>[of the park theme]</i>
al polideportivo <i>(to the sports centre)</i>	enfrente <i>(opposite)</i>		del teatro <i>(the theatre)</i> <i>[of the theatre]</i>	
No me gustaría ir <i>(I would not like to go)</i> <i>[Not me it would please to go]</i>	a la panadería <i>(to the bakery)</i>		al lado <i>(next to)</i>	de la carnicería <i>(the butcher)</i> <i>[of the butcher]</i>
	a la bolera <i>(to the bowling alley)</i>		cerca <i>(near to)</i>	de la piscina <i>(the swimming pool)</i> <i>[of the swimming pool]</i>
*Tengo ganas de ir <i>(I'm really keen to go)</i> <i>[I have desires of to go]</i>	a la pista de hielo <i>(to the ice-rink)</i> <i>[to the track of ice]</i>	lejos <i>[[ar from]</i>	de la mezquita <i>(the mosque)</i> <i>[of the mosque]</i>	

¿Cómo te preparas? (How do you get ready?) [How yourself you prepare?]

Time phrase	Reflexive verb	Time	Time phrase	Reflexive verb
Siempre <i>(Always)</i>	me ducho <i>(I have a shower)</i> <i>[myself I shower]</i>	a las seis y veinte <i>(at 6.20am)</i> <i>[at the 6 and 20]</i>	después <i>(afterwards)</i>	me peino <i>(I do my hair)</i> <i>[myself I comb]</i>
A veces <i>(Sometimes)</i>	me baño <i>(I have a bath)</i> <i>[myself I bathe]</i>	a las seis y media <i>(at 6.30am)</i> <i>[at the 6 and half]</i>	luego <i>(then)</i>	me maquillo <i>(I do my make-up)</i> <i>[myself I make up]</i>
	me lavo la cara <i>(I wash my face)</i> <i>[myself I wash the face]</i>	a las siete menos cuarto <i>(at 6.45am)</i> <i>[at the 7 minus quarter]</i>		me pongo gomi-na <i>(I gel my hair)</i> <i>[myself I put gel]</i>
me visto <i>(I get dressed)</i> <i>[myself I dress]</i>	a las siete en punto <i>(at 7.00am exactly)</i> <i>[at the 7 on point]</i>	me aliso el pelo <i>(I straighten my hair)</i> <i>[myself I straighten the hair]</i>		
Primero <i>(First)</i>	me lavo los dientes <i>(I brush my teeth)</i> <i>[myself I wash the teeth]</i>	a las siete y cuarto <i>(at 7.15am)</i> <i>[at the 7 and quarter]</i>	finalmente <i>(finally)</i>	

*Soy madrugador / madrugadora (I am a morning person) [I am dawner]

*No soy madrugador / madrugadora (I am not a morning person) [Not I am dawner]

Science Knowledge Navigators

4.4 - Moments	
Moment	Turning effect of a force about a pivot.
Equation	Moment = Force x Distance
Units	Nm or Ncm
Lever	Device which increases the distance between the force and the pivot to give a larger moment.
Balanced moments	Clockwise moments = anticlockwise moments
4.5 - Density	
Definition	Mass per unit volume (a measure of how heavy compared to size).
Particles	Tightly packed particles -> high density.
States of matter	Solids have high densities. Gases have low densities.
Equation	density = mass / volume
Units	kg/m ³ or g/cm ³
Density of regular solid (e.g. cuboid)	1. Measure length, width and height with a ruler. 2. Calculate volume: length x width x height. 3. Measure mass with a mass balance. 4. Use density equation.
Density of irregular solid (e.g. a stone)	1. Fill eureka can with water and insert object. 2. Collect displaced water in a measuring cylinder to measure volume. 3. Measure mass with a mass balance. 4. Use density equation.

4.1 – Pressure on Solid Surfaces	
Pressure	Force per unit area.
Equation	Pressure = Force / Area
Units	N/m ² or N/cm ²
Factors affecting pressure	A larger force or a smaller area would give a higher pressure.
High pressure examples	Drawing pins and knives.
Low pressure examples	Camels' feet on sand and polar bears' feet on snow.
4.2 – Pressure in Liquids	
Liquid Pressure	Particles collide with the walls of the container and exert a force. Acts in all directions.
Compressibility	Liquid particles cannot be compressed as the particles are already close together.
Hydraulic systems	Liquids transfer pressure from a small area piston to a large area piston to create a larger force.
Relationship with depth	As you go deeper, pressure increases -> caused by the increase in the weight of the column of liquid above.
Water dams	Thicker at the bottom to withstand higher pressure.
4.3 – Pressure in Gases	
Gas particle motion	Particles move randomly in all directions in straight lines at a range of speeds.
Gas pressure	Particles collide with the walls of the container and exert a force. Acts in all directions.
Temperature and pressure	Temperature of gas increases -> particles have more K.E. -> move faster -> more frequent collisions with walls -> and larger force exerted -> pressure increases.
High pressure danger	May cause container to break, burst or explode.

Y8 Science Cycle 2 - Sheet 4

Pressure, Density & Moments

French Knowledge Navigator			
Venir	Country	Aller	Country
Je viens de / d' (I come from)	France (France)	je vais (I am going)	en France (to France)
	Angleterre (England)		en Angleterre (to England)
	Allemagne (Germany)		En Allemagne (to Germany)
Il vient de / d' (he comes from)	Autriche (Austria)	je suis allé(e) (I went)	en Autriche (to Austria)
	Espagne (Spain)		en Espagne (to Spain)
	Irlande (Ireland)		en Irlande (to Ireland)
Elle vient de / d' (she comes from)	Italie (Italy)	j'irais (I would go)	en Italie (to Italy)
	Grèce (Greece)		en Grèce (to Greece)
	Royaume-uni (U.K.)		en Royaume-uni (to U.K.)
	Roumanie (Romania)	je vais aller (I am going to go)	en Roumanie (to Romania)
	Portugal (Portugal)		en Portugal (to Portugal)
		je voudrais aller (I would like to go)	

Quel temps fait-il? (What is the weather like)				
Where	Country	Verb	Weather	Adverb
En (In)	France (France)	il y a	il neige (its snowing)	partout (everywhere)
	Angleterre (England)		il pleut (its raining)	
À (in)	Autriche (Austria)	il y a	du soleil (its sunny)	toujours (always / still)
	Espagne (Spain)		du vent (its windy)	
Dans le nord de la / l' (in the north of)	Irlande (Ireland)	il y a	du brouillard (its foggy)	malheureusement (unfortunately)
	Italie (Italy)			
Dans le sud de la / l' (in the south of)	Grèce (Greece)	il fait	chaud (its hot)	aujourd'hui (today)
	Royaume-uni (U.K.)		froid (its cold)	
Dans l'est de la / l' (in the east of)	Roumanie (Romania)	il fait	beau (its nice)	
			mauvais (its bad)	
Dans l'ouest de la / l' (in the west of)		il fait	nuageux (its cloudy)	

French Knowledge Navigator			
Comment vous sentez-vous? (How are you feeling?)			
Sentence starter	Verb	Illness	Body Part
Je suis malade (I am ill)	j'ai (I have)	mal	à la tête (a headache)
			à la gorge (a sore throat)
Je ne sens pas bien (I don't feel well)	j'ai (I have)	mal	au ventre (a stomach ache)
			au dos (back pain)
	j'ai (I have)	mal	au cou (neck pain)
			aux bras (arm pain)
	j'ai (I have)	mal	aux jambes (leg pain)
			aux oreilles (earache)
	j'ai (I have)	mal	aux yeux (eye pain)
			aux dent (toothache)
	je me suis cassé(e) (I have broken)	mal	une rhume (a cold)
			la grippe (the flu)
	je me suis cassé(e) (I have broken)	mal	le nez qui coule (a runny nose)
			de la fièvre (a fever)
	je me suis cassé(e) (I have broken)	mal	de la toux (a cough)
	je me suis cassé(e) (I have broken)	mal	le bras (my arm)
			la jambe (my leg)
	je me suis cassé(e) (I have broken)	mal	le doigt (my finger)
			la cheville (my ankle)

Comment vous sentez-vous? (How are you feeling?)		
Sentence starter	Modal Verb	Advice (infinitive verb phrase)
Pour récupérer (in order to recover)	On doit (you must)	se reposer (take it easy)
	On devrait (you should)	rester bien hydraté(e) (stay hydrated)
	On doit (you must)	manger des repas nutritifs (eat nutritious meals)
	On devrait (you should)	prendre son médicament (take your medicine)
	On ne doit pas (you must not)	se pousser trop fort (push yourself too hard)
		boire de l'alcool (drink alcohol)
		sortir chaque nuit (go out every night)

French Knowledge Navigator

Décris les logements (Describe the logings)			
Rester	Logings	Être	Adjective
Je reste (I stay)	dans une chambre d'hôtel (in a bedroom in a hotel)	c'est (it is)	propre (clean)
Je suis resté (I stayed)	dans une auberge (in an inn) dans un motel (in a motel) dans une station thermale (in a spa re-sort)	c'était (it was)	sale (dirty) confortable (comfortable) inconfortable (uncomfortable)
Je resterais (I would stay)	dans une station balnéaire (in a seaside resort)	ce serait (it would be)	spacieux (-se) (spacious)
Je vais rester (I am going to stay)	dans une station de sports d'hiver (in a ski resort) dans une tente (in a tent) dans une auberge de jeunesse (in a youth hostel)	ce sera (it will be)	douillet(te) (cosy) grand(e) (big) petit(e) (small)
Je voudrais rester (I would like to stay)	dans un hôtel de luxe (in a luxury hotel) dans un hôtel à trois étoiles (in a three star hotel) dans un camping (in a campsite)		
Décris le voyage (Describe the journey)			
Voyager	Transport	Être	Adjective
Je voyage (I travel)	en avion (by plane)	c'est (it is)	peu fiable (unreliable)
J'ai voyagé (I travelled)	en car (by coach) en voiture (by car) en bus (by bus)	c'était (it was)	rapide (fast)
Je voyagerais (I would travel)	en tramway (by tram) en bateau (by boat) en taxi (by taxi)	ce serait (it would be)	bondé(e) (crowded)
Je vais voyager (I am going to travel)	en métro (by metro) à pied (on foot) à vélo (by bike)	ce sera (it will be)	lent(e) (slow)
Je voudrais voyager (I would like to travel)	à scooter (by scooter) à moto (by motorbike) par le char (by tank)		confortable (comfortable) secure (safe)

French Knowledge Navigator

Aller	Country	Connective	Weather
Je vais (I am going) Je suis allé(e) (I went) J'irais (I would go) Je vais aller (I am going to go) Je voudrais aller (I would like to go)	en France (to France) en Angleterre (to England) en Autriche (to Austria) en Espagne (to Spain) en Irlande (to Ireland) en Italie (to Italy) en Grèce (to Greece) en Royaume-uni (to U.K.) en Roumanie (to Romania) au Portugal (to Portugal)	car (because) cependant (however) mais (but)	Il pleut (it is raining) Il pleuvait (it was raining) Il va pleuvoir (it is going to rain) il fait (it is) il faisait (it was) il va faire (it is going to be) Il y a (it is) Il y avait (it was) Il y aurait (it would be)
			chaud (hot) froid (cold) beau (nice) mauvais (bad) nuageux (cloudy) du soleil (sunny) du vent (windy) du brouillard (foggy)

Time phrase	Aller	Country	Connective	Reason
En été (in summer) En hiver (in winter) Le weekend dernier (last week) La semaine dernière (last week) L'année dernière (last year) Le weekend prochain (next weekend) L'année prochaine (next year) La semaine prochaine (next week)	je vais (I am going) j'allais (I used to go) je suis allé(e) (I went) j'irais (I would go) je vais aller (I am going to go) je voudrais aller (I would like to go)	en France (to France) en Angleterre (to England) en Autriche (to Austria) en Espagne (to Spain) en Irlande (to Ireland) en Italie (to Italy) en Grèce (to Greece) en Royaume-uni (to U.K.) en Roumanie (to Romania) au Portugal (to Portugal)	car (because) cependant (however) mais (but)	il fait beau (it is nice weather) il fait mauvais (it is bad weather) c'est super (it is super) c'est intéressant (it is interesting) c'est ennuyeux (it is boring) il faisait beau (it was nice weather) il faisait mauvais (it was bad weather) c'était super (it was super) c'était intéressant (it was interesting) c'était ennuyeux (it was boring) il va faire beau (it is going to be nice weather) il va faire mauvais (it is going to be bad weather) ce sera super (it will be super) ce sera intéressant (it will be interesting) ce sera ennuyeux (it will be boring)

French Knowledge Navigator

Qu'est-ce que tu fais / as fait en vacance? (What do you do / did you do on holiday?)			
Time phrase	Activity	Time phrase	Activity
En été (in summer)	je vais à la plage (I go to the beach)	Le weekend dernier (last week)	je suis allé à la plage (I went to the beach)
	je me bronze (I sunbathe)		je me suis bronzé (I sunbathed)
	je fais les magasins (I go shopping)		j'ai fait les magasins (I went shopping)
En hiver (in winter)	je nage (I swim)	La semaine dernière (last week)	j'ai nagé (I swam)
	je fais du tourisme (I go sightseeing)		j'ai fait du tourisme (I did sightseeing)
En vacance (on holiday)	je lis (I read)	L'année dernière (last year)	j'ai lu (I read)
	je fais de la plongée (I go diving)		j'ai fait de la plongée (I went diving)
	je vais à la pêche (I go fishing)		je suis allé à la pêche (I went fishing)
	je vais aux musées (I go to museums)		je suis allé aux musées (I went to museums)
	je fais de la voile (I go sailing)		j'ai fait de la voile (I went sailing)

Où restes-tu? (Where do you stay?)

Time phrase	Rester	Logings
En été (in summer)	je reste (I stay)	dans une chambre d'hôtel (in a bedroom in a hotel)
En hiver (in winter)		dans une auberge (in an inn)
Pendant les vacances (during the holidays)	je suis resté (I stayed)	dans un motel (in a motel)
Le weekend dernier (last week)		dans une station thermale (in a spa resort)
La semaine dernière (last week)	je resterais (I would stay)	dans une station balnéaire (in a seaside resort)
L'année dernière (last year)	je vais rester (I am going to stay)	dans une station de sports d'hiver (in a ski resort)
Le weekend prochain (next weekend)		dans une tente (in a tent)
L'année prochaine (next year)	je voudrais rester (I would like to stay)	dans une auberge de jeunesse (in a youth hostel)
La semaine prochaine (next week)		dans un hôtel de luxe (in a luxury hotel)
		dans un hôtel à trois étoiles (in a three star hotel)
		dans un camping (in a campsite)

French Knowledge Navigator

Qu'est-ce que tu fais / vas faire en vacance? (What do you do / are you going to do on holiday?)			
Time phrase	Activity	Time phrase	Activity
En été (in summer)	je vais à la plage (I go to the beach)	Le weekend prochain (next week)	je vais aller à la plage (I am going to go to the beach)
	je me bronze (I sunbathe)		je vais me bronzer (I am going to sunbathe)
	je fais les magasins (I go shopping)		je vais faire les magasins (I am going to go shopping)
En hiver (in winter)	je nage (I swim)	La semaine prochaine (next week)	je vais nager (I am going to swim)
	je fais du tourisme (I go sightseeing)		je vais faire du tourisme (I am going to go sightseeing)
En vacance (on holiday)	je lis (I read)	L'année prochaine (next year)	je vais lire (I am going to read)
	je fais de la plongée (I go diving)		je vais faire de la plongée (I am going to go diving)
	je vais à la pêche (I go fishing)		je vais aller à la pêche (I am going to go fishing)
	je vais aux musées (I go to museums)		je vais aller aux musées (I am going to go to museums)
	je fais de la voile (I go sailing)		je vais faire de la voile (I am going to go sailing)