



Wadham School



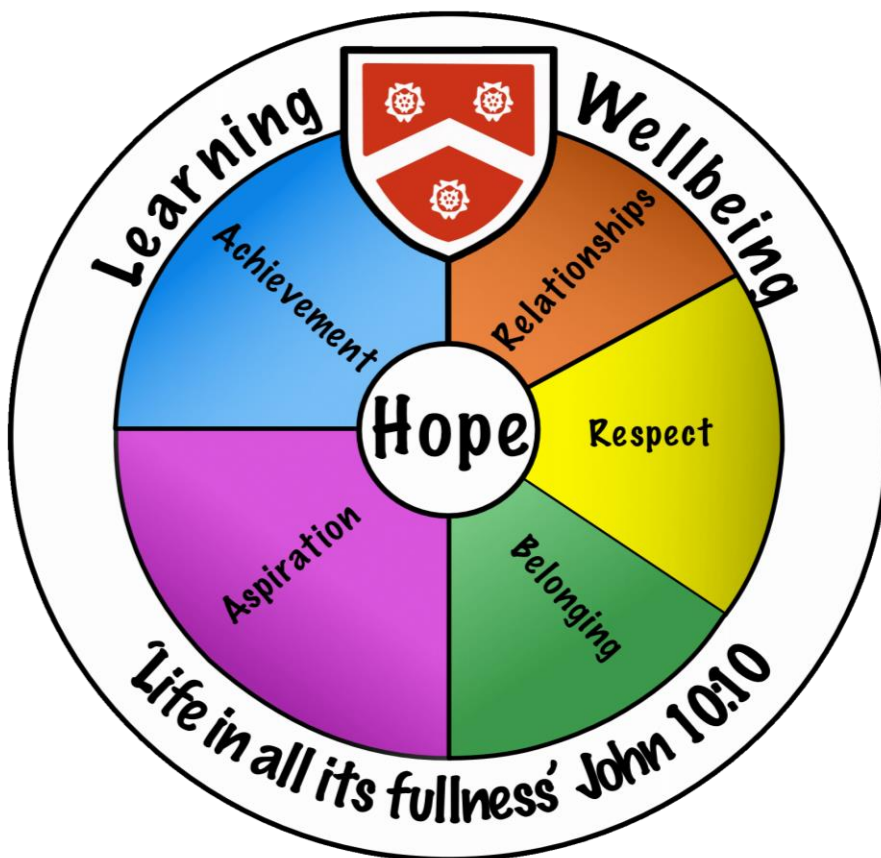
A Church of England Community School

Knowledge Organisers

Year 9

Autumn 2

2023-2024











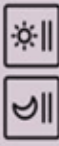









Name.....

Tutor group.....

“Life in all its fullness” John 10:10

How to use Knowledge Organisers?

How to use a knowledge organiser – step by step guide

	Look, Cover, Write, Check	Definitions of Key Words	Flash Cards	Self Quizzing	Mind Maps	Paired Retrieval
Step 1	<p>Look at and study a specific area of your KO.</p> 	<p>Write down the key words and definitions.</p> 	<p>Use your KO to condense and write down key facts or information onto flash cards.</p> 	<p>Use your KO to create a mini quiz. Write down your questions using your KO.</p> 	<p>Create a mind map with all the information you can remember from your KO.</p> 	<p>Ask a friend or family member to have the KO or flash cards in their hands.</p> 
Step 2	<p>Cover or flip the KO over and write down everything you can remember.</p> 	<p>Try not to use your KO to help you.</p> 	<p>Add pictures to help support. Then self-quiz using the flash cards. You could write questions on one side, and answers on the other!</p> 	<p>Answer the questions and remember to use full sentences.</p> 	<p>Check your KO to see if there are any mistakes on your mind map.</p> 	<p>They can test you by asking you questions on different sections of your KO.</p> 
Step 3	<p>Check what you have written down. Correct any mistakes in green pen and add anything you have missed. Repeat.</p> 	<p>Use your green pen to check your work.</p> 	<p>Ask a friend or family member to quiz you on the knowledge.</p> 	<p>Ask a friend or family member to quiz you using the questions.</p> 	<p>Try to make connections, linking the information together.</p> 	<p>Write down your answers,</p> 



HOW TO USE KNOWLEDGE ORGANISERS TO CHECK YOUR UNDERSTANDING

1

READ

CHOOSE A 'CHUNK' OF KNOWLEDGE ...
BUT DON'T CHOOSE TOO MUCH (2 - 9 FACTS)
WRITE DOWN YOUR LIST OF FACTS / DEFINITIONS
READ AND HIGHLIGHT KEYWORDS
RE-READ FOR A FEW MINUTES

Atoms and Elements	
Element	Contains one type of atom
Compound	Contains two or more types of atom, chemically bonded

2

COVER

NOW COVER THE DEFINITIONS - CAN YOU STILL REMEMBER THEM?

Atoms and Elements	
Element	
Compound	

3

WRITE

NOW WRITE THE DEFINITIONS/FACTS AS ACCURATELY AS YOU CAN

Atoms and Elements	
Element	Contains one type of atom
Compound	Contains two or more

4

CHECK

CHECK WHAT YOU GOT RIGHT AND WRONG

Atoms and Elements	
Element	Contains one type of atom
Compound	Contains two or more types of atom, chemically bonded

Contains one type of atom
Contains two or more types of atom bonded

5

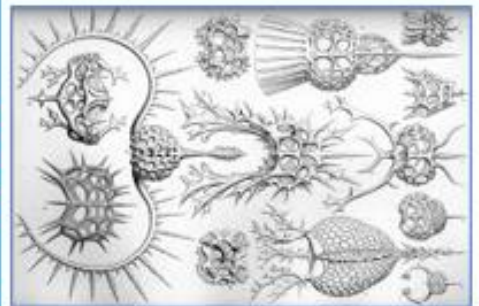
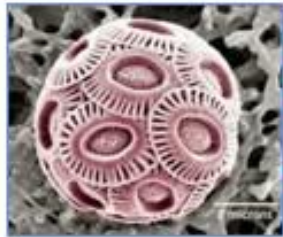
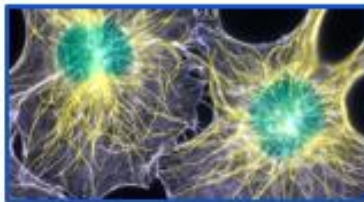
CORRECT

IT IS REALLY IMPORTANT TO CORRECT ANY MISTAKES AND ADD ANYTHING YOU MISSED

Atoms and Elements	
Element	Contains one type of atom
Compound	Contains two or more types of atom, chemically bonded

Contains one type of atom
Contains two or more types of atom bonded
chemically

Science In Art

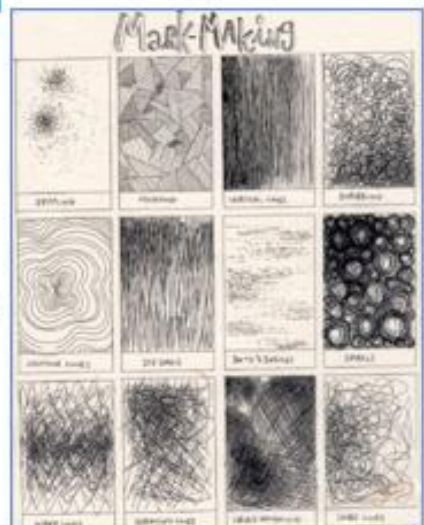


Keywords

Abstract Stem cell **Mark making** **Tone**
Micro Organism Ecology **Microscopic**
 Line **Fungi** Shape **Bacteria** Mixed
 Media

Mark Making

Mark making describes the different lines, dots, marks, patterns, and textures we create in an artwork. It can be loose and gestural or controlled and neat. It can apply to any material used on any surface: paint on canvas, ink or pencil on paper, a scratched mark on plaster, a digital paint tool on a screen, a tattooed mark on skin...even a sound can be a form of mark making. Artists use gesture to express their feeling and emotions in response to something seen or something felt – or gestural qualities can be used to create a purely abstract composition.

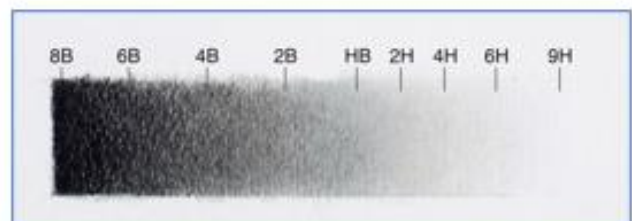


Mixed Media

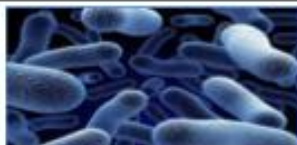
Mixed media art refers to a visual art form that combines a variety of materials in a single artwork. This media can be layered and applied using different methods and they can produce a range of interesting outcomes. They can be realistic and abstract.

Tone

Tone describes the lightness or darkness of a surface. A gradient is a series of tones from lightest to darkest. An artwork can have many different tones.



Science In Art



Who were the first scientists to discover microorganisms?

Two men are credited today with the discovery of microorganisms using primitive microscopes:

Robert Hooke who described the fruiting structures of molds in 1665 and **Antonie van Leeuwenhoek** who is credited with the discovery of bacteria in 1676.



Robert Hooke



Antonie van Leeuwenhoek

What is a microorganism?

It is a microscopic organism, especially a bacterium, virus, or fungus.

Ernst Haeckel

German biologist and artist **Ernst Haeckel** dedicated his life studying far flung flora and fauna, **drawing** each of their peculiar forms with an immense scientific detail. **Haeckel** made hundreds of such drawings during his lifetime, works which were used to explain his biological discoveries to a wide audience.



Rogan Brown

Rogan Brown's work is inspired by the tradition of scientific illustration and model making. He creates detailed observational drawings based on patterns and motifs found in nature. These are transformed into incredibly detailed, delicate relief sculptures made from layer upon layer of either hand or laser cut paper. He makes multiple visual references - cells, microbes, fossils, insects, cloud formations, the organs and parts of the human body.



Why is Science and Art more closely related than you think?

Both science and art are human attempts to understand and describe the world around us. Scientists do experiments over and over, trying to find out about a new discovery. Artists often start with a new vision, then work through experiments in which they explore how best to get the message across to an audience.

Beliefs and World Views

Philosophy and argument

1	Philosophy	The study of the nature of knowledge, reality and existence.
2	Premise	A building block of an argument.
3	Conclusion	The point or goal of an argument.
4	A priori	Knowledge before experience, from reason or logic. E.G. $2+2=4$
5	A posteriori	Knowledge from experience and senses. E.G. what colour my shirt is.

Design arguments

6	Complexity	When something has many parts that work together.
7	William Paley	Philosopher who put forward the design argument based on complexity.
8	Thomas Aquinas	Philosopher who said God designed everything with a purpose.
9	Charles Darwin	Person who put forward the theory of evolution.
10	Evolution	Theory that small changes over time explain the complexity of living things.
11	David Hume	Scottish philosopher who argued against the design argument with the epicurean thesis and problem of evil.
12	Epicurean thesis	Theory that if the universe is infinite every possible version of it must exist at some point.

Religious experiences

13	Richard Swinburne	Philosopher who argued we should believe peoples accounts of religious experience based on principle of credulity and testimony.
14	Principle of testimony	Idea we should trust that when people say something happened to them they are telling the truth.
15	Principle of credulity	Idea that we should trust that when people say they experienced something they did experience it and weren't mistaken.
16	Numinous	Religious experience of awe and wonder at nature.
17	Conversion	Religious experience where someone becomes religious.
18	Freud	Psychologist who argued that religion comes from subconscious desires.
19	Subconscious	Part of the brain your not aware of.

Problem of evil

20	Problem of evil	Argument that God cannot have created the world as it is full of suffering and God is supposed to be loving.
21	Natural evil	Evil that is part of the natural world and no ones fault. E.G. Earthquakes
22	Moral evil	Evil that is done by choice by human beings. E.G. Murder
23	Inconsistent triad	Three things that cannot all be true, God is all powerful, all loving and evil exists.
24	Theodicy	An attempt to explain why God allows evil and suffering.
25	Augustine	Philosopher who argued evil comes from Adam and Eve disobeying God.
26	The fall	Adam and Eve disobeying God and eating the fruit.

Computing

What is Data Science

Data science is extracting meaning from large data sets in order to gain insights to support decision-making

Infographics versus data visualisations

Data visualisations are visual representation of data (such as charts and graphs) intended to help an audience process the information more easily and get a clear idea about the data at a glance.

Infographics are visual representations of data, often involving pictures that reflect patterns and help tell a story. Infographics can include visualisations.



Statistics

A correlation shows that there is a relationship between two or more variables. For example data could indicate a clear upwards trend, showing that there is a relationship between the two **variables**; we call that a **correlation**. This would be an example of a **positive correlation**, meaning that as one variable increases, the other one increases too.

However correlation doesn't always mean causation

A **correlation** shows that there is a relationship between two or more variables, but that doesn't guarantee that one causes the other.

For example, there is likely to be a correlation between ice cream sales and the weather. Does that mean that ice cream sales cause hot weather? The correlation doesn't guarantee that one causes the other.

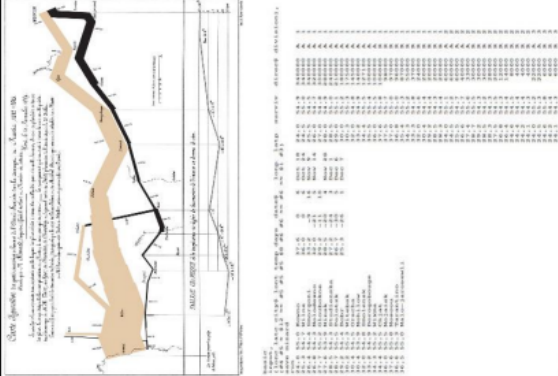
Data Science History

The foundations of data science were laid by Joseph Minard.

Joseph Minard used these numbers in 1869 to find meaning and tell a story with the data.

The data you looked at before relates to Napoleon's march on Russia in 1812.

The numbers by themselves don't tell much of a story, but Joseph Minard created what is widely regarded to be the best statistical graph of all time.



What about anomalies?

Data that sits outside a trend is known as an **outlier**. Outliers can cause problems when working out statistics such as the mean, but they shouldn't be removed from the data set without investigating the reason for them.

Data Cleansing

Once data has been collected it should be checked through it to see if it needs **cleansing**. Cleansing involves **detecting** and **correcting**, or **removing**, **corrupt** or **inaccurate data**. There are several things that need to be checked when cleansing data, this will help to make sure the data set is accurate and robust.

Missing values

Is there some data missing on the data set, how would this affect the results of the research?

Duplicate entries

Duplicate data can happen when the same data has been entered twice in the dataset. This has often been entered mistakenly and will need to be removed or corrected during the data cleansing process.

Invalid data

This could be data outside the normal range that would be expected. For example if someone had their height recorded as over 3 meters tall then this would clearly be a mistake or inaccurate data. Also a person's age could be recorded as zero, this again isn't possible and would be inaccurate data and should be either corrected or removed.

Key Vocabulary

Key Word	Definition
Analysis	A thorough study doing a careful analysis of a problem.
Causation	This is when one variable influences another.
Correlation	Shows that there is a relationship between two or more variables.
Data visualisation	Representation of data with charts and graphs to help the audience process the information easily.
Infographics	Visual representations of data, often involving pictures.
Outlier	A data point on a graph or in a set of results that is very much bigger or smaller than the next data point.
Positive correlation Variable	A relationship between two variables that tend to move in the same direction. Something that may or does vary or change.

Jon Snows Visualisation



In 1854 there was an outbreak of cholera in the Soho area of London.

At the time it was widely believed that cholera was caused by pollution in the air.

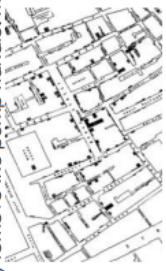
John Snow's observation of the evidence led to him discounting this belief, but he could not prove how people did become infected.

John Snow made a dot map of Soho.

The dots (or shaded-in parts) on the map represent where a cholera-related death had occurred. John Snow highlighted on the map the position of a water pump on Broad Street.

This data visualisation helped him to prove his theory that all the deaths had been of people who had used this water pump for drinking water.

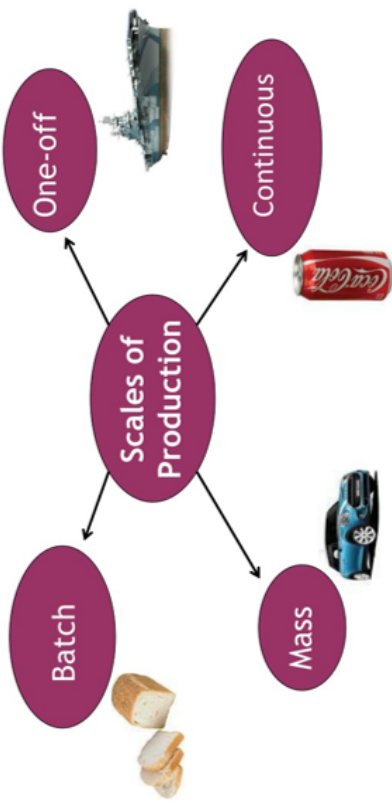
This map helped convince the local council to immediately remove the pump handle. Many lives



D&T Knowledge Organiser

Making a model allows designers to visualise and test how a product looks and performs in 3D and is a great way of checking a product's viability.

Advantages of physical modelling	Disadvantages of physical modelling
Allows a designer to physically handle a design and view from all sides	Can be time-consuming and complicated
Changes can be made quickly and easily	3D printed models can be expensive and have limited materials available
Materials such as cardboard can be found cheaply and easily	Models can't generally be used for testing as they don't use the same materials that the product will be made of
Models can be scaled up or down in size	
Models can be used to show to a client and get feedback on before production	



Developing prototypes

Prototypes can be full-size, working models of a product, and are the next stage of development after modelling. They are often made from the same material as the product and often have fully functioning parts. Prototyping is expensive, so a product needs to have already been modelled and tested.

Reasons for prototyping

- a manufacturing specification can be produced from a prototype and allows for the planning of cost, materials and quantities
- following client and user feedback, small changes and improvements in aesthetics and function can be made before production starts
- user trials with a prototype can check functionality, marketability and whether a product is fit for purpose before spending money on production
- specialist tools and equipment can be planned for and costed for when the product is later produced for the mass market
- Prototyping can help work out the cost of manufacturing a product, including how much material is needed and what machinery is required. The percentage profit can be worked out from this and can be improved by lowering production costs, e.g. by using cheaper materials or fewer workers.

Writing an Evaluation

<div>Evaluative Language Effective Successful Interesting Creative Unique</div> <div>SPITE Settings People Ideas Tone/Theme Events</div>	
<div>Masterful Powerful Excellent Useful Pleasing</div> <div>Good Clear Sensitive Relevant Competent</div> <div>Adequate Intelligent Unusual Intriguing Sustained</div>	
<div>Example: Gaiman effectively creates tension. He does this by creating a dark and eerie tone. The noun "knife" suggests danger and a threat. This creates tension in the reader as you fear for the characters' lives.</div>	<div>Sentence Starters: Point: The writer _____ creates _____. Evidence: They do this by _____. The quote " _____ " shows _____. Explain: This is _____ because _____</div>
<div>In an evaluation, you are making a judgment about the text. How effective or successful is it? Why? Analyse the writer's work and make a judgment.</div>	

Food labelling

- Food labels provide information, which helps people to know when to eat food, and how to store it safely.
- Nutrition and allergy information on food labels help to make informed food and drink choices.

Food labelling

Information on the labels of pre-packed food and drink products can be legally required or just for consumer information:

- country of origin and place of provenance;
- date mark;
- list of ingredients (including additives and allergens);
- name and address of the manufacturer, packer or seller;
- name of food or drink;
- nutrition information;
- storage and preparation instructions;
- weight or volume.

Consumer information:

- front-of-pack nutrition label;
- price;
- serving suggestions/image.

Date marks/shelf life

'Use by' dates relate to the safety of the food and 'best before' dates relate to quality. Eating foods after their 'use by' date could lead to food poisoning.

USE BY:

25/08/20

KEEP REFRIGERATED

BEST BEFORE:

25/08/21

STORE IN A COOL DRY PLACE

Baby leaf salad

Keep refrigerated. Once opened consume within 24 hours and by the 'use by' date shown.

Allergen labelling

There are 14 ingredients (allergens) that are the main reason for adverse reactions to food. They must be labelled on pre-packaged food and menus so that consumers can make safe choices.

From summer 2021 new legislation will tighten the rules requiring food that is prepared for direct sale, e.g. in a coffee shop, to carry a full list of ingredients.

The 14 allergens are:

Foods containing gluten, present in wheat, barley and rye	Crustaceans	Eggs	Fish	Lupin
				
				
				

Ingredients

It is a legal requirement to include an ingredients list on packaged or pre-prepared foods. The ingredients must appear in descending order and with the allergens identified in **bold**, **highlighted**, underlined or in *italics*.

INGREDIENTS

Water, Carrots, Onions, Red Lentils (4.5%), Potatoes, Cauliflower, Leeks, Peas, Cornflour, **Wheat** flour, Cream (**milk**), Yeast Extract, Concentrated Tomato Paste, Garlic, Sugar, **Celery** Seed, Sunflower Oil, Herb and Spice, White Pepper, Parsley

ALLERGY ADVICE

For allergens, see ingredients in **bold**

Nutrition information

Nutrition information can help consumers make healthier choices.

Back-of-pack nutrition information is legally required.

NUTRITION

When heated according to instructions

Typical values	Per 100g	Each pack (330g**)
Energy	457kJ 109kcal	1781kJ 424kcal
Fat	3.9g	15.2g
of which saturates	1.9g	7.5g
Carbohydrate	12.1g	47.1g
of which sugars	1.6g	6.2g
Fibre	11g	4.2g
Protein	5.8g	22.5g
Salt	0.8g	2.4g

Key terms

Allergen: An ingredient that may cause an adverse reaction to food.

Back-of-pack labelling: Is legally required and can help consumers make healthier choices.

Front-of-pack labelling: Is voluntary but must provide certain information and can use red, amber and green colour coding.

Use-by-date: Relates to the safety of the food. Food must be eaten by this date.

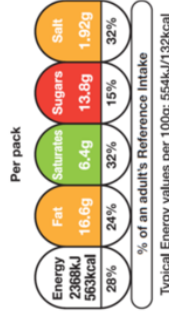
Best-before-date: Relates to the quality of the food. Food may still be eaten beyond this date.

Front-of-pack labelling

Front-of-pack nutrition information is voluntary. If a food business chooses to provide this, only the following information may be provided:

- energy only,
- energy along with fat, saturates, sugars and salt.

Red, amber and green colours, if used, show at a glance whether a food is high, medium or low for fat, saturates, sugars or salt. The colour coding can be used to compare two products.



Task

Produce a food label for a dish you have made. Ensure that the label includes the information required by law that relates to food hygiene and safety, i.e. a date mark, ingredient list (with allergens identified) and storage instructions.

Planning what to cook

- Current healthy eating advice, preferences, socio-economic factors, dietary needs, occasion and cost need to be considered when planning to cook.

Planning what to cook

Deciding on what to cook or eat, whether for yourself or someone else, requires making a number of decisions:

- beliefs and values;
- consumer information;
- food preferences;
- food provenance;
- health and wellbeing;
- social and economic considerations;
- who, what, when and where.



Beliefs and values

Personal beliefs and values include:

- culture, tradition and heritage;
- food ethics, e.g. environment, fair trading, organic, free-range, local and seasonal food;
- lifestyle choices, e.g. vegetarian, vegan;
- religion.

Religion	Pork	Beef	Lamb	Chicken	Fish
Islam	x	Halal only	Halal only	Halal only	✓
Hinduism	x	x	✓	✓	✓
Judaism	x	Kosher only	Kosher only	Kosher only	✓
Sikhism	x	x	✓	✓	✓
Buddhism (strict)	x	x	x	x	x
Seventh-day Adventist Church	x	x	x	✓	✓
Rastafarian movement	x	x	x	x	x

Eating the seasons

Most foods are grown in a particular season of the year, e.g. strawberries are harvested in summer in the UK. These are called 'seasonal foods'. Buying foods when they are in season will often mean that the price is lower. Technology and the importation of food has allowed food to be available all year round.

Frozen foods, such as vegetables, are a great alternative to fresh, if they are unavailable.

Consumer information

Information can help consumers make informed choices, including:

- advertising and marketing;
- media;
- online blogs/forums;
- packaging, nutrition and health claims;
- point of purchase information;
- product placement;
- recipe ideas.



Food provenance

Food provenance is about where food is grown, caught or reared, and how it was produced. Food certification and assurance schemes guarantee defined standards of food safety or animal welfare. There are many in the UK, including:



Red Tractor



British Lion

Marine Stewardship Council

Health and wellbeing

People may choose their food based on their own or their family's health and wellbeing:

- age and gender;
- allergy and intolerance;
- body image;
- health status;
- mental health;
- physical activity.

Who, what, when and where

The time of day, location and who is eating can impact food choice:

- eating alone, with family or friends;
- celebration;
- day of the week;
- location, e.g. at home, school or work, at a restaurant, on the go;
- meal or snack;
- occasion and time of day.

Personal preferences

A number of factors can influence personal preferences, including:

- colour, size and shape of crockery and cutlery used;
- portion size;
- serving style;
- taste, aroma, texture, appearance, shape and colour of food.

Social and economic considerations

The cost of food, money available and social aspects will influence people's food choices:

- cost of food;
- greater food availability;
- income;
- labour saving equipment;
- lack of cooking skills;
- long hours at work;
- wider range of convenience foods.

Allergy and intolerance

There are 14 ingredients (allergens) that are the main reasons for adverse reactions to food. People who are allergic, or intolerant, to these ingredients should take care to avoid eating them. The 14 allergens are:

- | | |
|---------------------------|-----------------|
| Celery (and celeriac) | Milk |
| Cereals containing gluten | Molluscs |
| Crustaceans | Mustard |
| Eggs | Nuts |
| Fish | Peanuts |
| Lupin | Sesame |
| | Soybeans |
| | Sulphur dioxide |

Food



Key words

Advertising: Advertising is a form of communication for marketing and used to encourage, persuade, or manipulate an audience to continue or take some new action.

Allergens: Substances that can cause an adverse reaction to food.

Ethical: Relating to personal beliefs about what is morally right and wrong.

Food certification and assurance schemes: Defined standards of food safety, quality or animal welfare.

Food provenance: Where food is grown, caught or reared, and how it was produced.

Marketing: Promoting and selling products or services, including market research and advertising.

Religion: A particular system of faith and worship.

Seasonal food: Food grown at a particular time of year.

Seasonality: The times of year when a given type of food is at its peak, either in terms of harvest or its flavour.

Task

Research one consideration when planning what to cook. Prepare a PPT presentation to share with the class next lesson.

To find out more, go to:

<https://bit.ly/3dNUMBf>



Year 9 French Autumn Term 2: En Ville







Les directions (Directions)	
Pour aller au/à la/aux...?	How do I get to the...?
Allez tout droit.	Go straight on.
Tournez à gauche!	Turn left.
Tournez à droite!	Turn right.
Prenez la première rue à gauche.	Take the first road on the left.
Prenez la deuxième rue à droite.	Take the second road on the right.
puis	then
Excusez-moi!	Excuse me...
Merci!	Thank you!
S'il vous plaît.	Please.
De rien.	You're welcome.

Les projets (Plans)	
Tu veux venir?	Do you want to come?
Je veux bien.	I want to.
On va...	We are going...
Rendez-vous à quelle heure?	When do you want to meet?
Rendez-vous à...	Let's meet at...
aujourd'hui	today
ce matin	this morning
ce soir/weekend	this evening/weekend

Au café (at the café)	
Vous désirez?	What would you like?
Je voudrais...	I would like...
un Orangina	a fizzy orange
un café crème	a milky coffee
un chocolat chaud	a hot chocolate
un thé au lait	a tea with milk
un jus d'orange	an orange juice
un coca (light)	a (diet) coke
un eau minérale	a mineral water
un croquemonsieur	a toasted cheese and ham
un sandwich au fromage	a sandwich
une crêpe	a pancake
une glace à la fraise	strawberry ice cream
des frites	chips
C'est combien?	How much is it?
Ca fait...	It comes to...

à Paris (in Paris)	
Qu'est-ce que tu vas faire à Paris?	What are you going to do in Paris?
Je vais...	I am going...
visiter la cathédrale.	to visit Notre Dame Cathedral
visiter le tour Eiffel.	to visit the Eiffel Tower
aller au musée du Louvre.	to go to the Louvre museum.
faire une balade en bateau.	to go on a boat trip.
acheter des souvenirs.	to buy souvenirs.

Phonics Focus:	
 ou 'oo'	 u 'oo'
 eu 'uh'	 -er 'ay'

Vital Verb:	
aller = to go	
Je vais... + inf	I am going...
Tu vas... + inf	You are going...
Il/elle va... + inf	He/she is going...
Nous allons... + inf	We are going...
Vous allez... + inf	You are going...
Ils/elles vont... + inf	They are going...
NEAR FUTURE TENSE	

Grammar:
An infinitive is the basic form of the verb that you find in the dictionary and translates as 'to...' (aller = to go). It has not been conjugated yet.

Language Links:	
gauche =	Someone or something that is awkward or clumsy

Geography



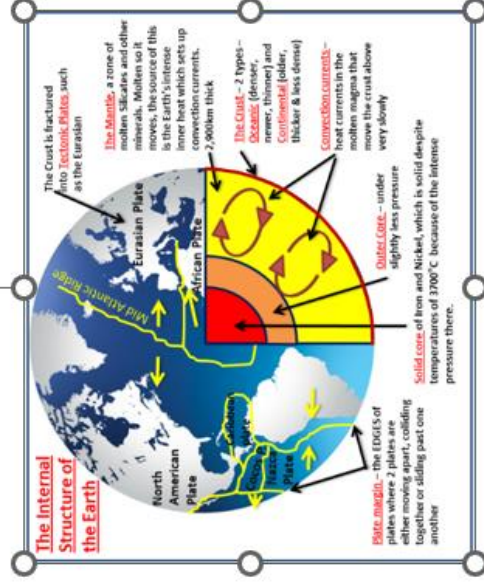
Types of Natural hazard.

A natural event (for example earthquake, volcanic eruption, tropical storm, flood) that threatens people or has the potential to cause damage, destruction and death." Can be atmospheric (hurricane), Geomorphological (landslide) or Geological (earthquake).

CHALLENGE OF NATURAL HAZARDS

©Rob Gamesby

<http://www.coollgeography.co.uk>



Factors affecting hazard risk - Not all hazards cause extreme death and destruction. Affected by Natural factors (e.g. rock type), magnitude (size of event) such as how high up on the Richter scale, population density (how many people in area affected), Level of development and capacity to cope, management via Prediction, Preparation and Prevention (life safe buildings, storm shelters), Education.

Global distribution (where they are) of earthquakes and volcanic eruptions - vast majority of both earthquakes and volcanoes occur on the plate boundaries. Most destructive and damaging around the Pacific Ring of Fire, on destructive plate margins. Shield volcanoes less destructive on constructive plate margins. Earthquakes on all 3 plate margin types. Some volcanoes not on plate margins - explained by hot spots (e.g. Hawaii)

Processes taking place at different types of plate margin

Conservative plate margins	Constructive plate margins	Destructive plate margins
<p>Slow</p> <p>Fast</p> <p>Move side by side at different speeds, this creates earthquakes along fault lines</p>	<p>the plates move apart and create volcanoes, ridges, islands and minor earthquakes</p>	<p>the plates move together destroying crust - Creates Fold mountains, trenches, volcanoes, earthquakes</p>
<p>A Conservative Plate Margin</p> <p>USA</p> <p>Mexico</p> <p>San Andreas Fault</p> <p>Pacific Plate moving relatively FASTER</p>	<p>A constructive or DIVERGENT plate margin</p> <p>Mid Atlantic Ocean Ridge - a large rift valley where magma rises from the mantle and cools.</p> <p>Volcanic Vent</p> <p>When the Ridge moves apart, new land is created.</p> <p>Magmas rise through rift valley.</p> <p>Atlantic Ocean</p> <p>Earth's Crust (lithosphere)</p> <p>Mantle</p> <p>Convection Currents Drive the plates apart</p>	<p>A Destructive (CONVERGENT) Plate Margin - The Andes Mountains in South America</p> <p>South American Plate</p> <p>South Atlantic Ocean</p> <p>Andes Mountains (folded up)</p> <p>Peru - Chile Trench and subduction zone</p> <p>Convection Currents Drive the plates together.</p> <p>TOGETHER</p>

Geography

Contrasting tectonic hazard case studies

Haiti	Japan	Reasons for differences
316,000 deaths Millions homeless Textiles industry lost 280,000 buildings destroyed Response SLOW and external	5,894 people died, Tsunami up to 40 m high Damage - 332,395 buildings, 2,126 roads, 56 bridges and 26 railways were destroyed or damaged.	<ol style="list-style-type: none">1. Secondary effects like fire and landslides2. Building design and quality3. Capacity to cope of country4. Internal immediate response5. Starting point of country i.e. Haiti already poor



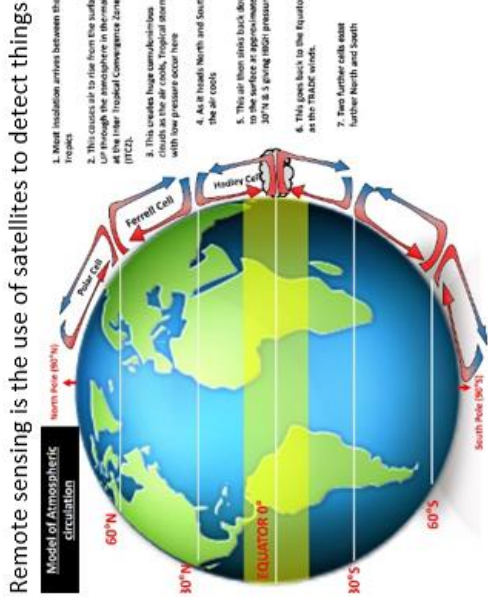
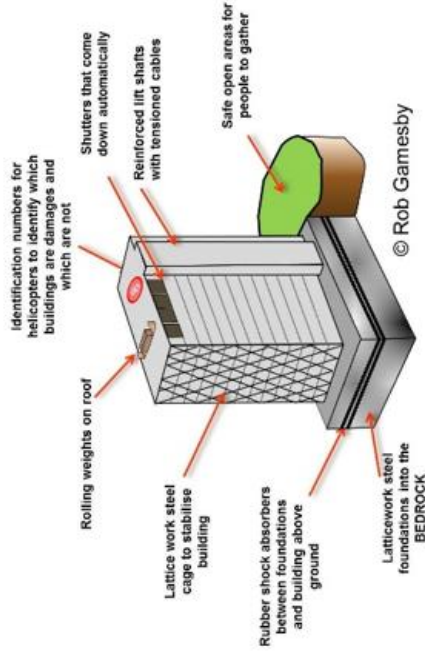
Reasons why people continue to live in areas at risk from tectonic hazards.

Preparation makes people feel safe – difficult to move – **Good job** or high standard of living – Sulphur can be mined – **Fertile volcanic soils** – **Tourism** is possible, especially adventure tourism – **minerals** such as gold can be found – **culture and religion** – coffee is often grown on volcanic soils – **Geothermal power** can be generated – poverty traps people in hazard zones – **Basalt** is available for use in construction – -engineering makes the hazard zones safer – volcanic and earthquake events are infrequent

How monitoring, prediction, protection and planning can reduce the risks from a tectonic hazard.

Humans can use lots of ways to try to reduce volcanic & earthquake risks such as –

1. Seismic waves shown on a seismograph
2. Monitoring gas emissions like Sulphur Dioxide
3. Ground deformation
4. Satellite Images and Remote Sensing - Remote sensing is the use of satellites to detect things about the Earth's surface. This is useful for monitoring any changes in volcanoes at the surface such as heat build up of deformation.
5. Laser beams - Laser beams can be used to detect plate movement by directing the beam across the fault line.



6. Protection - Buildings can be designed to withstand the shaking of the earth and to limit the loss of life and damage caused.
7. Planning - Prior to events we can plan where we will or will not allow building.

Global atmospheric circulation – set up by uneven distribution of heat over Earth's surface. Results in hurricanes around Equator, Depressions in UK, Deserts at 30°N and S, Trade winds and Westerlies that affect the UK. Model describes how air moves in 3 cells as shown on diagram.



Year 9 German Autumn Term 2: Meine Stadt



Die Wegbeschreibungen (Directions)	
Wie komme ich zum/zur...?	How do I get to the...?
Geh/Geht/Gehen Sie!!	Go...!
(nach) links	(to the) left
(nach) rechts	(to the) right
geradeaus	straight on
Nimm/Nehmt/Nehmen Sie...!	Take...
die erste Straße links	the first street on the left
die zweite Straße rechts	the second street on the right
Geh an der Ampel links!	Go left at the lights.
Geh an der Kreuzung	Go right at the crossroads.
vor dem/der	in front of the...
Entschuldigung/bitte...	Excuse me...
Bitte.	You're welcome.

Pläne (Plans)	
Möchtest du ...gehen?	Do you want to go...?
Ich möchte...gehen.	I want to go...
Wir gehen...	We go/are going...
Möchten Sie mit uns kommen?	Do you want to come with us?
Wann möchtest du treffen?	When do you want to meet?
Heute morgen	this morning
Morgen	tomorrow
Am Wochenende	at the weekend

Im Schnellimbiss (at the snack bar)	
Was möchten Sie?	What would you like?
Ich möchte einmal/zweimal/dreimal...	I would like one/two/three...
die Bratwurst	fried sausage
der Hamburger	hamburger
die Pizza	pizza
die Pommes	chips
der Salat	salad
das Eis	ice cream
die Cola	cola
das Mineralwasser	mineral water
der Tee	tea
das Fleisch	meat
der Ketchup	ketchup
die Mayo	mayo
der Senf	mustard
Das macht 8 Euros.	That's 8 euros.

In Berlin (in Berlin)	
Was wirst du in Berlin machen?	What will you do in Berlin?
Ich werde...	I will...
die Museen besuchen	visit the museums.
ins Kino gehen	go to the cinema.
Souvenirs kaufen	buy souvenirs.
Bratwurst essen	eat fried sausage.
ein Fahrradtour machen.	go on a cycle tour.

Phonics Focus:	
z	'tz'
	'oy'
ö	'er'
	ch (soft)
	'kuh'

Vital Verb:	
werden = to become	
Ich werde...+ inf	I will...
Du wirst...+inf	You will...
Er/sie wird...+ inf	He/she will...
Wir werden...+ inf	We will...
Ihr werdet...+ inf	You will...
Sie werden...+ inf	They will...
FUTURE TENSE	

Grammar:	
An infinitive is the basic form of the verb that you find in the dictionary and translates as 'to...' (gehen = to go). It has not been conjugated yet.	

Language Links:	
nimmer =	a thief/pilferer (someone who takes or steals)

History

Key Word	Meaning
Alliance	An agreement between countries that benefits each of them
Allied forces	British troops and those of Britain's allies
Allied Powers	An alliance between a number of countries including Britain, France, Russia, Italy, and The USA (from 1917).
Arms Race	A competition between countries for the development and production of weapons
Blockade	A common tactic of war in which ships belonging to an enemy nation are prevented from reaching port, normally in order to damage the enemy's economy. Blockades were used to great effect by the British against Germany in the First World War.
Censorship	Censorship blocks something from being read, heard, or seen. If you've ever heard the sound of bleeping when someone is speaking on television, that's censorship. To "censor" is to review something and to choose to remove or hide parts of it that are considered unacceptable.
Central Powers	The Central Powers included Germany, Austria-Hungary, the Ottoman Empire, and Bulgaria.
Colony	Land settled by and under the control of people from another country
Conscientious objector	A conscientious objector is someone who refuses to fight in war for moral reasons. In WW1, conscientious objectors were made to take on medical roles and other "work of national importance" on the roads and land. Only a small number of conscientious objectors were exempted from service absolutely. Most were obliged to serve in non-combatant roles or faced courts martial.
Conscript	A person who is enlisted into the army whether they want to join or not.
Eastern Front	The Eastern Front during World War I was fought in Eastern Europe between Germany, Austria-Hungary, and Bulgaria on one side and Russia and Romania on the other side.
Empire	A large group of states or colonies ruled over by a single head of state
Front line	The front line was the point at which the armies of each side met. This is where most of the fighting took place.
Kaiser	German word for emperor. Used to describe the head of unified Germany after 1871.
Militaristic	Prioritising the armed forces over other parts of society
Mobilise	Prepare and organise troops for active service
Munitions	Things needed for war, including shells, bullets, guns and uniforms
Nationalist	Believing strongly in your own country
No Man's Land	The area between the front lines of two enemy armies was called No Man's Land.
Pacifist	Someone who is against war and fighting for any reason.
Pals battalions	The Pals battalions were units in the British Army that grouped men who were friends and had enlisted together.
Patriotism	Love for your own country

History

Propaganda	Information used and distributed to present one side of an issue. Can mislead people by giving a biased or one sided view.
Schlieffen Plan	A strategy that Germany had for fighting a war on two fronts: one against France and one against Russia.
Stalemate	A situation where nobody in a conflict can win
The Balkans	An area in South-East Europe that included Albania, Bosnia, Bulgaria, Herzegovina, Greece, Kosovo, Macedonia, Montenegro, Serbia and Turkey.
Treaty of Versailles	The Treaty between the Allies and Germany that ended World War I.
Trench foot	Trench foot is caused by prolonged exposure to a cold temperature that is usually above freezing and damp, sometimes unsanitary conditions. The condition ultimately causes skin and tissue breakdown which increases the risk of infection and increases associated morbidity and mortality.
Trench warfare	A type of land warfare where each side digs long lines of trenches for protection. Much of the western front during World War I was fought for years using trench warfare. A defensive military tactic used extensively by both sides, allowing soldiers some protection from enemy fire but also hindering troops from readily advancing and thus prolonging the war.
Trenches	The typical trench system in World War I consisted of a series of two, three, four, or more trench lines running parallel to each other and being at least 1 mile (1.6 km) in depth. Each trench was dug in a type of zigzag so that no enemy, standing at one end, could fire for more than a few yards down its length.
Western front	The region of fighting that took place in Western Europe between Germany and Austria-Hungary on one side and France, Britain, and (later) the United States on the other.

Mathematics

9.4 3D Shapes.....

What do I need to be able to do?

By the end of this unit you should be able to:

- Name 2D & 3D shapes
- Recognise Prisms
- Sketch and recognise nets
- Draw plans and elevations
- Find areas of 2D shapes
- Find Surface area for cubes, cuboids, triangular prisms and cylinders
- Find the volume of 3D shapes

Keywords

2D: two dimensions to the shape e.g. length and width

3D: three dimensions to the shape e.g. length, width and height

Vertex: a point where two or more line segments meet

Edge: a line on the boundary joining two vertex

Face: a flat surface on a solid object

Cross-section: a view inside a solid shape made by cutting through it

Plan: a drawing of something when drawn from above (sometimes birds eye view)

Perspective: a way to give illustration of a 3D shape when drawn on a flat surface.

The Sparx logo consists of the word "Sparx" in a white, bold, sans-serif font, centered within a dark blue rectangular background.

Properties, nets & plans of 3D shapes: U719, U761, U743

Surface area: U929, U259, U464

Volume: U786, U174, U915

Additional higher content: U484, U116, U617

Mathematics

Name 2D & 3D shapes

	Circle		Square		Cylinder
	Triangle		Rhombus		Trapezium
	Parallelogram		Hexagon		Square based Pyramid
	Cone		Cube		Triangular Prism
	Sphere		Cuboid		Cuboid

Recognise prisms

A solid object with two identical ends and flat sides

The cross section will also be identical to the end faces

A cylinder although with very similar properties does not have flat faces so is not categorised as a prism

Sketch and recognise nets

Do they have the same number of faces?

Where do the edges join?

Are the shapes of the faces correct?

Visualise the folding of the net. Will it make the cuboid with all sides touching

Volumes

Volume is the 3D space it takes up – also known as capacity if using liquids to fill the space

Counting cubes

Some 3D shape volumes can be calculated by counting the number of cubes that fit inside the shape

Cubes/Cuboids – $\text{base} \times \text{width} \times \text{height}$

Remember multiplication is commutative

Prisms and cylinders – $\text{area cross section} \times \text{height}$

Height can also be described as depth

Areas – square units

Volumes – cube units

Areas and volumes can be left in terms of π

Surface area

Sketching nets first helps you visualise all the sides that will form the overall surface area

Sum of all sides is surface area

For cubes and cuboids you can also find one of each face and double it

For other shapes – not all the sides are the same, so calculate the individually

Area of 2D shapes

Rectangle: $\text{Base} \times \text{Height}$

Triangle: $\frac{1}{2} \times \text{Base} \times \text{Perpendicular height}$

Parallelogram/Rhombus: $\text{Base} \times \text{Perpendicular height}$

Area of a trapezium: $\frac{(a+b) \times h}{2}$

Area of a circle: $\pi \times \text{radius}^2$

Surface area - cylinders

The area of the circle: $\pi \times \text{radius}^2$

The width of this face is the same as the circumference: $\pi \times \text{diameter} \times \text{height}$

$2 \times \pi \times \text{radius}^2 + \pi \times \text{diameter} \times \text{height}$

Plans and elevations

The direction you are considering the shape from determines the front, and side views

front, side, plan, 3D Shape

Nets of cuboids

1cm grids help to draw accurately

Mathematics

9.5 Constructions & congruency.....

What do I need to be able to do?

By the end of this unit you should be able to:

- Draw and measure angles
- Construct scale drawings
- Find locus of distance from points, lines, two lines
- Construct perpendiculars from points, lines, angles
- Identify congruence
- Identify congruent triangles

Keywords

Protractor: piece of equipment used to measure and draw angles

Locus: set of points with a common property

Equidistant: the same distance

Discorectangle: (a stadium) — a rectangle with semi circles at either end

Perpendicular: lines that meet at 90°

Arc: part of a curve

Bisector: a line that divides something into two equal parts

Congruent: the same shape and size

Interpreting scale drawings: U257

Constructions: U678, U187, U787, U245, U979

Congruence: U790, U866

Higher level content: U820

Sparx

Mathematics

Locus of a distance from a straight line

All points are equidistant (the same distance) from line.

The ends of the line are fixed points

Equipment needed
The line is straight so a ruler is used for the straight lines parallel to your original line

Locus of a distance from two lines

Also an angle bisector
This cuts the angle in half

From the angle vertex draw two arcs that cut the lines forming the angle

Keep the compass the same size and use the new arcs as centres to draw intersecting arcs in the middle

Join the vertex to the intersection

Constructing Triangles

Side, Angle, Angle

Side, Angle, Side

Side, Side, Side

Link to steps →

Locus equidistant from two points

Also a perpendicular bisector
Because if the points are joined, this new line intersects it at a 90°

Join the intersections with a ruler

Keep the compass the same size and draw two arcs from each point

Also points on this line are equidistant from both points

Congruent figures

Congruent figures are identical in size and shape – they can be reflections or rotations of each other

Congruent shapes are identical – all corresponding sides and angles are the same size

Because all the angles are the same and $OC=OM$ and $BC=LM$ triangles OBC and NLM are **congruent**

Construct a perpendicular from a point

Use a compass and draw an arc that cuts the line. Use the point to place the compass

Keep the compass the same distance and now use your new points to make new intersecting arcs

Connecting the arcs makes the bisector

If P is a point on the line the steps are the same

Congruent triangles

Side-side-side
All three sides on the triangle are the same size

Angle-side-angle
Two angles and the side connecting them are equal in two triangles

Side-angle-side
Two sides and the angle in-between them are equal in two triangles (it will also mean the third side is the same size on both shapes)

Right angle-hypotenuse-side
The triangles both have a right angle, the hypotenuse and one side are the same

Draw and measure angles

Make a mark at 35° with a pencil and join to the angle point (use a ruler)

Draw a 35° angle

The angle

Make sure the cross is at the end of the line (where you want the angle)

Scale drawings

A picture of a car is drawn with a scale of 1:30

For every 1cm on my image is 30cm in real life

The car image is 10cm

Image: Real life
10cm : 300cm
1 : 30

Locus of a distance from a point

All points are equidistant (the same distance) from the fixed point in the middle

Equipment needed
The radius is the distance from the fixed point

If the point is in the corner it can only make a quarter circle

Music

Keyboard Skills

Exploring Treble Clef Reading and Notation



A. Layout of a Keyboard/Piano

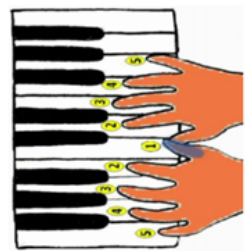
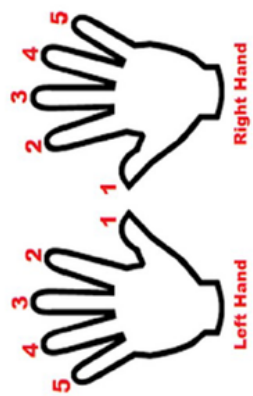


A piano or keyboard is laid out with **WHITE KEYS** and **Black Keys** (see section G). C is to the left of the two Black Keys and the notes continue to G then they go back to A again. Notes with the same letter name/pitch are said to be an **OCTAVE** apart. **MIDDLE C** is normally in the centre of a piano keyboard.

D. Keyboard Functions



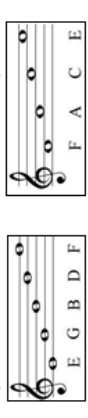
E. Left Hand/Right Hand (1-5)



B. Treble Clef & Treble Clef Notation

A **STAVE** or **STAFF** is the name given to the five lines where musical notes are written. The position of notes on the stave or staff shows their **PITCH** (how high or low a note is). The **TREBLE CLEF** is a symbol used to show high-pitched notes on the stave and is *usually* used for the right hand on a piano or keyboard to play the **MELODY** and also used by high pitched instruments such as the flute and violin. The stave or staff is made up of 5 **LINES** and 4 **SPACES**.

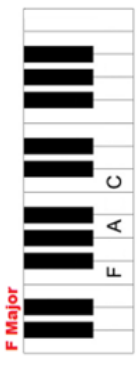
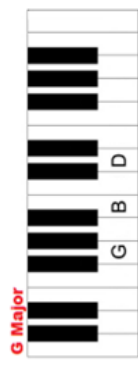
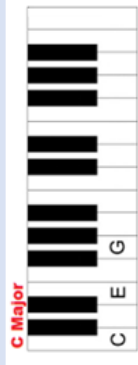
Every Green Bus Drives Fast. Notes in the SPACES spell "FACE"



Notes from **MIDDLE C** going up in pitch (all of the white notes) are called a **SCALE**.



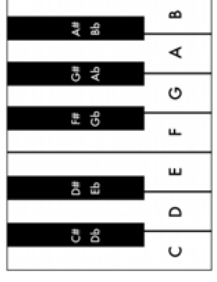
C. Keyboard Chords



Play one – Miss one – play one – miss one – play one

F. Black Keys and Sharps and Flats

There are five different black notes or keys on a piano or keyboard. They occur in groups of two and three right up the keyboard in different pitches. Each one can be a **SHARP** or a **FLAT**. The # symbol means a **SHARP** which raises the pitch by a semitone (e.g. C# is higher in pitch (to the right) than C). The b symbol means a **FLAT** which lowers the pitch by a semitone (e.g. Bb is lower in pitch (to the left) than B). Each black key has 2 names – C# is the same as Db – there's just two different ways of looking at it! Remember, black notes or keys that are to the **RIGHT** of a white note are called **SHARPS** and black notes to the **LEFT** of a white note are called **FLATS**.



Personal Development

Define: Sexual Consent		Consent is:		What does the Law say?		
The giving of permission by a person to engage in any form of sexual activity including penetrative and oral sex.		1	Freely given. It's not okay to pressure, trick, or threaten someone into saying yes.	Act	Definition	Consequence
2		Reversible. It's okay to say yes and then change your mind — at any time!		Rape	A rape is when a person uses their penis without consent to penetrate the vagina, mouth, or anus of another person.	Rape is punished by a maximum of fifteen years' in prison. Aggravated Rape is punished by a maximum of twenty years' in prison Both offences would result in placement on the sex offenders register.
3		Informed. You can only consent to something if you have all the facts.		Sexual Assault	Sexual assault is when a person is coerced or physically forced to engage against their will, or when a person, touches another person sexually without their consent. Touching can be done with any part of the body or with an object.	Up to 10 years in prison and placement on the sex offenders register
4		Enthusiastic. You should do stuff you WANT to do, not things people expect you to do. If someone doesn't seem enthusiastic stop and check in.		Sex Between Minors	When both parties involved the sexual activity are under 16 but have consented to the activity.	Technically the law is that if two 13 – 15 year olds engage in consensual sexual activity and each knows that the other is under 16, they will both be guilty of an offence carrying a maximum penalty of five years' imprisonment, however it is unlikely the CPS will prosecute. If one party is under 13 and the other under 18 it is statutory Rape which is punishable by life imprisonment, but the average is 6-7 years when prosecuted.
5		Specific. Saying yes to one thing (like going to the bedroom to make out) doesn't mean you're saying yes to other things (like having sex).				
Define: Affirmative Consent		When can consent not be given?		Who Can you turn to for help and Support		
Consent is only given when a person agrees verbally to engage in sexual activities including penetrative and oral sex.		1	When a person is drunk or high, to the point that they are unable to speak or look after themselves.	Parents or trusted family members	The Police / Community support officers	
Define: Coercion		2	Asleep or Passed Out – if they are not conscious they are unable to agree to any sexual activity. If someone passes out whilst engaging in sexual activity – STOP!	School Safe Guarding Team or any member of staff.		
The action or practice of persuading someone to do something they wouldn't normally do or something they don't want to do by using force or threats.		3	They are Underage – Legally a person under the age of 16 cannot give consent to any sexual activity.	NSPCC	Helpline: 0800 800 5000 (24 hours, every day) nspcc.org.uk	
Define: A person who is a minor		4	Mental disability or learning difficulties which mean they are unable to fully understand what they are consenting to.	Childline	Helpline: 0800 1111 (24 hours, every day) https://www.childline.org.uk	
A person who is under the age of 18 and legally considered a child.				Rape Crisis	Helpline: 0800 802 9999 (12-2:30 and 7-9:30) rapecrisis.org.uk	
				Survivors UK – Male Rape and Sexual Abuse Support	survivorsuk.org	
				RASAC: (Rape and Sexual Abuse Support Centre)	National Helpline: 0800 802 9999 (12-2:30 & 7-9:30) rasac.org.uk	

Personal Development

Define: Contraception
Methods that are used to prevent pregnancy from occurring during sexual activity.
Define: Hormonal Methods
Contraceptive methods with use hormones to prevent pregnancy, usually used by Women only.
Define: Barrier Methods
Contraceptive methods which prevent pregnancy by stopping the sperm from reaching the egg.
Define: Combination Methods
Contraceptive methods which use both hormonal and barrier methods to prevent pregnancy.
Define: Natural Methods
Contraceptive methods which do not use hormones or barriers, mostly focused on fertility awareness

Hormonal		Birth Control	How to Use	Prescription Needed	Protects Against STDs	Where to get more help and support
	Monthly oral contraceptive (the Pill)		Take one pill every day as directed.	Yes	No	<ul style="list-style-type: none">Your DoctorCommunity NurseSchool NurseNHS Onlinewww.helathforteens.co.ukwww.brook.co.uk
	Extended-regimen oral contraceptive		Take one pill every day for three months as directed.	Yes	No	
	Patch		Apply to skin and change weekly.	Yes	No	
	Vaginal ring (hormonal)		Insert monthly and leave in place for 21 days.	Yes	No	
	Injection		Get injections every three months.	Yes, injections given in health care provider's office	No	
	Hormonal intrauterine contraceptive (IUC)		Inserted in the uterus and can remain for up to three or five years.	Yes, IUC inserted in health care provider's office	No	
	Implantable hormonal contraceptive		Implanted under the skin of the arm and can remain for up to three years.	Yes, implanted in health care provider's office	No	
	Spermicide		Apply every time before sex.	No	No	
	Diaphragm		Insert every time before sex. Keep in place for six hours after sex.	Yes	No	
	Contraceptive sponge		Insert vaginally. Effective for 24 hours. Keep in place for six hours after sex.	No	No	
Non-hormonal		Cervical cap	Insert every time before sex and keep in place for six hours after sex.	Yes	No	Things to Remember <ul style="list-style-type: none">Contraception is a personal choice.You may need to try more than one to find what works best for you.You will need to consult your Doctor for most contraceptive methods.
		Female condom	Insert every time before sex.	No	Yes	
		Male condom	Partner must wear every time during sex.	No	Yes (latex or synthetic only)	
		Non-hormonal intrauterine contraceptive (IUC)	Inserted in the uterus and can remain for up to 10 years.	Yes, IUC inserted in health care provider's office	No	
		Female sterilization or male sterilization (vasectomy)	No action required after surgery.	No, performed surgically	No	

Personal Development

Define: Sexually transmitted Infection Sexually Transmitted Infections are infections that are passed on mainly through sexual contact both vaginally, anally and orally.	Define: Bacteria Single-celled microorganisms that can exist either as independent (free-living) organisms or as parasites (dependent on another organism for life).	Define: Virus A microorganism that is smaller than bacteria that cannot grow or reproduce apart from a living cell. A virus invades living cells and uses their chemical machinery to keep itself alive and to replicate itself.	Define: Parasite A plant or an animal organism that lives in or on another and takes its nourishment from that other organism.
Infection	Symptoms	Treatment	Where to get more help and support
Chlamydia: Bacterial Infection	Women often have no symptoms or may have pain with sexual intercourse, lower abdominal pain, changes in bleeding pattern. Men may have no symptoms or may have watery or thick discharge from penis, pain or urinating.	Antibiotics	<ul style="list-style-type: none">Your DoctorCommunity NurseSchool NurseNHS Onlinewww.helathfortegns.co.ukwww.brook.co.uk
Gonorrhoea: Bacterial Infection	Women usually have no symptoms, but may have pain with sex, vaginal discharge, lower abdominal pain. Men may have no symptoms or discharge from penis, discharge from anus, pain in testicles, pain on urinating.	Antibiotics	
Syphilis: Bacterial Infection	Painless ulcer (chancere) usually on genitals; later swollen glands, rash, hair loss.	Antibiotics	
Bacterial vaginosis Bacterial Infection	If the control of the normal bacteria in a healthy vagina fails, an overgrowth of certain bacteria can occur. Greyish white, smelly vaginal discharge.	Oral tablets and/or vaginal pessaries.	
Genital warts Viral Infection	Fleshy or flat lumps on or around genitals, anus, groin or thigh.	Visible warts can be treated, but the infection cannot be cured..	
Genital herpes Viral Infection	Painful, red blisters, little sores or ulcers, flu-like symptoms, and sometimes a discharge.	Anti-herpes drugs and pain relief can be given to treat symptoms, but the infection cannot be cured.	
Hepatitis B Viral Infection	May have no symptoms or mild flu-like illness or vomiting, abdominal pain, dark urine and yellowing of the skin and whites of the eyes. Can be passed on through vaginal, anal or oral sex without a condom with someone who has the infection; from mother-to-baby. By sharing needles, syringes, toothbrushes, razors and unsterilized instruments that pierce the skin.	Not curable, but it is treatable with Anti-viral medications	<ul style="list-style-type: none">You can have an STI and not know it.Only a Doctor can diagnose an STI.If you are diagnosed with an STI you must inform prior partners so they can be tested.Some STI's can be transmitted without having sex
Trichomoniasis Parasitic Infection	Women may have no symptoms, but there may be a yellowy-green frothy vaginal discharge. Men usually have no symptoms.	Antibiotic tablets and/or vaginal pessaries.	
Public lice - crabs Parasitic Infection	Intense itching in the pubic area, small nits (eggs) on pubic hair.	Special shampoo, cream or spray applied to pubic area. Wash all clothing and bed linen.	
HIV Human Immunodeficiency Virus	HIV attacks the white blood cells and causes damage to the immune system so that it can be difficult to fight off infections. Usually no obvious symptoms for many years. HIV can be transmitted through blood, semen and vaginal fluids, sharing needles and from mother-to-baby.	No immunisation or cure available although there are medications to manage the condition.	
Pelvic Inflammatory disease (PID)	An infection of the womb and fallopian tubes that can cause infertility. Pain during sex, sore abdomen or back, heavy, irregular or painful periods, spotting, high temperature, feeling sick; sometimes no symptoms.	Antibiotics and rest.	

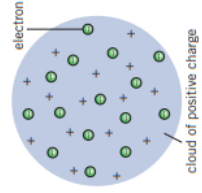
Development of the model of the atom

Dalton's model

John Dalton thought of the **atom** as a solid sphere that could not be divided into smaller parts. His model did not include **protons**, **neutrons**, or **electrons**.

The plum pudding model

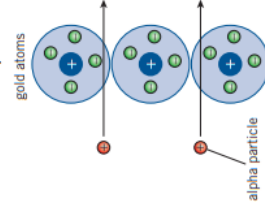
Scientists' experiments resulted in the discovery of sub-atomic charged particles. The first to be discovered were electrons – tiny, negatively charged particles. The discovery of electrons led to the plum pudding model of the atom – a cloud of positive charge, with negative electrons embedded in it. Protons and neutrons had not yet been discovered.



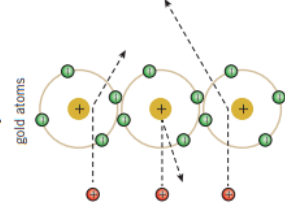
Alpha scattering experiment

- 1 Scientists fired small, positively charged particles (called alpha particles) at a piece of gold foil only a few atoms thick.
- 2 They expected the alpha particles to travel straight through the gold.
- 3 They were surprised that some of the alpha particles bounced back and many were deflected (alpha scattering).
- 4 To explain why the alpha particles were repelled the scientists suggested that the positive charge and mass of an atom must be concentrated in a small space at its centre. They called this space the **nucleus**.

scientists predicted:

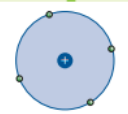


actually observed:



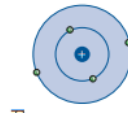
Nuclear model

Scientists replaced the plum pudding model with the nuclear model and suggested that the electrons **orbit** the nucleus, but not at set distances.



Electron shell (Bohr) model

Niels Bohr calculated that electrons must orbit the nucleus at fixed distances. These orbits are called **shells** or **energy levels**.



The proton

Further experiments provided evidence that the nucleus contained smaller particles called protons. A proton has an opposite charge to an electron.

Size

The atom has a radius of 1×10^{-10} m. Nuclei (plural of nucleus) are around 10 000 times smaller than atoms and have a radius of around 1×10^{-14} m.

Relative mass

One property of protons, neutrons, and electrons is **relative mass** – their masses compared to each other. Protons and neutrons have the same mass, so are given a relative mass of 1. It takes almost 2000 electrons to equal the mass of a single proton – their relative mass is so small that we can consider it as 0.

The neutron

James Chadwick carried out experiments that gave evidence for a particle with no charge. Scientists called this the neutron and concluded that the protons and neutrons are in the nucleus, and the electrons orbit the nucleus in shells.

Elements and compounds

Elements are substances made of one type of atom. Each atom of an element will have the same number of protons.

Compounds are made of different types of atoms chemically bonded together. The atoms in a compound have different numbers of protons.



Mixtures

- A mixture consists of two or more elements or compounds that are not chemically combined together.
- The substances in a mixture can be separated using physical processes.
- These processes do not use chemical reactions.

Separating mixtures

- filtration – insoluble solids and a liquid
- crystallisation – soluble solid from a solution
- simple distillation – solvent from a solution
- fractional distillation – two liquids with similar boiling points
- paper chromatography – identify substances from a mixture in solution

Atoms and particles

	Relative charge	Relative mass	
Proton	+1	1	= atomic number
Neutron	0	1	= mass number – atomic number
Electron	-1	0 (very small)	= same as the number of protons

All atoms have equal numbers of protons and electrons, meaning they have no overall charge:

$$\text{total negative charge from electrons} = \text{total positive charge from protons}$$



Isotopes

Atoms of the same element can have a different number of neutrons, giving them a different overall mass number.

Atoms of the same element with different numbers of neutrons are called **isotopes**.

The **relative atomic mass** is the average mass of all the atoms of an element:

$$\text{relative atomic mass} = \frac{(\text{abundance of isotope 1} \times \text{mass of isotope 1}) + (\text{abundance of isotope 2} \times \text{mass of isotope 2})}{100}$$

Key terms

Make sure you can write a definition for these key terms.

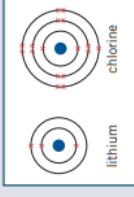
abundance	atom	atomic number	aqueous	compound	electron
element	energy level	isotope	neutron	nucleus	orbit
product	proton	reactant	relative atomic mass	relative mass	shell

Drawing atoms

Electrons in an atom are placed in fixed shells. You can put

- up to two electrons in the first shell
- eight electrons each in the second and third shells.

You must fill up a shell before moving on to the next one.



Changes of state

Changes of state and conservation of mass

Changes of state are physical changes because no new substances are produced. The mass always stays the same because the number of particles does not change.

Particles and kinetic energy

When the temperature of a substance is increased, the kinetic energy store of its particles increases and the particles vibrate or move faster.

If the kinetic store of a substance's particles increases or decreases enough, the substance may change state.

Density

You can calculate the density of an object if you know its mass and volume:

$$\text{density (kg/m}^3\text{)} = \frac{\text{mass (kg)}}{\text{volume (m}^3\text{)}} \quad \rho = \frac{m}{V}$$



Internal energy

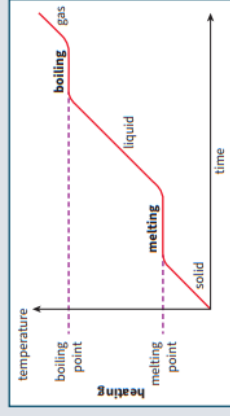
Heating a substance increases its **internal energy**.

Internal energy is the sum of the total kinetic energy the particles have due to their motion and the total potential energy the particles have due to their positions relative to each other.

Latent heat

In a graph showing the change in temperature of a substance being heated or cooled, the flat horizontal sections show when the substance is changing state.

The energy transfers taking place during a change in state do not cause a change in temperature, but do change the internal energy of the substance.



States of matter

Gas		<ul style="list-style-type: none"> particles are spread out almost no forces of attraction between particles large distance between particles on average particles move randomly at high speed low density no fixed volume or shape can be compressed and can flow spread out to fill all available space
Arrangement		
Movement		
Properties		
Liquid		<ul style="list-style-type: none"> particles are in contact with each other forces of attraction between particles are weaker than in solids particles are free to move randomly around each other usually lower density than solids fixed volume shape is not fixed so they can flow
Arrangement		
Movement		
Properties		
Solid		<ul style="list-style-type: none"> particles held next to each other in fixed positions by strong forces of attraction particles vibrate about fixed positions high density fixed volume fixed shape (unless deformed by an external force)
Arrangement		
Movement		
Properties		

The relationship between temperature and pressure in gases

Gas temperature

The particles in a gas are constantly moving in random directions and with random speeds. The temperature of a gas is related to the average kinetic energy of its particles. When a gas is heated, the particles gain kinetic energy and move faster, so the temperature of the gas increases.

If the temperature of a gas in a sealed container is increased, the pressure increases because

- the particles move faster so they hit the surfaces with more force
- the number of these impacts per second increases, exerting more force overall.

Gas pressure

The pressure a gas exerts on a surface, such as the walls of a container, is caused by the force of the gas particles hitting the surface. The pressure of a gas produces a net force at right angles to the walls of a container or any surface.

If a gas is compressed quickly, for example, in a bicycle pump, its temperature can rise. This is because

- compressing the gas requires a force to be applied to the gas – this results in work being done to the gas, since work done = force × distance
- the energy gained by the gas is not transferred quickly enough to its surroundings.

Key terms

Write a definition for these key terms.

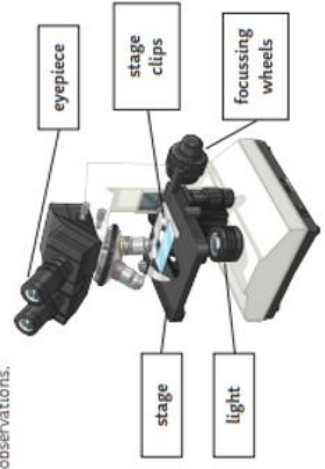
boiling internal energy condensation latent heat conservation of mass specific latent heat density melting evaporation sublimation freezing vapourisation fusion

B1 Key Concepts in Biology

Required Practical

Microscopy Required Practical

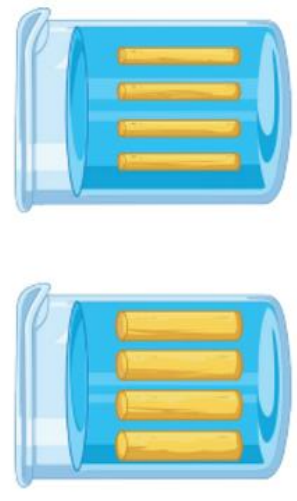
- Includes preparing a slide, using a light microscope, drawing any observations – use a pencil and label important observations.



Osmosis and Potato Practical

- Independent variable – concentration.
- Dependent variable – change in mass.
- Control variable – volume of solution, temperature, time, surface area of the potato.

The potato in the sugar solution will lose water and so will have less mass at the end; the potato in the pure water solution will gain water.



Specialised Cells

When a cell changes to become a specialised cell, it is called differentiation.

Specialised Cell	Function	Adaptation
sperm	To get the male DNA to the female DNA.	Streamlined head, long tail, lots of mitochondria to provide energy.
nerve	To send electrical impulses around the body.	Long to cover more distance. Has branched connections to connect in a network.
muscle	To contract quickly.	Long and contain lots of mitochondria for energy.
root hair	To absorb water from the soil.	A large surface area to absorb more water.
phloem	Transports substances around the plant.	Pores to allow cell sap to flow. Cells are long and joined end-to-end.
xylem	Transports water through the plant.	Hollow in the centre. Tubes are joined end-to-end.

Equations and Maths

Equation

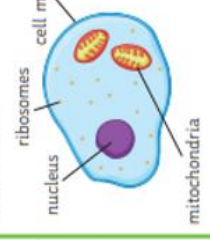


Maths Skills

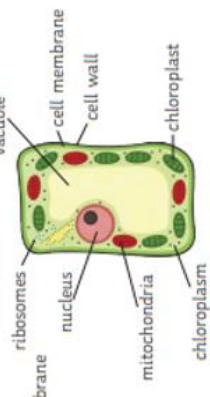
Conversions:
Micrometres to millimetres: divide by 1000.
Standard Form:
 $0.003 = 3 \times 10^{-3}$
 $5.6 \times 10^{-5} = 0.0056$

Prokaryotic and Eukaryotic Cells

Animal Cells



Plant Cells



Plant and animal cells have similarities and differences:

	Animal	Plant
nucleus	✓	✓
cytoplasm	✓	✓
chloroplast	X	✓
cell membrane	✓	✓
permanent vacuole	X	✓
mitochondria	✓	✓
ribosomes	✓	✓
cell wall	X	✓

Bacterial Cells

Bacterial cells do not have a true nucleus, they just have a single strand of DNA that floats in the cytoplasm. They contain a plasmid.

