Knowledge Organisers
Year 8
Summer 2024

Knowledge Organisers

Contents

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

An Introduction to Knowledge Organisers

What is a Knowledge Organiser?

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

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

What are the benefits of knowledge organisers?

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

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

How can the students use them?

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

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

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

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

How can parents use them?

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

How the booklet is organised

The knowledge organisers are in alphabetical order by subject.

YEAR 8
Knowledge Organiser

Mexican Culture
Day of the Dead

KEYWORDS

Culture	Tone/value
Pattern	Gradient
Symbolism	Colour
Ceramic	3D Design
Calaveras	Symmetry

Throughout this project you will learn about the Mexican festival 'Day of the Dead.

You will learn:

- About the festival and Mexican Culture
- About the significance of symbols
- How to create your own Calavera design

For your final piece you will learn how to produce a clay slab Calavera

SKILLS

- To develop work from the design stage into clay
- To learn how to develop ceramic skills (score and slip, incise, apply and add clay, carve, impressing
- Manipulate different materials
- Observation in drawing
- Painting techniques
- Colour mixing
- Developing imagination to create meaningful artworks
- Developing intentions and ideas
- Presentation skills

Clay Vocabulary

Computer Misuse Act 1990

The CMA was made law in 1990 and has been updated several times since. It outlines four offences:

1.Unauthorised access to computer material.

2.Unauthorised access to computer material with intent to commit further crime.

- Fraud or blackmail could be committed with the information found out

3.Unauthorised modification of computer material

- This means changing programs or data on a computer.
- Using malware, such as viruses and trojans.

4. Making, supplying or obtaining anything that can be used to assist in hacking a computer system.

- This means creating, distributing or knowingly getting malware.

How to Spot Fake News

- Has the story been reported anywhere else? Is it on the radio, TV or in the newspapers?
- Have you heard of the organisation that published the story?
- Does the website where you found the story look genuine? Does it look like a copycat website?
- Does the website address at the very top of the page look real? Is the end of the website something normal like '.co.uk' or '.com', and not something unusual, like 'com.co'?
- Does the photo or video look normal?
- Does the story sound believable?

Computing: The Impact of Computers on Society

How society has been shaped by information technology

Why are Games so Addictive?

Tactics used by games designers to keep you playing:

1. They are often free.
2. Earn rewards for playing.
3. Punishments for not playing.
4. Notifications to remind you to play.
5. Use an in-game currency to buy game enhancements.
6. Progression points, such as XP.
7. Endless games.
8. Complete levels with a scoring system, such as stars.
9. Daily rewards that increase as you play more.
10. Global league tables.

Copyright

Key words:

Copyright is a law to protect creators of work from other people stealing it.

Work can mean pieces of literature, photographs, artwork, music, video software etc.

Plagiarism is passing off somebody else's work as yours.

Public domain work is not protected by copyright law.

Creative commons licences allow certain things to be done to work. This is decided by the owner.

Attribution is giving the owner credit for the work.

Blood Brothers

- Willy Russel wrote the play Blood Brothers in the 1970's.
- The main characters are Edward and Mickey; two twins separated by birth.
- Mrs Johnstone and Mrs Lyons demonstrate the class divides in Liverpool at the time. They are both the parents of the boys.
- Linda is both brothers' best friend and Mickey's future wife.
- Prologue – Piece of text before the action explaining what is about to happen.
- Musical theatre- Theatre created with song.

Theatre through the ages

- Greek theatre – Chorus, amphitheatre, masks and movement.
- Medieval – trades, biblical stories and guild.
- Commedia – Exaggeration, masks, body language, characterisation,
- Kabuki – Dance, design, set, costume and make-up.
- Victorian theatre – Stock characters, Melodrama, Shakespeare, globe theatre.
- Naturalism – Stanislavsky, emotional memory, relaxation, character building.
- Brecht – Epic theatre, non- naturalism, placards, alienation.

Let him ave it

- Verbatim Theatre
- Using theatre to explore a real-life story
- Exploring the background of characters in order to build on and adapt the characterisation that we use.
- Exploring capital punishment and the Pros/Cons
- Cross-cutting
- Teacher in Role
- Conscious Alley
- Non-naturalism

A midsummers night dream

Key Words

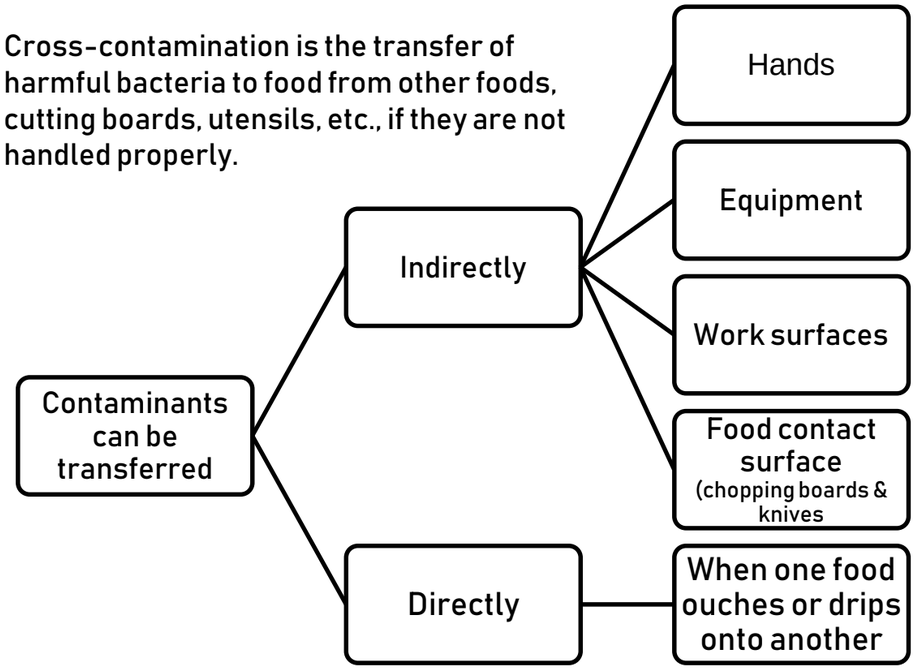
Employability

• A Mid Summers Night Dream is a play written by William Shakespeare. • Key characters of Egeus, the fairies and Helena and Hermia. • Stage combat- BEDPAN • Actioning- Actioning is when an actor uses a verb to describe how the character would deliver the line. Each line could have a different action word • Proxemics- Using space/distance to show the relationship between characters on stage. • Animal instincts- a naturalistic techniques, using animal mannerism to help develop a character.	• Pitch • Pace • Pause • Volume • Tone • Diction • Choral Speaking • Role on the wall • Gait • Body Language • Facial Expression • Posture • Cross – cutting • Marking the moment • Direct Address • Interpretation of text • Genre • Style <u>Important Practitioner:</u> ➢ Bertolt Brecht 	• Team work • Collaboration • Listening Skills • Creative Thinking • Leadership • Focus • Concentration • Positivity • Confidence • Self-Belief • Problem solving • Reflection • Refining work • Independence

Year 8 Cooking & Nutrition Knowledge Organiser

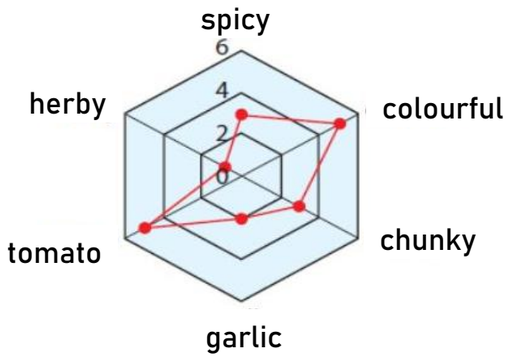
Food Hygiene

Cross-contamination is the transfer of harmful bacteria to food from other foods, cutting boards, utensils, etc., if they are not handled properly.



Sensory Testing/Star Profile Charts

- These kind of tests can be used to find out what people particularly like about a food product to help build up a profile of it according to a range of sensory qualities such as saltiness, smoothness, crispiness, flavour.
- Star profile –This type of test gets testers to describe the appearance, taste and texture of a food product on a star chart.



Hygiene & Safety Rules
Tie up long hair
Wear an apron
Tuck tie in
Wash hands
No running
Use oven gloves when necessary
Clean practical equipment thoroughly

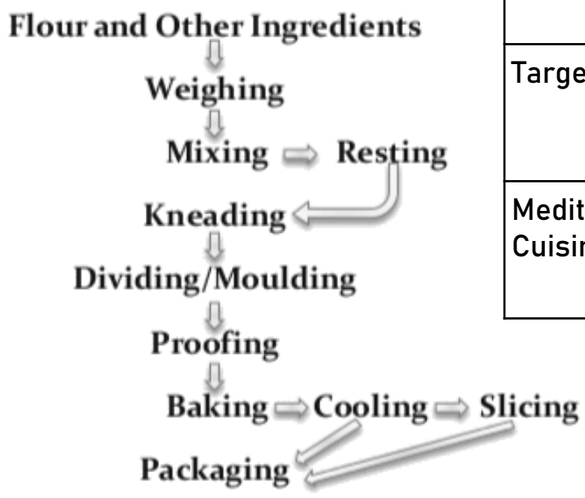
Strategies for Choosing Recipes

1. Pick recipes based on common ingredients that are easy to get.
2. Cook things you really want to eat.
3. Check if you have the correct equipment required for making.
4. Do you have the skills to make the dish?
5. Do you have the time to make the dish?

Example Time Plan

Time	Process	Hygiene & Safety
8:50 – 9:00	Collect all equipment and ingredients. Wash hands.	Is fridge 0°C - 4°C?
9:00 – 9:15	Dice onion, peppers and mushrooms.	Use a green chopping board. Use bridge and claw techniques.
9:15 – 9:30	Thread vegetables onto a skewer. Make dressing.	Ensure skewer has been soaked in cold water.

Bread Production Flow Chart



Key vocabulary	
Design Brief	An written outline which explains the aims and objectives and milestones of a design project.
Task Analysis	Breaking a design brief down to understand the requirements of the task.
Target Audience	The person or people most likely to be interested in your design or product.
Mediterranean Cuisine	Food from the countries that surround the Mediterranean Sea.

Year 8 Product Design Knowledge Organiser

Picture Frame Clock Design

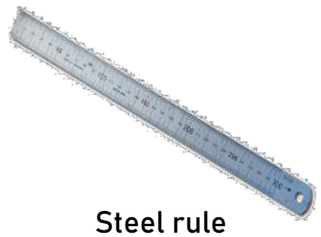
Key Skills

- Responding to a Design Brief & identifying an audience
- Developing CAD skills using 2D Design tools to create a clock face design appropriate for a target audience
- Applying Health & Safety procedures and PPE in the workshop environment
- Identify specific workshop tools and equipment
- Developing practical skills to create lap & rebate joints to join materials
- Knowledge of specific timbers & their origins
- Inserting a clock mechanism
- Prototype modelling including finishing & presentation skills
- Evaluating the manufacturing process

Tools for working with Timber

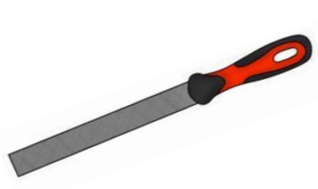

Try square


Bench vice


Steel rule


Marking gauge


Tenon saw


File


Belt & Disc Sanders


Coping Saw

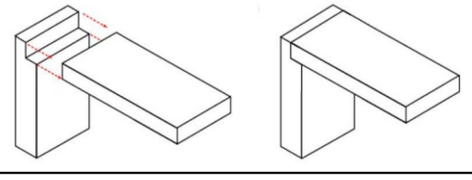

Bench hook


Pillar drill

Joining materials – construction techniques

Lap & Rebate joints

A lap or rebate joint is where two pieces of material overlap. This joint can be used to join wood, plastic, or metal.



Key vocabulary

Function	What a product does, how it works and what it will be used for?
Target Audience	The person or people most likely to be interested in your design or product.
Wood grain	Wood grain is the pattern made by the wood fibres in trees when it grows.
Materials	What something is made from.
Clock mechanism	This is the engine of a watch that makes the clock and its functions work.
Finishing	The process of applying a finish to preserve or protect a material & improve aesthetics.
Modelling	To present ideas in 2D & 3D to the user (target audience) or client.
Prototype	A prototype is a model that is built to test to see if it is successful or whether it needs further modification or improvements.
PPE	Personal protective equipment are items

Timber is a natural material with imperfections, knots and grain – always sand with the grain

Softwood 	From coniferous trees that are evergreen, which are faster to grow and are less expensive than hardwoods. Softwoods are a sustainable material as the resource can be regrown and not depleted. Softwoods are strong and easy to work with.

Manufactured boards are timber produced by gluing wood layers or wood fibres together.

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

Year 8 Product Design Knowledge Organiser

Pizza Cutter

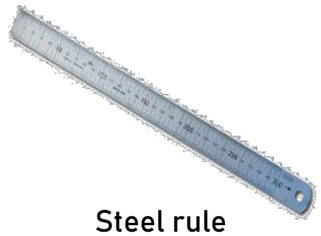
Key Skills

- Responding to a Design Brief
- Identifying a target audience and product function
- Applying Health & Safety procedures and PPE in the workshop environment
- Developing practical skills to shape and manipulate acrylic and aluminium
- Become confident in joining methods suitable for plastics and metals
- Develop an ergonomic design for users
- Identifying specific workshop tools and equipment
- Manufacturing a prototype model
- Finishing materials
- Presentation skills
- Evaluating the manufacturing process

Tools for working with metal and plastic

Ball Pein Hammer

Bench vice



Steel rule

Scriber

Center Punch

File

Metalworking Lathe

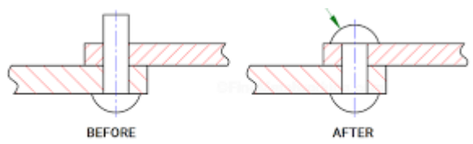
Abrasive Paper

Buffing Wheel

Pillar drill

Joining materials – construction techniques

A rivet is a permanent mechanical fastener. Before being installed, a rivet consists of a smooth cylindrical shaft with a head on one end. The end opposite to the head is called the tail.



Key vocabulary

Ergonomics	Ergonomics aims to make sure that tasks, equipment, information and the environment fit each worker.
Turning	Turning is the process of using lathes to remove material from the outer diameter of a rotating workpiece.
Diameter	In geometry, a diameter of a circle is any straight line segment that passes through the center of the circle and whose endpoints lie on the circle.
Materials	What something is made from.
Tolerance	Engineering tolerance is the permissible limit or limits of variation in: a physical dimension; a measured value or physical property of a material, manufactured object, system, or service; other measured values
Finishing	The process of applying a finish to preserve or protect a material & improve aesthetics.
Prototype	A prototype is a model that is built to test to see if it is successful or whether it needs further modification or improvements.
PPE	Personal protective equipment are items such as goggles and aprons.

Aluminium

Aluminium is the most abundant metal in the Earth's crust (8.1%) but is rarely found un-combined in nature. It is usually found in minerals such as bauxite and cryolite. These minerals are aluminium silicates.

Acrylic

Acrylic is a transparent plastic material with outstanding strength, stiffness, and optical clarity. Acrylic sheet is easy to fabricate, bonds well with adhesives and solvents, and is easy to thermoform. It has superior weathering properties compared to many other transparent plastics.

Year 8 Textiles Knowledge Organiser

Sustainable Children's Toy

Key Skills

- Responding to a Design Brief
- Analysing existing products
- Identifying a target audience
- Designing & annotating to include a range of a range of decorative and construction techniques
- Demonstrating ability to complete decorative techniques:
  - Tie dye
  - Appliqué
  - Hand embroidery stitches (running stitch, blanket stitch)
- Using a range of construction techniques:
  - 3D features
  - Inserting wadding
  - Applying buttons & googly eyes
  - Sewing seams on the sewing machine
- Understanding the properties of materials:
  - Natural fibres & organic fabrics

Product features	
Consideration of a specified target market	Appliqué or reverse appliqué
Engaging & stimulating	Creative & individual
Recycled materials & components as decoration	Features are in proportion to the body shape
Organic Cotton fabric	Accurate machine stitches
3D features	Seam allowance
Hand embroidery	Sustainable

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

Key vocabulary	
Design Context	The circumstances, problem or setting in which a product will be used.
Design Brief	An written outline which explains the aims and objectives of a project.
Target Audience	The person or people most likely to be interested in your design or product.
Function	What a product does, how it works and what it will be used for? Is it sensory or educational or both?
Sustainable	Conserving an ecological balance by avoiding the depletion of natural resources.
Organic Cotton	Cotton that is produced without the use of chemical fertilizers, pesticides, or other artificial chemicals that cam pollute the environment and be harmful to the producer.
Fairtrade	When producers in developing countries are paid a fair price for their work.
Materials	What the product is made from?
Components	The parts/materials/threads needed to make a product.
Interactive	Components or features that can be attached/detached or have different textures
3D features	Use of wadding to make a feature stand up or raised off the backing fabric
Aesthetics	How a product or design looks .
Embroidery	Even stitch widths and lengths completed by hand sewn stitches
Reverse appliqué	A decorative technique whereby a fabric is sewn on the reverse of the top fabric and is visible from the front
Appliqué	A decorative technique whereby one material is sewn on top of another by machine
Tie dye	Patterns in cloth created by tying parts so its resists the dye.

English Knowledge Organiser: Introduction to the Gothic Genre

Year: 8 Unit: 3

Gothic conventions

- Elements of both the horror and romance genres
- Texts feature sinister settings like castles, dungeons, secret passages, etc. Sometimes they feature vast landscapes too – Frankenstein has chapters set in the Swiss mountains and the Arctic!
- The weather is often used to create fear: storms, thunder, lightning, mist and fog are all common examples
- Curses, secrets, hauntings and bad omens are amongst the supernatural conventions Typical character types are ghosts, vampires, monsters, doppelgangers and scientists. This was because of people's greater supernatural beliefs and their increasing curiosity into the possibilities of scientific discover
- The 19th Century was influential for the influx of gothic writing.

Gothic Texts

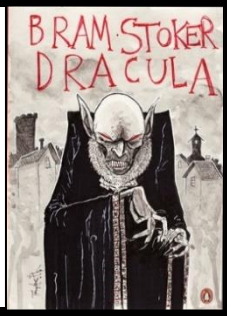
The Castle of Otranto by Horace Walpole (1764) – the first gothic novel
The Red Room by HG Wells (1894)
Frankenstein by Mary Shelley (1818)
Dracula by Bram Stoker (1897)
Dr. Jekyll and Mr. Hyde by Robert Louis Stevenson (1886)
The Monkey's Paw by W.W. Jacobs (1902)
My Swordhand is Singing by Marcus Sedgewick (2007)
The Mistletoe Bride by Kate Mosse (2013)
Click Clack the Rattlebag by Neil Gaimon (2013)
The genre has continued to be popular because readers enjoy being scared and discovering the truth of many of the mysteries gothic texts hold!

The Red Room by H.G. Wells

The Red Room is a short story written by H.G. Wells. It follows a confident young boy as he attempts to spend a night in a haunted room in a castle. Owing to the black and red décor of the room, the narrator finds it necessary to light candles to see his way around, but a draft keeps extinguishing the candles faster than he can keep them lit. Eventually, the candles go out, he loses his sense of direction and trips over the furniture. He falls down knocking himself out. In the morning, the boy thinks the room is haunted by no ghost, but by fear.

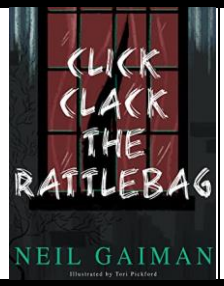
Dracula By Bram Stoker

Dracula is probably the most famous vampire in literature!
A young lawyer travels to Castle Dracula in Transylvania; he quickly realises though that the gentleman that lives there has effectively made him a prisoner. After nearly being attacked by female vampires, Jonathon escapes and returns to England. However, soon in England, people start becoming ill and Dying and with two little red marks appearing on their necks...



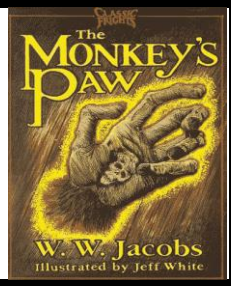
Click Clack the Rattlebag by Neil Gaimon

The story is a simple one between an adult writer and a child who wants the adult to tell him a story before he goes to sleep. The boy asks him if he knows the story of 'Click-Clack the Rattle Bag'. No, our narrator replies, and so the boy begins to tell him... The adult ends up being the one told a rather interesting story of beings providing the basis for "Click-Clack the Rattlebag".



The Monkey's Paw by W.W. Jacobs

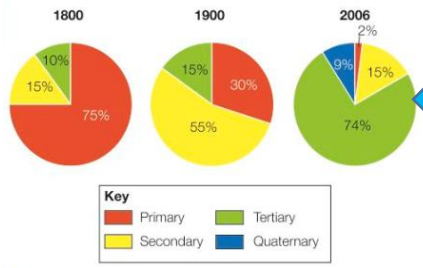
"The Monkey's Paw" is a supernatural horror short story by William Wymark Jacobs. It was published in 1902, in the book The Lady of the Barge. It is one of the most famous horror short stories of English literature. It is based on the idea that the holder of a talisman (an object that is thought to have magical powers) has three wishes.



Key spellings for this scheme of work

supernatural	grotesque	isolation	power	morality
imprisonment	monstrosity	abandonment	haunting	trope
terror	villain	ominous	ancestral curse	trepidation

Year 8 Geography
Unit 3: Economic Activities



The UK's changing employment structure

Lesson 1-2: Economic activities are split into 4 categories, primary, secondary, tertiary, quaternary.

Lesson 17:

- In the past, the UKs economy was based on farming. Two types- arable and pastoral farming
- During industrialisation, the UK moved to the secondary sector
- De-industrialisation (factories and industry moving to elsewhere)
- The UK then moved into tertiary and quaternary sectors

	Definition
Primary	collecting or producing raw materials e.g coal miner, farmer
Secondary	making something using the processed raw materials. Manufacturing products. e.g a joiner
Tertiary	Selling services or skills. e.g banking or retail jobs
Quaternary	Providing information services. E.g. research and development jobs, government

Lesson 2-4: When choosing a site for a factory to locate, the following factors need to be considered:

Raw materials-These are the things that are made into something

Labour- These are the workers who work at the factory

Power- This is the energy used to make the factory work

Transport-This is how the natural resources and finished products are moved

Market-This is the place where the finished products are sold

Site-This is where the factory is located

Lesson 5-6: 'Made in China' China now produces goods for the world. This has given China much more money, but has harmed the environment

Lessons 10-15: Shopping patterns, high street change and Altrincham fieldwork.

Out of town shopping centres (like the TC) led to a decline in UK high streets, especially Altrincham, resulting in many empty shops. Altrincham has changed its high street to attract more people back to it.

Methodologies carried out during Alt. fieldwork. These were presented as a **bi-polar graph** and **bar chart.**

	HOW?	WH	POSITIVES?	NEGATIVES?
Land Use Mapping				
Environmental Quality				
Pedestrian Counts				

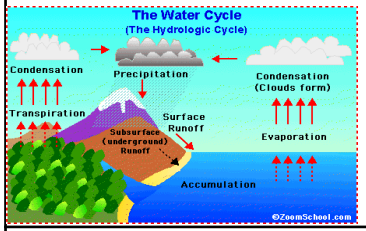
Lesson 16: High tech industries:
These are advanced industries, that develop new things. They are located near business/science parks and Universities so they can recruit a highly skilled workforce.

The M4 corridor is the most famous UK EG

Lesson 18: Modern industries, like quarries, can be made more sustainable. This means that the damage they do to the environment can be reduced. One way to do this is by turning old quarries into nature reserves.

Year 8 Geography
Unit 4: River Landscapes

Lesson 1-3



The water cycle is the never ending movement of water from the **air** to the **land**, to the **sea** and back to the air again. This continues over and over. Key transfers of water from these three areas are Surface Runoff, Evaporation, Precipitation and Transpiration.

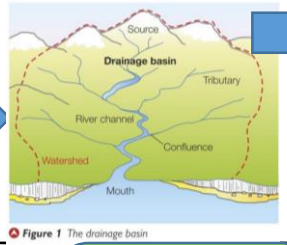
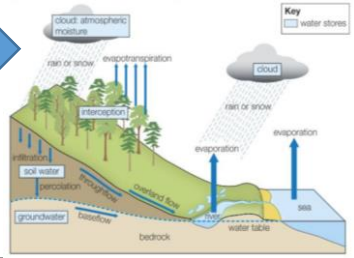
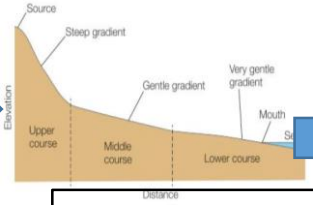


Figure 1 The drainage basin



Lesson 4-6

The **long profile** shows the side view of the river from **source** to **mouth**. It is steepest in the upper course and more gentle in the middle and lower course. However, the river is slower in the upper course – Know why!



Erosion = Abrasion and Hydraulic Action
Transport = Traction Suspension
Deposition = Dropping of material

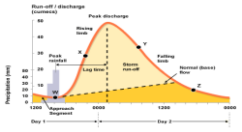
Upper Course landforms like a waterfall is formed when soft rock gets eroded quicker than hard rock and leaves a cliff . Here the soft rock undercuts the hard rock until it collapses into a plunge pool beneath.

Lesson 9-11

Middle course landforms are meanders and sometimes oxbow lakes.
These are bends in a river that get larger to faster moving water and erosion on the outside of the bend.

In the lower course the land is flat on each side of the river, this is where flooding can occur. This is called a floodplain. Farming takes place here and the floods deposit Nutrients which is good for crops.

Flooding can be caused be different features of a drainage basin. Eg steep slopes



Hydrographs!

Lesson 12,14 – 16 HIC FLOODING EXAMPLE

Boscastle floods in 2004 devastated the village in August.
A flash flood caused by natural and human reasons.
The effects were environmental, social and economic.

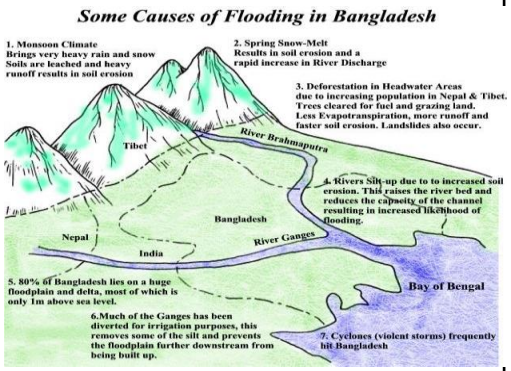
HARD

SOFT

Since then a number of hard and soft management methods have been used to prevent this happening again.

Lesson 17-18 LIC FLOODING EXAMPLE

Bangladesh flooding in 2012 devastated large parts of this very flat country. Natural and human causes are responsible for this. However, the effects are often a lot more serious – For example people rely on crops for food. Also flood water contaminates well water and cholera spreads.
Despite being a LIC Bangladesh has installed a number of basic but often effective flood protection methods – E.g. Earth Embankments, Stilt houses, Flood shelters and basic warning systems. Each has advantages and disadvantages. Which is best? Which are given by Aid?



KEYWORDS

	Definition
Drainage Basin	An area of land drained by a main river channel and it's tributaries.
Water Cycle	Where water is moved from the Air to the Land and then to the Sea in a never ending cycle.
Long Profile	The side view of a river from source to mouth. Then it enters the sea.
Meander	This is a bend in a river in the middle section usually.
Hard Engineering	Where expensive methods using concrete and steel are used to stop flooding.
Soft Engineering	Less expensive natural ways are used to cope with floods.

Wellington History
Year 8 HT 5 Knowledge Organiser

How was slavery abolished by the Americans and the British?

Has Britain (and Manchester) done enough to confront its links to the Slave Trade?

- ✓ What and why? To study the variety of reasons for the ending of the slave trade and the impact of slavery on the modern world. You will also consider whether Britain has done enough to acknowledge the impact of slavery.
- ○ Stop, think and link: Why did the Slave Trade develop? What impact did slavery have?

❖ **Want to explore further?**

Book: Underground to Canada by Barbara Smucker
Book: Brit(ish) On Race, Identity and Belonging by Afua Hirsch
Book: The Interest How the British Establishment Resisted the Abolition of Slavery by Michael Taylor
Documentary: https://www.bbc.co.uk/iplayer/episodes/b063db18/britains-forgotten-slave-owners

Key Questions

- Why did the British abolish slavery?
- How was abolition different in the USA?
- Did life change after the abolition of Slavery in the USA?
- Did life change after the abolition of Slavery in British colonies?
- How important was slavery to the Industrial Revolution?
- How should we remember the Salve Trade?
- How does Quarry Bank Mill confront its links to slavery?
- Should Britain do more to confront its link to the Slave Trade?

Key events and Key People

Ignatius Sancho: Well known 18th century black Briton, and the first to vote in an election
William Grenville: Prime Minster of Britain from 1806-1807
Olaudah Equiano: Freed slave who lived in London as a prominent antislavery campaigner
Thomas Clarkson: Leading campaigner against slavery and the slave trade
1582: First English Slavery voyage to Africa
1660: Royal African Company is founded
1787: Thomas Clarkson sets up the Abolition of Slavery Committee
1789: Olaudah Equiano publishes his autobiography
1791: The slave rebellion on St Domingue
1804: The slaves on St Domingue win the rebellion
1807: The Slave Trade is abolished in Britain
1833: Slavery abolished in Britain's Empire
1861-1865: The American Civil War is fought between Northern and Southern States. The North defeats the South and Slavery is officially abolished in the USA.

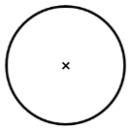
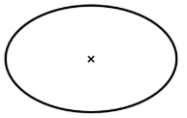
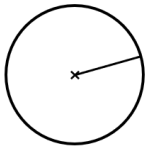
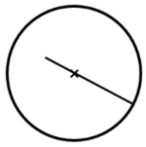
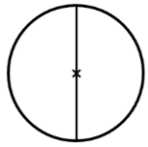
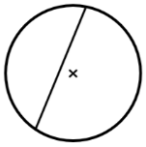
Keywords

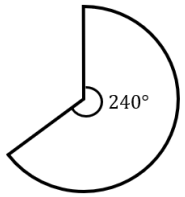
Abolish
To stop something happening by making it illegal
Abolitionist
Someone involved in public campaigning to end slavery and the slave trade
Boycott
Refusal to purchase a particular product as an act of protest
Labour
Physical work done by people
Middle Passage
The second voyage of the Triangular Trade
Petition
A written request made to the government asking for change
Plantation
Fields where crops were grown
Quaker
A Christian group
Slavery
A slave is a person who is owned by another person. Slaves are forced to work and are not paid.
Society for the Abolition of the Slave Trade
Group formed in 1781 to campaign for an end to the slave trade
Civil War
War between two groups within one country

Topic: Equations and Formulae

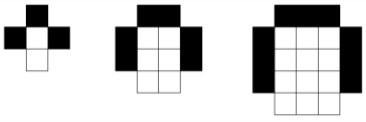
Topic/Skill	Definition/Tips	Example
1. Solve	To find the **answer**/value of something **Use inverse operations** on both sides of the equation (balancing method) until you find the value for the letter.	Solve $2x - 3 = 7$ Add 3 on both sides $2x = 10$ Divide by 2 on both sides $x = 5$
2. Inverse	**Opposite**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

Key Stage 3 Topic 11: Circles

Topic/Skill	Definition/Tips	Example	Non-example
1. Labelling Circles	A circle is the set of points that are a fixed distance from a centre.		
	The circumference of a circle is the distance around the outside of the shape (the perimeter).		
	The radius of a circle is the distance from the centre of the circle to any point on the circumference.		
	The diameter of a circle is the distance from one point of the circumference to another. It must go through the centre.		
2. Circumference	Pi (π) is the number of times that the diameter fits around the circumference. $\pi \approx 3.14159 \ldots$		
	Answers can be left in terms of pi. This is the final step before a calculator is needed.	30π $\frac{1}{5}\pi$ -0.5π	43.726 (3 d.p.) $67.23 \ldots$ (2 d.p.) 0.0488 (3 s.f.)
	The length of the circumference is calculated by using the formula: $C = \pi d$	$C = \pi d$ $C = \pi \times 6$ $C = 6\pi$ (in terms of pi) $C = 18.8$ (3 s.f.)	

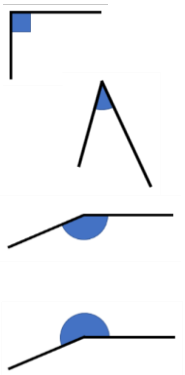
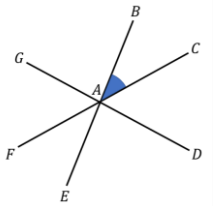
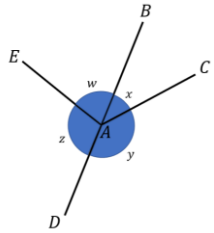
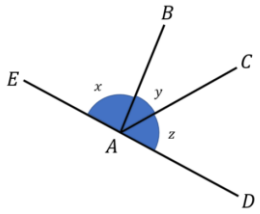
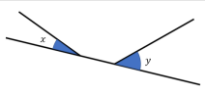
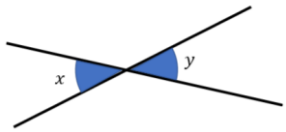
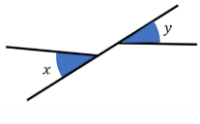
3. Area	The area of a circle is calculated by using the formula: $A = \pi r^2$	$A = \pi r^2$ $A = \pi \times 3^2$ $A = 9\pi$ (in terms of pi) $A = 28.2$ (3 s.f.)	$A = \pi r^2$ $A = \pi \times 5^2$ $A \neq 10\pi$
4. Fractions of Circles	Areas and perimeters can be calculated for fractions of a circle. There are 360° in a full turn. To find the fraction of a circle, the angle given is the numerator of a fraction over 360.	 $\frac{240}{360} = \frac{2}{3}$	

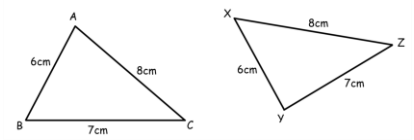
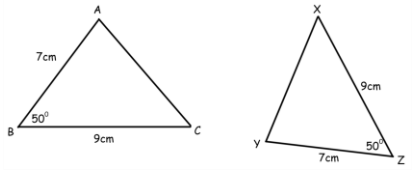
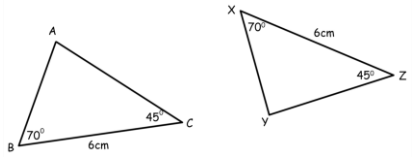
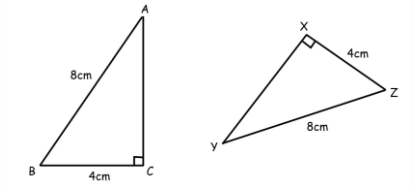
Key Stage 3 Topic 12: Sequences

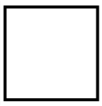
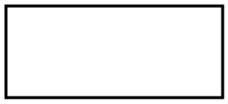
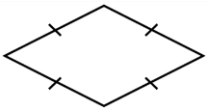
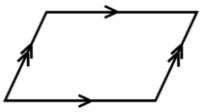
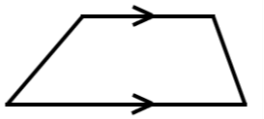
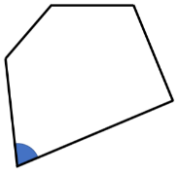
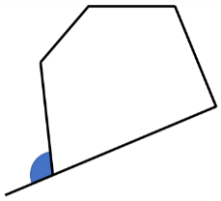
Topic/Skill	Definition/Tips	Example	Non-example
1. Describing types of sequences	An arithmetic/linear sequence involves adding/subtracting the same number to get from one term to the next.	$7, 13, 19, 25, \ldots$ $4, -1, -6, -11, \ldots$	$4, 6, 9, 11, \ldots$
	A geometric sequence involves multiplying/dividing by the same number to get from one term to the next.	$3, 6, 12, 24, \ldots$ $60, 30, 15, \frac{15}{2}, \ldots$	$4, 12, 24, 72 \ldots$
	A Fibonacci sequence involves adding the two previous terms to get the next term.	$1, 1, 2, 3, 5, 8, \ldots$	$1,2,3,4, \ldots$
	A quadratic sequence has a constant second difference.	$4, 5, 8, 13, 20, \ldots$	$2, 4, 8, 16, \ldots$
2. Position to term	Substitution is used to determine the value of a term in a sequence.	The 20th term of the sequence $5n - 1$ is: $5 \times 20 - 1 = 99$	The 6th term of the sequence $4n + 3$ is 6.
3. nth term of a linear sequence	The nth term describes the value of any term within that sequence.		
	The common difference determines the coefficient of n in the sequence.	The nth term of $5, 8, 11, 14, \ldots$ is: $3n + 2$	The nth term of $3, 9, 15, 21, \ldots$ is not $n + 6$.
4. Sequences from patterns	Pictorial sequences can be converted to numerical ones so that calculations can take place.	The number of black squares in the sequence is $3n$. 	

5. Plotting sequences	The terms of a linear sequence can plotted on a set of axes.	For the sequence $3n - 2$, the following table of values can be drawn. Term number (x) | 1 | 2 | 3 | 4 | 5 Value of term (y) | 1 | 4 | 7 | 10 | 13 The coordinates (1, 1), (2, 4), (3, 7), (4, 10) and (5, 13) can be plotted on a set of axes. The line that connects those points is given by $y = 3x - 2$.	

Key Stage 3 Topic 15: Angles

Topic/Skill	Definition/Tips	Example	Non-example
1. Introduction to angles	A right angle is 90°. An acute angle is less than 90°. An obtuse angle is between 90° and 180°. A reflex angle is between 180° and 360°.		
	Angles are labelled using three letters. They are determined by the lines forming the angle with the middle letter being where the angle 'is'.	 The labelled angle is $\angle BAC$	The labelled angle across is not angle A.
	Angles around a point add up to 360°.	 $w + x + y + z = 360$	
	Angles on a straight line add up to 180°.	 $x + y + z = 180$	 $x + y \neq 180$
	Vertically opposite angles are equal. 'Vertically' is used as the angles are around a single vertex.	 $x = y$	 $x \neq y$

2. Angles in triangles	Angles in a triangle add up to 180°.		
3. Properties of triangles	A <u>scalene triangle</u> has all lengths and angles of different sizes. An <u>isosceles triangle</u> has two equal lengths and angles. An <u>equilateral triangle</u> has all equal lengths and angles (60°). A <u>right-angled triangle</u> is either scalene or isosceles but contains a right-angle.		
	Two shapes are <u>congruent</u> if they have all properties exactly the same (other than orientation). Two triangles are congruent if you can match up: SSS (Side, Side, Side) SAS (Side, included Angle, Side) ASA (Angle, included Side, Angle) RHS (Right angle, Hypotenuse, Side)	<u>SSS</u>  <u>SAS</u>  <u>ASA</u>  <u>RHS</u>  	
4. Angles in quadrilaterals	Angles in a quadrilateral add up to 360°.		

5. Properties of quadrilaterals	A square is a special rectangle (all sides are same length). A square is a special rhombus (all angles are the same size). A rectangle is a special parallelogram (all angles are right-angles). A rhombus is a special parallelogram (all lengths are the same size). A parallelogram is a special trapezium (two pairs of parallel sides). A trapezium has four sides and one pair of parallel lengths.	    	
6. Properties of polygons	An interior angle of a polygon is an angle on the inside of a shape. An exterior angle is formed by extending an edge and measuring the angle. The sum of interior angles for an n-sided polygon is: $180(n-2)$ The sum of exterior angles for an n-sided polygon is: 360	  The sum of a heptagon (7-sided shape) is: $180(7-2) = 180 \times 5 = 900$	

Year 8 Spanish Knowledge Orgnaiser

Las vacaciones - Holidays

¿Adónde fuiste?	**Where did you go (to)?**
el año pasado…	Last year…
Fui a…	I went to…
Alemania	Germany
Argentina	Argentina
Cuba	Cuba
Escocia	Scotland
España	Spain
Francia	France
Gales	Wales
Grecia	Greece
India	India
Inglaterra	England
Irlanda	Ireland
Italia	Italy
México	Mexico
Pakistán	Pakistan
Portugal	Portugal
República Dominica	the Dominican Republic

¿Cómo fue?	What was it like?
Fue…	It was…
estupendo	fantastic
genial	brilliant
guay	great,cool
aburrido	boring
horrible	awful
un desastre	a disaster

¿Con quién fuiste?	Who did you go with?
Fui…	I went…
con mi familia	with my family
con mis padres	with my parents
con mis amigos	with my friends

¡Buen viaje!

¿Adónde fuiste de vacaciones?	
Fui a Madrid	I went to Madrid
¿Cómo fuiste?	¿Cómo fuiste?
Fui…	I went
a pie	on foot
en autocar	by bus
en avión	by plane
en barco	by boat
en bicicleta	by bike
en coche	by car
en monopatín	by skateboard
en tren	by train

Las estaciones

l**a** primaver**a** pasad**a**	last Spring
el verano pasado	last Summer
el otoño pasado	last Autumn
el invierno pasado	last Winter

¿Qué hiciste?

Bailé	I danced
Descansé	I had a rest/break.
Escuché música	I listened to music
Fui de excursión	I went on a trip
Jugué al voleibol en la playa	I played volleyball on the beach
Mandé mensajes	I sent messages
Monté en bicicleta	I rode my bike
Saqué fotos	I took photos
Tomé el sol	I sunbathed
Visité monumentos	I visited monuments

¿Qué tal lo pastaste?

¡Lo pasé bomba!	I had a fantastic time
¡Lo pasé fenomenal!	I had a wonderful time
¡Lo pasé guay!	I had a wonderful time!
¡Lo pasé bien!	I had a good time!
¡Lo pasé mal!	I had a bad time!
¡Lo pasé fatal!	I had an awful time

Duración	**Duration**
¿Cuánto tiempo pasaste allí?	
Pasé	I spent…
diez días	ten days
una semana	a week
dos semanas	two weeks
una quincena	two weeks
un mes	a month

Mis vacaciones	**My holidays**
Generalmente…	Usually…
Normalmente…	Normally…
Me quedo en casa	I stay at home
Salgo con mis amigos	I go out with my friends
Por la noche	In the evening
Vamos a la cafetería	We go to the café
Voy a España	I go to Spain
Pero el año pasado…	But last year…
fui a Cuba	I went to Cuba
fuimos en avión	We went by plane
fuimos a un restaurante italiano	We went to an Italian restaurant
hice excursiones muy interesantes	I went on very interesting trips
jugué al fútbol	I played football
pinté	I painted

Palabras muy útiles
Very useful words

a	to
con	with
en	in, by
¿Cómo?	How?
¿Adónde?	where (to)
¿Quién?	Who? Whom?
¿Qué?	What?

El tiempo

Había buen tiempo	It was good weather
Había calor	It was hot
Había frío	It was cold
Había tormenta	It was stormy
Había niebla	There was fog
Llovía	It was raining
Nevaba	It was snowing

Year 8 Spanish Knowledge Organiser HT6 End of Year revision

Basic verbs 1st- 3rd person

Tengo	I have
Tienes	You have
Tiene	He/She has
Soy/Estoy	I am
Eres/estás	You are
Es/está	He/She/it is
Vivo	I live
Vives	You live
Vive	He/she lives
Me gusta	I like
Te gusta	You like
Le gusta	he/she likes
Me encanta	I love
Te encanta	You love
Le encanta	He/She loves
Veo	I watch
Ves	You watch
Ve	He/She watches
Pienso	I think
Piensas	You think
Piensa	He/she thinks
Voy	I go/I am going
Vas	You go/You are going
Va	He/she goes/ He/She is going
Vamos	We go/We are going
Hago	I do
Haces	You do
Hace	He/she does
Hacemos	we do

Giving an opinion

pienso que	I think that
creo que	I believe that
en mi opinion	in my opinion
prefiero	I prefer
lo encuentro	I find it
estoy de acuerdo	I agree
no estoy de acuerdo	I don't agree
Odio	I hate

Making comparisons

Más… que	more… than
Menos… que	less… than
Tan… como	as… as

Adjectives

Bonito/a	pretty
Viejo/a	old
Acogedor(a)	cosy
Hermoso/a	beautiful
gracioso/a	funny
divertido	fun
emocionante	exciting
aburrido/a	boring
fácil	easy
fastidoso/a	annoying
amable	nice/kind
sympa	nice
perezoso/a	lazy

Frequency and Time markers

Hoy	Today
Por lo general	In general
Generalmente	Usually
siempre	Always
todos los días	everyday
De vez en cuando	From time to time
A menudo	Often
A veces	Sometimes
Casi nunca	Rarely
Cuando	When
Si	If
Luego	then

Using the past tense

Anoche	Last night
La semana pasada	Last week
Fui	I went
Fuimos	We went
Visité	I visited
Comí	I ate
Era	It was…

Using the future tense

Este fin de semana	This weekend
Este verano	This summer
Voy a ir	I'm going to go
Voy a visitar	I'm going to visit
Voy a comer	I'm going to watch
Va a ser	It's going to be

Using the conditional tense

Me gustaría	I would like
Sería	It would be

Year 8 French Knowledge Organiser HT5

Intensifiers

vraiment	really
très	very
assez	quite
trop	too
un peu	a bit

Giving an opinion

je pense que	I think that
je crois que	I believe that
à mon avis	in my opinion
je préfère	I prefer
je trouve ça	I find it
je suis d'accord	I agree
je ne suis pas d'accord	I don't agree
Je suis fan de	I'm a fan of
J'ai horreur de	I hate

Complex justifications

Ils me font peur	They frighten me
Ils me font rire	They make me laugh
Ça me plait	It pleases me
Ça m'énerve	It annoys me
Ça me rend…	It makes me…

Sequencers and Time phrases

D'abord	First of all
Avant	Before
Après	After
Puis	Then
Ensuite	Next
Finalement	Finally
Quand	When
Si	If

Adjectives

Drôle/marrant	funny
rigolo(te)	funny
amusant	fun
passionant	exciting
ennuyeux/barbant	boring
effrayant	scary
pénible	annoying
casse-pied	annoying
gentil(le)	nice/kind
sympa	nice
intelligent(e)	intelligent

Frequency Words

Normalement	Normally
En general	In general
D'habitude	Usually
Toujours	Always
Tout le temps	all the time
De temps en temps	From time to time
Souvent	Often
Parfois/Quelquefois	Sometimes
Rarement	Rarely

Verbes essentiels	**Key verbs**
ALLER	**TO GO**
Je vais	I am going/I go
Tu vas	You go/You are going
Il/elle va	He/She is going/He/She goes
On va	We are going/we go

ETRE	**TO BE**
Je suis	I am
Tu es	You are
Il/elle est	He/she is
AVOIR	**TO HAVE**
J'ai	I have
Tu as	You have
Il/elle a	He/she has
FAIRE	**TO DO**
Je fais	I do
Tu fais	You do
Il/elle fait	He/she does

Using the past tense

Hier	Yesterday
La semaine dernière	Last week
Je suis allé(e)	I went
Nous sommes allé(e)s	We went
J'ai visité	I visited
J'ai regardé	I watched
C'était	It was…

Using the future tense

Ce weekend	This weekend
Cet été	This summer
Je vais aller	I'm going to go
Je vais visiter	I'm going to visit
Je vais regarder	I'm going to watch
Ça va être	It's going to be

Using the conditional tense

Je voudrais..	I would like
Mes parents voudraient	My parents would like
Ce serait	It would be

Les mots essentiels High frequency words

Avec	with
Bien	well
Comme d'hab	as usual
En plus	in addition
Ensemble	together
Même	same
Ou	or
Partout	everywhere
Plutôt	rather
Sinon	otherwise
Surtout	especially
Souvent	often
Tout(e)	all, every

Year 8 French Knowledge Organiser HT6 End of Year revision

Basic verbs 1st- 3rd person

J'ai	I have
Tu as	You have
Il/elle/on a	He/She/ (we) have
Je suis	I am
Tu es	You are
Il/elle/on est	He/She (we) are
J'habite	I live
Tu habites	You live
Il/elle/on habite	He/she (we) live
J'aime	I like
Tu aimes	You like
Il/elle/on aime	he/she (we) like
J'adore	I love
Tu adores	You love
Il/elle/on adore	He/She (we love)
Je regarde	I watch
Tu regardes	You watch
Il/elle/on regarde	He/She (we) watch
Je pense	I think
Tu penses	You think
Il/elle/on pense	He/she (we) think
Je vais	I am going/I go
Tu vas	You go/You are going
Il/elle va	He/She is going/He/She goes
On va	We are going/we go
Je fais	I do
Tu fais	You do
Il/elle fait	He/she does
On fait	we do

Giving an opinion

je pense que	I think that
je crois que	I believe that
à mon avis	in my opinion
je préfère	I prefer
je trouve ça	I find it
je suis d'accord	I agree
je ne suis pas d'accord	I don't agree
Je suis fan de	I'm a fan of
J'ai horreur de	I hate

Making comparisons

Plus que	more than
Moins que	less than

Complex justifications

Ils me font peur	They frighten me
Ils me font rire	They make me laugh
Ça me plait	It pleases me
Ça m'énerve	It annoys me
Ça me rend…	It makes me…

Adjectives

Joli(e)	pretty
Vieux/Vielle	old
Douillet	cosy
Bel/belle	beautiful
Drôle/marrant	funny
rigolo(te)	funny
amusant	fun
passionant	exciting
ennuyeux/barbant	boring
effrayant	scary
pénible	annoying
casse-pied	annoying
gentil(le)	nice/kind
sympa	nice
paresseux/se	lazy

Frequency and Time markers

Aujourd'hui	Today
En general	In general
D'habitude	Usually
Toujours	Always
Tous les jours	everyday
De temps en temps	From time to time
Souvent	Often
Parfois/Quelquefois	Sometimes
Rarement	Rarely
Quand	When
Si	If
Puis	then

Using the past tense

Hier soir	Last night
La semaine dernière	Last week
Je suis allé(e)	I went
Nous sommes allé(e)s	We went
J'ai visité	I visited
J'ai regardé	I watched
C'était	It was…

Using the future tense

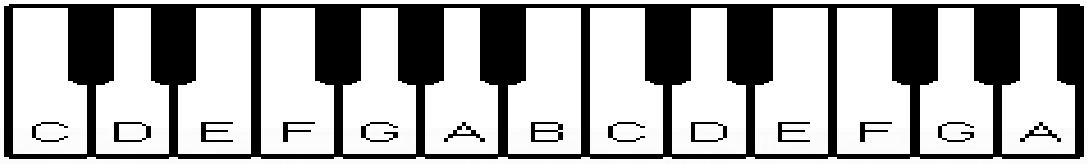
Ce weekend	This weekend
Cet été	This summer
Je vais aller	I'm going to go
Je vais visiter	I'm going to visit
Je vais regarder	I'm going to watch
Ça va être	It's going to be

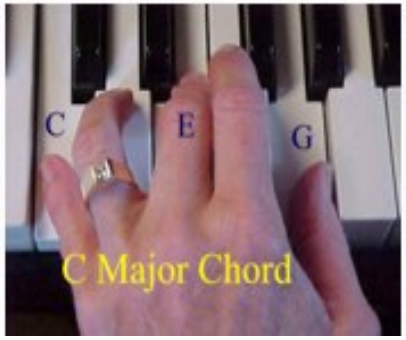
Using the conditional tense

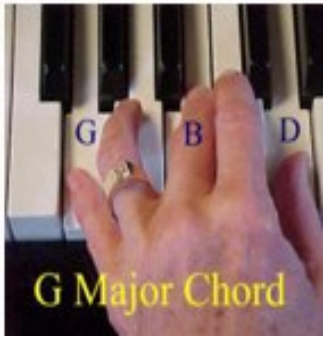
Je voudrais	I would like
Mes parents voudraient	My parents would like
Ce serait	It would be

Music Year 8 Knowledge Organiser: Musical Theatre (Summer Term)

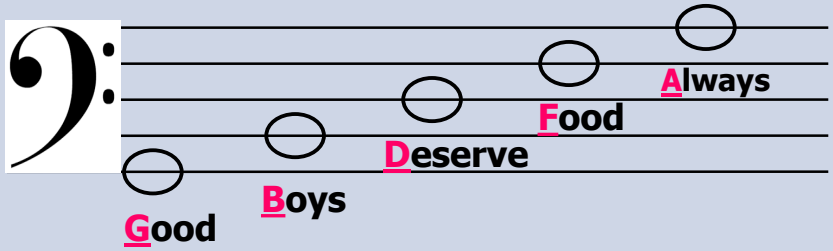
Overture	A piece of music to open the musical, often including some of the key themes form the show.
Solo	A song sung by one member of the production
Duet	A song sung by two of the main members of cast
Chorus	A number where everyone on the show performs together
Dance	An extended dance number of any type
Action	A song which moves the story or plot forward
Character	A song which allows the character to express their feelings.
Finale	The final piece of music in a musical—usually recycles common themes from throughout the production.

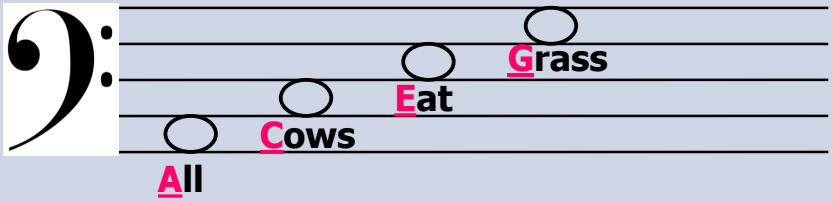






BASS CLEF NOTATION





Greased Lightnin' Chord Structure

C	C	C	C
F	F	C	C
G	F	C	C

Year 8 Unit 3: Living in the Wider World

KNOWLEDGE

L1. study, organisational, research and presentation skills

L2. to review their strengths, interests, skills, qualities and values and how to develop them

L3. to set realistic yet ambitious targets and goals

L4. the skills and attributes that employers' value

L5. the skills and qualities required to engage in enterprise

L6. the importance and benefits of being a lifelong learner

L11. different types and patterns of work, including employment, self-employment and voluntary work; that everyone has a different pathway through life, education and work

L12. about different work roles and career pathways, including clarifying their own early aspirations

L15. to assess and manage risk in relation to financial decisions that young people might make

L16. about values and attitudes relating to finance, including debt

L17. to manage emotions in relation to money

L18. to evaluate social and moral dilemmas about the use of money, including the influence of advertising and peers on financial decisions

L19. to recognise financial exploitation in different contexts e.g. drug and money mules, online scams

SKILLS

1. Engage with and reflect on different ideas, opinions and beliefs to help develop personal opinion.
2. Can express and explain opinions through discussion and written work.
3. Develop empathy with others and an understanding of how to safely and respectfully interact.
4. Is reflective about the knowledge and skills needed for setting realistic targets and personal goals.
5. Work individually and with others to negotiate, plan and take action.
6. Can recognise and reduce risk, minimising harm and getting help.
7. Develop skills of enquiry and advocacy via research and group work

Y8: Unit 3 Hinduism

Hinduism is the third biggest religion in the world, existing for around 4000 years. Hinduism is made up of a variety of different religious beliefs and practices which originated near the river Indus in India. In this unit of work, you will learn about the Hindu religion, analyse and understand ethical ideas such as potential consequences of actions and equality among all. Alongside this, you will consider philosophical questions surrounding human existence, considering a variety of different Hindu beliefs and ideas.

Curriculum Organiser

Lesson 1-2

Hinduism: what does it mean to be a Hindu today?

What are some of the basic practices and beliefs of one of the oldest religions in the world?

How do Hindus understand God?

Hindu's views towards Brahman are very different to the Jewish and Islamic view of God – how and why?

Lesson 7-8

Samskaras: What are significant events in the life of a Hindu?

Hindu's mark a series of events in their lives. What moments are these and why are they seen to be important?

Lesson 3-4

Life after death: How does it work?

Hindu's believe in the cycle of rebirth - can you explain key Hindu beliefs about karma, the cycle of samsara and the goal of moksha?

Representing this view – can you make it into a game?

Samsara and how it functions can be quite confusing – can you create a game to illustrate it, with rules and the possibility to play?

Lesson 9-10

End of Year exam and feedback

Lesson 5-6

The Caste System: What is the perfect way to organise society?

The Caste System existed to place Indian people into different classes or castes. How did it work and what impact did this have?

"Life is easier if everyone knows their place." – Do you agree?

Are some people more important than others? Is this just a fact of life or are we really all equals?

8C3 Combustion Knowledge Organiser

Burning Fuels

Fuels are usually **hydrocarbons** which are burnt to release **energy.**
Examples of fuels are: wood, methane, petrol and diesel.
When a hydrocarbon burns it reacts with oxygen from the air to produce **carbon dioxide** and **water**.
However, when Hydrogen burns it reacts with oxygen from the air to produce water only.

Fire Safety

Flammable

Oxidising

Explosive

The three sides of the fire triangle are: fuel, oxygen and heat.
If you want to put out a fire you remove at least one side of the fire triangle. It is easier to remove the heat or oxygen than the fuel.

Burning Candles

An experiment to find the effect of volume of air on the burning time of a candle.
The method is:

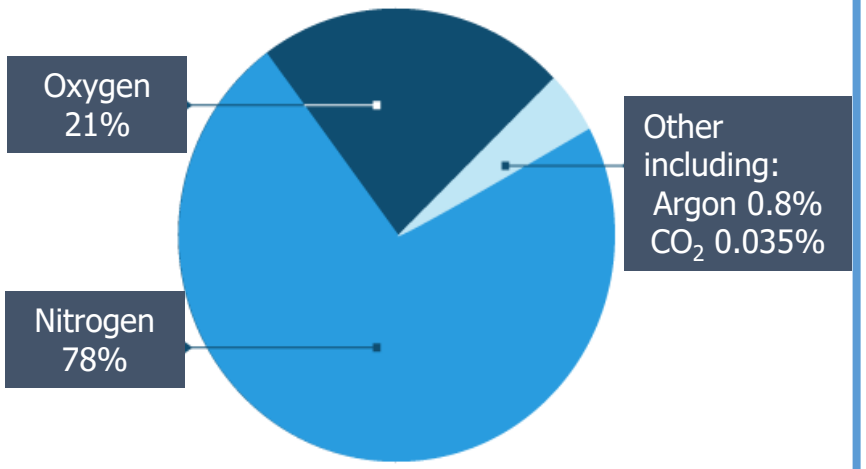
1. Place a small candle on a safety mat.
2. Light the candle.
3. Place a 100 cm^3 beaker over the candle and start the stop clock.
4. Time how long it takes for the candle to go out.
5. Repeat with four more different sized beakers.
6. Repeat each beaker 3 times.

Result: As the size of the beaker increases the time taken also increases.

Gas Tests

Hydrogen – lit splint, causes squeaky pop.
Oxygen – glowing splint, relights.
Carbon Dioxide – limewater turns cloudy.
Chlorine – Blue litmus paper turns red then white.

Gases in the atmosphere



Air Pollution

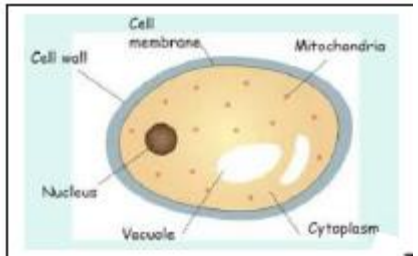
Lots of pollutants are released when fuels burn.
For example;
Carbon dioxide, nitrogen oxides and sulphur dioxide.

These gases cause environmental problems such as acid rain. This happens when sulphur reacts with oxygen to make sulphur dioxide and then it dissolves in rain water to make it acidic

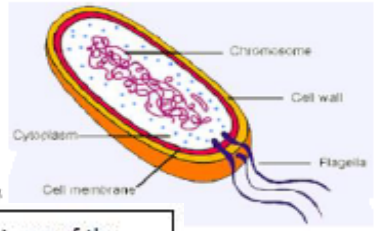
Year 8 Knowledge Organiser : Health and Disease

Pathogens are microorganisms that cause infectious disease. Pathogens may be **viruses, bacteria, protists or fungi**. They can be spread by direct contact, by water or by air. Bacteria and viruses may reproduce rapidly inside the body.

Fungi can also cause disease, by growing on living tissue (for example, athlete's foot is caused by a fungus).

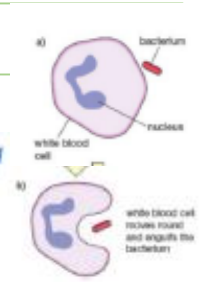


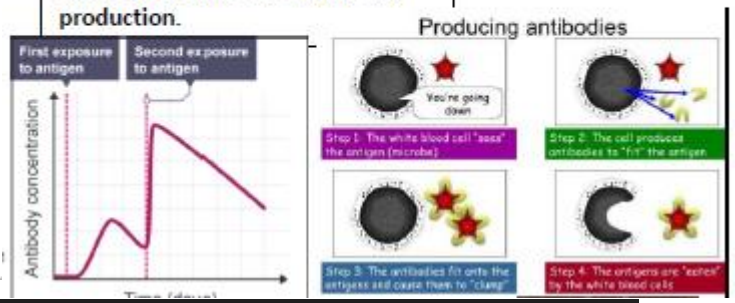
Bacteria reproduce rapidly and can release poisonous chemicals, called **toxins**, that damage our cells.
Examples of diseases caused by pathogenic bacteria include cholera, tuberculosis (TB) and food poisoning.



The specific defence system:

White blood cells help to defend against pathogens by: **phagocytosis, antibody production & antitoxin production.**

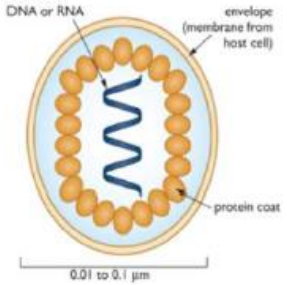




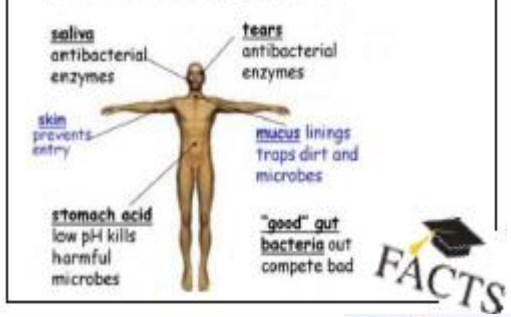
Antibiotics, such as penicillin, are medicines that help to cure **bacterial disease** by killing infective bacteria inside the body. It is important that specific bacteria should be treated by **specific antibiotics**. The emergence of strains **resistant** to antibiotics is of great concern. **Antibiotics cannot kill viral pathogens.**

Painkillers and other medicines are used to **treat the symptoms** of disease but do not kill pathogens.

Viruses need a host to survive. They cause disease symptoms by reproducing **inside** cells, and bursting the cell from the inside. This releases them, so they can be passed onto other host cells or other people (e.g. by coughing or sneezing out mucus that contains the viruses).



The non-specific defence systems of the human body against pathogens include the skin, nose, trachea and bronchi & stomach.



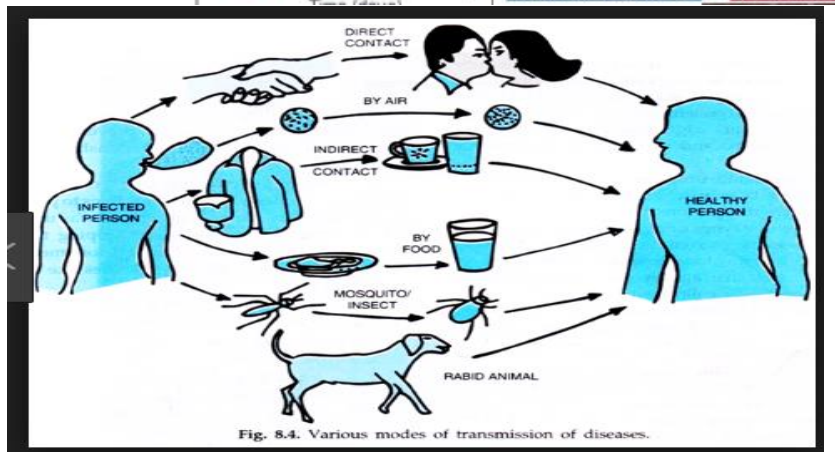
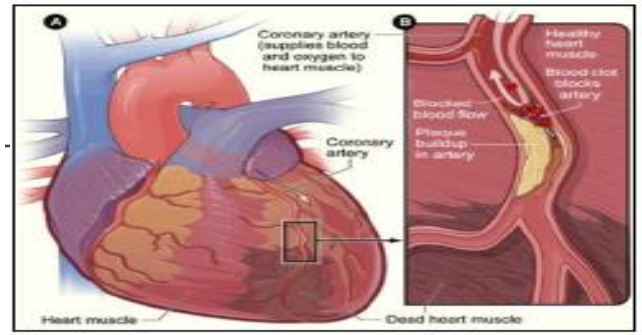
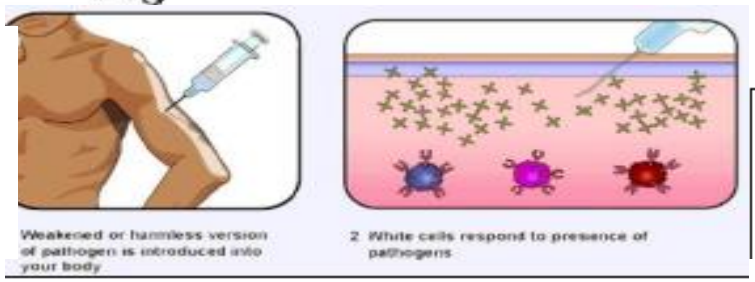


Fig. 8.4. Various modes of transmission of diseases.

In **coronary heart disease** layers of **fatty material** build up inside the **coronary arteries**, narrowing them. This **reduces** the flow of blood through the coronary arteries, resulting in a **lack of oxygen** for the heart muscle.

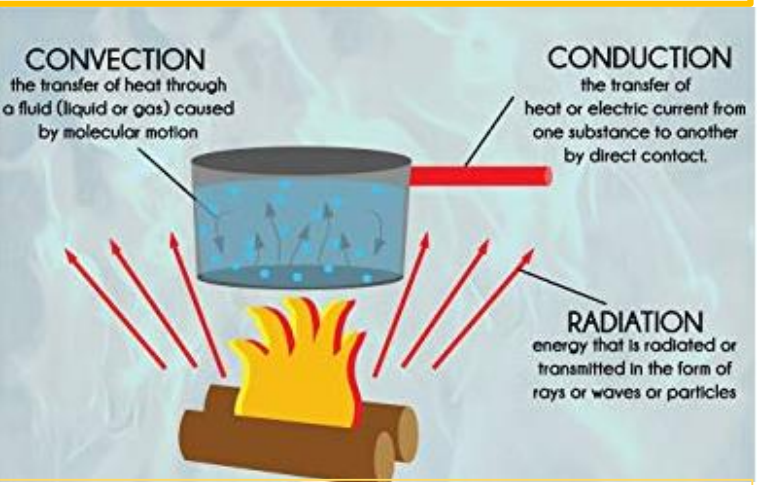


Health is the state of physical and mental well-being. **Diseases, both communicable and non-communicable**, are major causes of ill health. Other factors including **diet, stress and life situations** may have a profound effect on both physical and mental health.



Vaccination involves introducing small quantities of **dead or inactive** forms of a pathogen into the body to stimulate the white blood cells to produce **antibodies**. If the same pathogen re-enters the body the white blood cells respond quickly to produce the correct antibodies, preventing infection. The spread of pathogens can be reduced by **immunising** a large proportion of the population

Year 8 P3 Knowledge Organiser: Energy (part 2)



Conduction

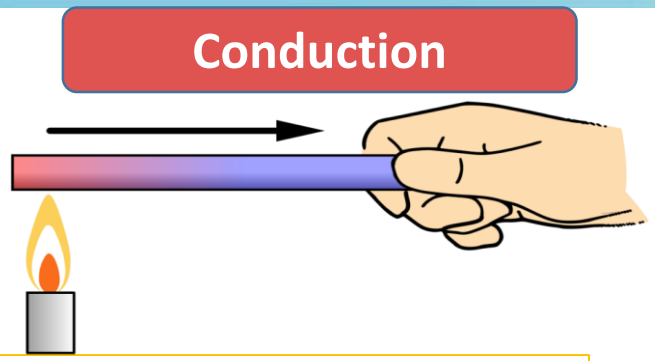
Particles bump into nearby particles and make them vibrate more. This passes the thermal energy through the substance by conduction, from the hot end to the cold end.

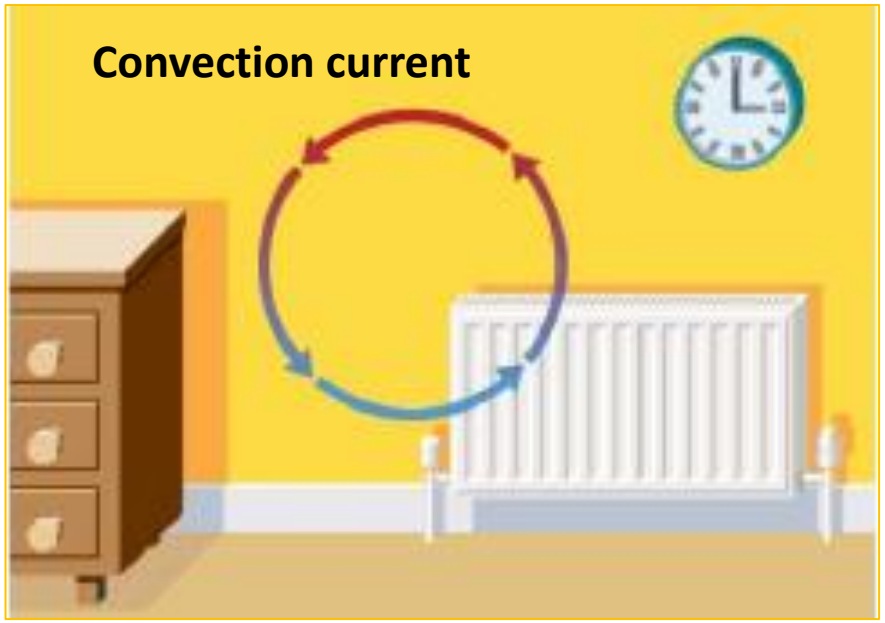
Convection

Particles with a lot of thermal energy in a liquid or gas move apart, the liquid or gas becomes less dense and rises, taking the place of particles with less thermal energy.

Infra-red Radiation

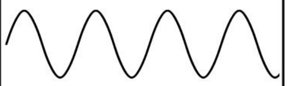
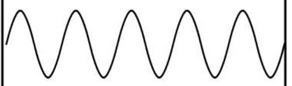
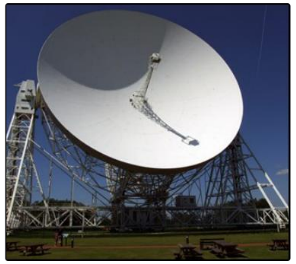
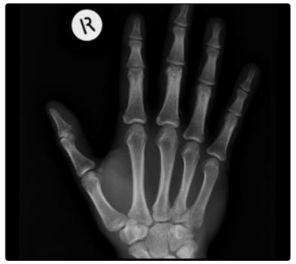
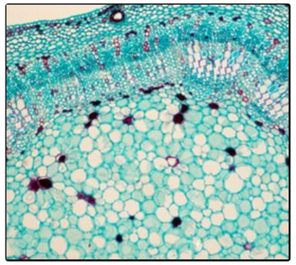
All objects transfer thermal energy by emitting **infra-red radiation,** the hotter an object is the more infra-red radiation it emits. Infra-red radiation is part of the electromagnetic spectrum.





$$Efficiency\ (\%) = \frac{Useful\ energy\ output}{Total\ energy\ input} (\times 100)$$

Uses and Dangers of the Electromagnetic Spectrum

	Radio Waves	Microwaves	Infrared	Visible Light	Ultraviolet	Xray	Gamma
Properties All electromagnetic waves travel at the same speed in a vacuum. They all travel at the speed of light: 3×10^8 m/s (or 299,792,458 m/s)	 Lowest Frequency: Longest Wavelength: Lowest Energy: Wavelength - 10^3 m Frequency - 10^4Hz	 Wavelength - 10^{-2} m Frequency - 10^8Hz	 Wavelength - 10^{-5} m Frequency - 10^{12}Hz	 White light is a mixture of all the colors of the rainbow. Wavelength - 10^{-6} m Frequency - 10^{15}Hz	 Wavelength - 10^{-8} m Frequency - 10^{16}Hz	 Wavelength - 10^{-10} m Frequency - 104Hz	 Highest Frequency: Shortest Wavelength: Highest Energy: Wavelength - 103 m Frequency - 104Hz
Uses	 Radio waves are used in radio telescopes to study far away objects in space. Radio waves are also used for RADAR, broadcasting, and communication.	 Microwaves can be used for communication between mobile phones. Microwaves can also be used to heat food. Microwaves cause the water molecules in food to get warmer.	 Infrared radiation is used for thermal imaging. Infrared rays are also used for cooking food in toaster ovens. IR is used to control your TV from your remote as well.	 Visible light is used to see things. It can be used in telescopes (to see really big things that are far away) or microscopes (really small things). It is also used in cameras to make photographs.	 Ultraviolet rays are used in tanning salons. Special ink is put into some bills and it shines (Fluoresces) when UV light is shined on it. This is used to check for counterfeit bills.	 X-rays are used for airport security and medical imaging. If you go to the hospital and they suspect you have a broken bone, they will send you for an X-ray scan.	 Gamma rays are used for sterilizing medical equipment. They are also used for treating cancer patients.
Dangers	 No Danger	 Microwaves can cause damage to your internal tissues as they heat up water. Your body is made of a lot of water.	 Infrared can cause skin burns.	 No danger	 Ultraviolet rays can leave to sunburn and damage to eyes. Exposure over a long time can increase the risk of getting skin cancer.	 X-rays can damage cells which can cause mutations which may lead to cancer.	 Gamma rays have extremely high energy which can cause cells to mutate leading to cancer.