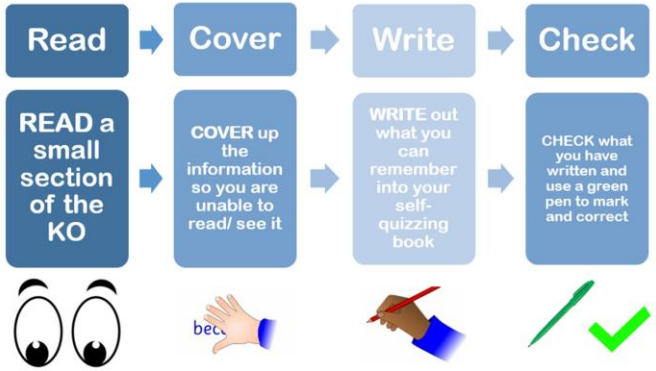
Year 9
Knowledge Organiser: Cycle 1

Name: _____

Tutor group: _____



Article 29:
Education must develop every child's personality, talents and abilities to the full. ***UNCRC***

Your Knowledge Organiser

- Knowledge Organisers contain critical knowledge you must know. This will help you recap, revisit and revise what you have learnt in lessons in order to remember this knowledge for the long-term.

- You must have this book for every lesson – it is part of your equipment.

Using Your Knowledge Organiser for Revision

- Students remember 50% more when they test themselves after learning.
- You can use your book to help **memorisation**.
- **Read** a section of your Knowledge Organiser.
- **Cover** it up.
- **Write** out what you've remembered.
- **Check** the Knowledge Organiser to see if you're right.
- **Repeat** this process.
- Do this **every day** to help commit the information to your **long-term memory**.

How to Use the Book for Self-Quizzing

Read	Cover	Write	Check
READ a small section of the KO	COVER up the information so you are unable to read/ see it	WRITE out what you can remember into your self-quizzing book	CHECK what you have written and use a green pen to mark and correct

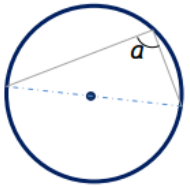
Using Your Knowledge Organiser for Revision

Research shows that students remember 50% more when they test themselves after learning something.

You can use your 100% book to create **flashcards**.

These should be:

- **double-sided**
- **a question on one side, the answer on other**
- **a keyword on one side, a definition or image on the other**
- **used for self-testing.**

Circles	**Circles**
1. What is the size of angle a? 2. State the rule. 	1. What do you know about the angles *x* and *y*? 2. State the rule. 

Q1 What is **emulsion**? Oil, water, droplet, shake, immiscible, bond, mixture.	**Q2** What is **one similarity** between an **alkene** and an **unsaturated** fat?
Q3 What is the name for the **test** for **unsaturated fat** or **alkene**? Describe what you would **see**.	**Q4** Describe two ways that **saturated** fat and **unsaturated fat** (oil) are **different**.
Q5 What is **the advantage** of cooking food in **oil**? **Explain** your answer.	**Q6** **Describe** what an **emulsifier** molecule does.
Q7 Name the **two parts** of an **emulsifier** molecule.	**Q8** What is the difference between a **monounsaturated** fat and **polyunsaturated** fat? **Mono** = one **Poly** = many

Feedback

Your teachers will give you feedback about your learning and progress in many different ways. These will include:

- Verbal feedback about something you are working on in the lesson (practical or written work).
- Verbal feedback through asking questions.
- Guided independent self-assessment.
- Guided peer assessment.
- Instant/quick written comments or identification of SPAG errors on your work as you complete it.
- Written feedback on your work and setting R4 or extension questions for you to complete.
- Knowledge quizzing/short tests that give you a score (i.e. 15/20).
- Longer tests that may also give a score (i.e. in %) as well as feedback about the content you need to re-learn/refresh.

You will be expected to respond to feedback in the following ways:

- ✓ Correcting all SPAG errors and copying out spellings as directed by your teacher.
- ✓ Answering R4 questions and completing extension questions/tasks in green pen.
- ✓ Giving peer feedback when it is expected by the teacher, using the format provided.
- ✓ Setting yourself targets when required, to ensure that you keep developing your knowledge and skills.
- ✓ Focusing on the areas of knowledge that you need to learn and quizzing yourself on these for homework.
- ✓ Showing that you take pride in your work by presenting it neatly.
- ✓ Always asking for help if you don't understand the work or what to do.

The Literacy Mat

Connectives

Adding Ideas
Furthermore, in addition, similarly, also, and, too.

Showing Difference
But, however, on the other hand, although, whereas, alternatively, arguably.

Evaluating
Consequently, surprisingly, significantly, interestingly, unexpectedly.

Listing
Firstly, secondly, last, then, next, finally.

Common Mistakes

Correct Capital Letters
To start EVERY sentence.
For 'I' (as in 'I went').
For ALL names.
Film/book names.
NeVeR To be uSed RanDomLy!

Would HAVE' vs 'Would OF'
NEVER use '**of**' after a modal verb:

'Would have' **NOT '**would of'
'Could have' **NOT '**could of'
'May have' **NOT '**may of'
'Should have' **NOT '**should of'
'Might have' **NOT '**might of'

Great Big Nevers!
Gonna - going to
Ain't - am not
We/they was - we were
Gotta - have got to
Innit - isn't it
Gotten - got
Coz/cause - because

Homophones
To/too - I went to school (towards). I ate too much (more than enough). I am happy too (also).
Their/there/they're - They're (they are) over there (that place) reading their (belonging to them) books.
Your/you're - Your work is great (belonging to you). You're awesome (you are).

Correct Sentences

Simple Sentence - must contain a verb and a subject.

subject verb
Matt was very cold today.

subject verb
I always eat breakfast in the morning

Compound Sentence - two **simple sentences** joined by a **connective**.

connective
I tried to speak slowly **but I was far too excited.**

connective
Dan is very organised and he always helps others.

Complex Sentence - contains a **simple sentence** and one or more '**subordinate clauses**' (extra information!).

subordinate clause comma
When he handed in the homework, the teacher knew he had worked hard on it.

comma comma
She told a joke, **which was hilarious**, to her friends.
subordinate clause

Proof Reading

Follow this checklist when proof-reading or editing your work, especially assessments!

1. Check your presentation: Underline your date, title and any subtitles. Check that your work is laid out in paragraphs.
2. Skim read: Make sure capital letters and full stops are 100% accurate.
3. Skim read again: Check that your complex sentences have accurate commas.
4. Skim read again: Check the spelling of words you are not sure about (neighbour/dictionary/teacher/literacy mat).
5. Read a final time but carefully: Do **ALL** of your sentences make sense? Is there a better, clearer way of explaining/describing something?

Apostrophe Rules

1. Contractions
The apostrophe is put in the place of missing/omitted letters:
I will becomes I'll / should not becomes shouldn't etc.

2. Possession
If something belongs to someone, we put an apostrophe, then an 'S':
Toby's football / The dog's collar / The door's handle.
But if the name already ends in an 'S', you just put an apostrophe:
Chris' guitar / Jess' book / Mr Jones' classroom.

3. Plural Possession
If something belongs to a group, we just put an apostrophe at the end.
The class' whiteboard / The boys' shoes.

4. It's vs Its
'It's' should ONLY have an apostrophe if it is being shortened from 'it is'.
NEVER for possession: Its legs were long and hairy.

Never use an apostrophe for plurals! Carrot's / Ball's / CD's

The Literacy Mat: Common Spellings

accommodation	daughter	improvise	performance	soldier
actually	decide/decision	industrial	permanent	stomach
alcohol	definite	interesting	persuade/persuasion	straight
although	design	interrupt	physical	strategy
analyse/analysis	development	issue	possession	strength
argument	diamond	jealous	potential	success
assessment	diary	knowledge	preparation	surely
atmosphere	disappear	listening	prioritise	surprise
audible	disappoint	lonely	process	survey
audience	embarrass	lovely	proportion	technique
autumn	energy	marriage	proposition	technology
beautiful	engagement	material	questionnaire	texture
beginning	enquire	meanwhile	queue	tomorrow
believe	environment	miscellaneous	reaction	unfortunately
beneath	evaluation	mischief	receive	Wednesday
buried	evidence	modern	reference	weight
business	explanation	moreover	relief	weird
caught	February	murmur	remember	women
chocolate	fierce	necessary	research	
climb	forty	nervous	resources	
column	fulfil	original	safety	
concentration	furthermore	outrageous	Saturday	
conclusion	guard	parallel	secondary	
conscience	happened	participation	separate	
conscious	health	pattern	sequence	
consequence	height	peaceful	shoulder	
continuous	imaginary	people	sincerely	
creation				

Maths Core Knowledge

hegartymaths

http://hegartymaths.com

Maths Lesson Essentials!

- Have you written and underlined the date and title?
- Have you written the question and shown your working out?
- Have you shown your units?
- Have you brought your calculator?
- Have you marked your answer in green pen?
- Does your answer make sense?

Number and Algebra

Ascending
Descending
Denominator
Numerator
Solve
Solution
Decimal
Percentages
Binary
Integer

Data

Mean
Median
Mode
Range
Scale
Proportion
Discrete data
Continuous data
Frequency
Cumulative frequency
Upper quartile
Lower quartile
Interquartile range
Distribution
Correlation
Scatter graph

Shape

Names 3D

Sphere
Cylinder
Tetrahedron
Prism
Cone
Pyramid

Shape

Names 2D

Quadrilaterals
Parallelogram
Trapezium
Rectangle
Rhombus

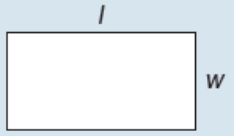
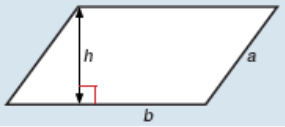
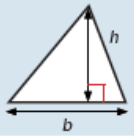
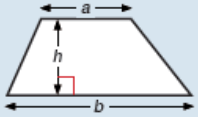
Triangles
Equilateral
Right-angle
Isosceles
Scalene

Keywords

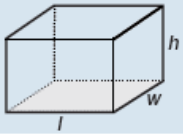
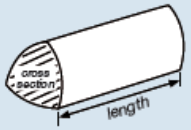
Circle
Polygon
Interior angles
Exterior angles
Acute angle
Right angle
Obtuse angle
Reflex angle
Vertically opposite angles
Corresponding angles
Alternate angles
Co-interior angles
Pythagoras
Trigonometry
Parallel
Perpendicular

Maths Core Knowledge

Areas

Rectangle = $l \times w$	
Parallelogram = $b \times h$	
Triangle = $\frac{1}{2} b \times h$	
Trapezium = $\frac{1}{2}(a + b)h$	

Volumes

Cuboid = $l \times w \times h$	
Prism = area of cross section × length	
Cylinder = $\pi r^2 h$	

Important Formulae

Compound measures

Speed

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

Pressure

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

Density

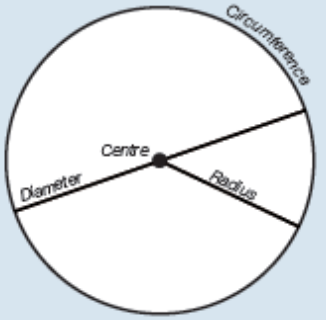
$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

Circles

Circumference = $\pi \times$ diameter, $C = \pi d$

Circumference = $2 \times \pi \times$ radius, $C = 2\pi r$

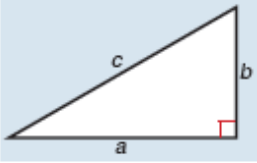
Area of a circle = $\pi \times$ radius squared $A = \pi r^2$



Pythagoras

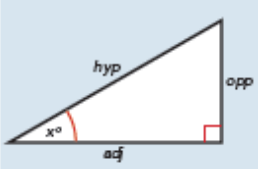
Pythagoras' Theorem

For a right-angled triangle,
$a^2 + b^2 = c^2$



Trigonometric ratios (*new to F*)

$$\sin x^\circ = \frac{\text{opp}}{\text{hyp}}, \quad \cos x^\circ = \frac{\text{adj}}{\text{hyp}}, \quad \tan x^\circ = \frac{\text{opp}}{\text{adj}}$$



http://hegartymaths.com

hegartymaths

Science Core Knowledge

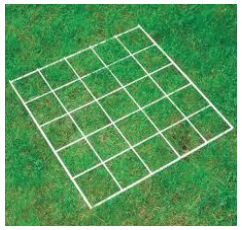
1. How Science Works Keywords

Keyword	Definition
Evidence	A set of data that proves a prediction or hypothesis.
Hazard	Something that could be dangerous.
Risk	Chance of something dangerous happening.
Prediction	Something you think will happen.
Hypothesis	Why you think something will happen.
Variables	Something that changes.
Independent variable	The variable that is changed or controlled in an experiment to test the effects on the dependent variable.
Dependent variable	The variable being tested and measured in an experiment.
Control variable	Something that is constant and unchanged during the experiment.
Repeatability	Closeness of repeats of results to each other.
Reproducibility	Agreement of results from different groups testing the same factor.
Accuracy	Closeness of a measured value to a standard or known value.
Precision	Closeness of two or more measurements to each other.
Reliability	The degree to which the result of a measurement can be depended on to be accurate.

2. Key Equipment

Measuring cylinders – 10 ml cylinders will allow measurement to the nearest 0.1 ml.
100 ml cylinders will allow measurement to the nearest 1 ml.

Thermometers – digital thermometers allow measurement to 1 decimal place, whereas alcohol thermometers only allow measurement to the nearest degree.



Quadrats – are used to do sampling and find the amount of a species in a certain area. Quadrats are placed onto the ground.

Metre ruler – used in multiple investigations in the lab. Allows us to measure to the nearest cm.

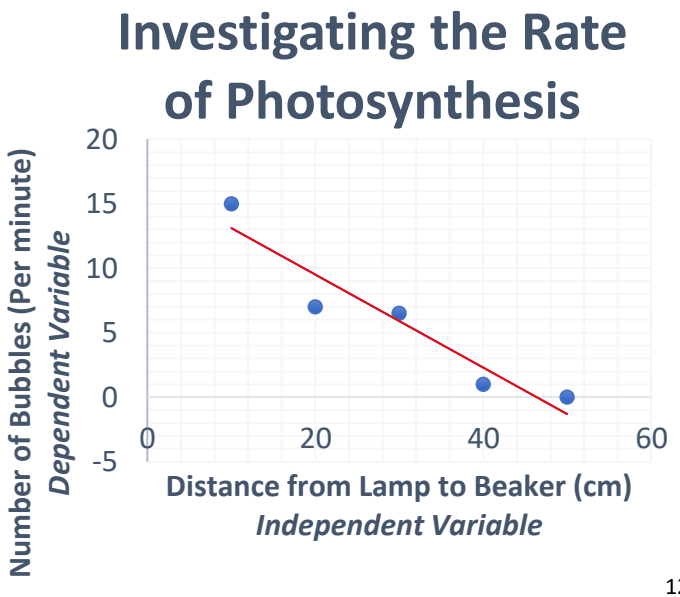
Measuring tape – used in sampling alongside the quadrat. Placed onto the ground to make a transect line to measure against.

Science Core Knowledge

3. Graphing, Analysis and Evaluation Keywords

Keyword	Definition	Example
Hypothesis	An educational guess based on what you already know.	The rate of photosynthesis will increase as the lamp moves closer to the beaker.
Independent Variable	The variable that can be changed by the scientist, it is the cause. Found on the *x*-axis.	Distance from lamp to beaker (cm)
Dependent Variable	The variable that the scientist observes, it is the effect. Found on the *y*-axis.	Number of bubbles (per minute)
Control Variable	The variables that must always be kept the same	Temperature, the size of the pond weed, amount of water
Line of Best Fit	A line that goes roughly through the middle of all the scatter points on a graph.	The red line on the graph above shows the line of best fit for the data plotted
Calculations	Use the correct equation to be used based on the variables of the experiment. Use correct units.	Calculation for mean of number of bubbles per minute: Trial 1 + Trial 2 + Trial 3 ÷ 3 15 + 14 + 15 ÷ 3 = 14.6
Results Analysis	Identify patterns in data. Describe what the table and graph show.	As the lamp is getting closer to the beaker, more bubbles are produced.
Conclusion	Answer your original question. State whether or not the hypothesis was supported.	The results prove that the rate of photosynthesis is effected by the distance of the light source. As the lamp was moved closer to the baker, more bubbles were produced.
Evaluation	Suggest an improvement for the equipment used. Suggest an improvement for the method used.	Use an LED lamp. Measure the volume of oxygen produced.

Distance from lamp to beaker (cm)	Number of bubbles (per minute)			Mean number of bubbles
	Trial 1	Trial 2	Trial 3	
10	15	14	15	14.6
20	7	7	7	7
30	7	7	6	6.7
40	1	2	1	1.3
50	0	0	0	0



Art

Practical Skills Visited

Colour
Nuances of tone and colour within objects

Drawing
Continued reinforcement of basics of shape and shading
Complex shapes and compositions, detail
Highlight and reflections
Drawing for recording ideas in different ways

Painting
Use of acrylics
Use of different surfaces/mixed media work
Painting on a larger/smaller scale – painting to suit scale

Printing
Collagraph

3D
Sculpture/ installation

Photography
Using photographs and edits to support practical work

Literacy
Writing about Art and own ideas in details with a focus on evidencing ideas and thoughts through annotation in the sketchbook.

Vocabulary

- **Installation** – artwork created by putting objects together in a particular way
- **Contemporary Art** – art that is being created in society today
- **Mixed media** – using different media together
- **Annotation** – adding useful notes to your work to explain ideas
- **Development** – showing progression within a project and showing links between artists you study and your own work
- **Refinement** – improving your ideas by trying them out in order to create a successful final piece
- **Collagraph –** a print that is created by building up a surface and then printing from this
- **Acrylic** – a thick, water based paint, often used as an alternative to oil paint

Stretch/Further Reading

1. Complete at least one drawing a week from real life of ANYTHING using a different media – pencil, pen, thread, crayon etc . This will greatly improve your drawing skills.
2. Find out about installation Art – what artists first starting working in this way?
3. Take photographs that relate to your projects, this will make your work more personal and GCSE in style, preparing you for GCSE and also making your work stand out from the rest.
4. Visit a gallery/museum: Pallant House in Chichester is a good start. London – National Gallery, Tate Britain, Tate Modern, The British Museum and the V&A Museum are just a few that are free.

LINKS
Drawing
https://www.studentartguide.com/articles/realistic-observational-drawings

Artists

This year your teacher will be being more creative and choosing artists specifically for you and your class,. You need to ensure that you read about the artists fully to understand them and be able to say HOW they influence the work that you create.

LINKS
How to analyse and use artists work
https://www.bbc.com/bitesize/guides/zymtv9q/revision/1

Computing – Spreadsheets

Spreadsheets are used to store information and data. Once we have our information in a spreadsheet we can run powerful calculations, make graphs and charts and analyse patterns.

Charts and graphs provide a **visual representation** of data, which can often be easier to understand.

Spreadsheets are used by businesses to keep control of the costs and forecasting sales in the future.

Students use spreadsheets to generate charts and graphs for coursework.

Key Points – Explain (Bitesize)	
Columns, rows and cells	- - -
Sorting	
Line graph	
Pie Chart	
Bar Chart	

Accounts (complete in pencil)

Account	Site	Login	P/W hint
Login	17SurnameInitial		
OneDrive/Email	http://outlook.office365.com/owa/theregisschool.co.uk	@theregisschool.co.uk	
Homework	https://idea.org.uk (catch up from the missing ones from year 7 and 8 list)	50 points+ from each area and you will be specifically told to do others during the year.	
Classcharts	https://www.classcharts.com		
Keywords practice	https://quizlet.com/login	TRS Year 9 Comp Sci 2019	

Computing – Spreadsheets

Excel Keywords	Definition
ascending	Ascending means starting at the Bottom and going up, for example, 0, 1, 2, 3.. (smallest to largest) or A–Z
axis labels	A label for a graph's horizontal (x) or vertical (Y) axis that explains what the value relates to.
data	Values, typically letters or numbers.
dialogue box	A window that displays some information or an error message for the user and waits for a response.
descending	Descending means starting at the Top and going Down, for example, 10, 9, 8 .. (largest to lowest) or Z–A.
double-click	To quickly click a button twice on a mouse or other computer input device.
duplicates	To make an exact copy of something.
format	The appearance of a document, including the fonts, colours, size and alignment.
formula	The use of symbols to make a calculation e.g. =Sum(A1*B1) or =Sum(A1:A5)
function	A predefined formula that performs calculations using specific values in a particular order. E.g. =Average(A1:A5) or **=**VLOOKUP(value, table, col_index, [range_lookup]) or =COUNT(A1:A5)

Homework Checklist		
1	Use this to complete the KO	https://www.bbc.com/bitesize/guides/zdydmp3/revision/1
2	Homework – Idea Badges	Internet & Web, What Is The Cloud? Teamwork (look on class charts for others to do)
3	Keywords – KO	You could also use Quizlet to practice.
4	Extension work	Create your own spreadsheet to balance your budget. Use some more complicated formulas/functions – look them up:

Dance – Key Concepts

Choreographer: Christopher Bruce

1	Christopher Bruce trained at the Ballet Rambert School before joining the company as a dancer in 1963. He served as Associate Director before becoming Associate Choreographer. In 1994 he became Artistic Director and 'relaunched' the company (which had been without an artistic director since the departure of Richard Alston in 1992). Bruce has created 30 dance works for Rambert as well as restaging works made for other companies.
2	"Not all my dances are thematic," he says. "But what I would say is that I have to have a good reason for making the dance. I feel that there is a story I want to tell."
3	Bruce's **choreography** reflects a range of **styles**: ballet, contemporary, folk and popular **dance**. He deals with themes linked to the human condition, political or social issues and tends to portray them through dramatic, emotive and theatrical elements.

Choreographer: Kenrick H20 Sandy

1	Kenrick "H20" Sandy is Atmosphere's Associate Creative Director and Choreographer. He is the choreographer of the Olympic Opening Ceremony. He is an IDO World Hip Hop Championship finalist and at the very forefront of UK hip hop. He is the Co-Creator and Choreographer of the Laurence Olivier Award Winning production 'Pied Piper' and a Judge of the Nike Dance Clash.

The Relationship between Constituent Features of Dance Work

1	Movement material such as actions, space, dynamics and relationship content
2	Costume, set design, aural setting and lighting to support the choreographic intent.
3	The ability to compare and contrast dance performance and choreography.

Choreographer: Wayne McGregor

1	Born in 1970, Wayne McGregor CBE is a multi award winning British choreographer and director, internationally renowned for trailblazing innovations in performance that have radically redefined dance in the modern era. Driven by an insatiable curiosity about movement and its creative potentials, his experiments have led him into collaborative dialogue with an array of artistic forms, scientific disciplines and technological interventions. The startling and multi-dimensional works resulting from these interactions have ensured McGregor's position at the cutting edge of contemporary arts for over 25 years.
2	Since 2006, McGregor has been Resident Choreographer at The Royal Ballet, the first choreographer from a contemporary dance background to be invited into the role. Here, his productions are acclaimed for their daring reconfiguring of classical language. He has made 16 works for The Royal Ballet, from Chroma (2006) set to music by The White Stripes and Joby Talbot, and winner of the Olivier Award for Best New Dance Production, to Woolf Works (2015), an "exhilarating and ravishingly expressive" (*Guardian*) full length ballet based on the life and writings of Virginia Woolf.

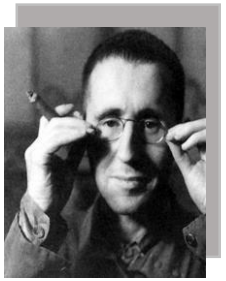
Drama

Theatre Practitioner: Antonin Artaud

1	**The Theatre of Cruelty:** This is what Antonin Artaud's theatre style was known as and was about bombarding the sense of the audience.
2	**Grotesque physicality and movement:** Body language, posture and movement that is exaggerated or contorted.
3	**Catharsis**: A feeling of relaxation or release after a moment of tension. This is what Artaud wanted his audiences to feel after seeing his theatre.
4	Artaudian theatre often bombarded the senses of his audience, creating a very sensory experience.
5	In his early work, Artaud did not favour spoken words but instead favoured rhythms, screams, cries etc. to awaken the audience's senses.
6	Artaud was influenced by a Balinese Theatre Company who used rhythm and stomps. He also write an essay about using breathing called 'The Athleticism of the Actor.'

Theatre Practitioner: Steven Berkoff

1	**Physical theatre/Body as Prop:** Using your body to create and become objects or furniture/set. Berkoff likes minimalist set.
2	**Objects with attitude:** Bringing objects to life with strong comedic and often 'sassy' personalities!
3	Berkovian theatre always has exaggerated characters with exaggerated physicality and the work is often comedic in style.



Theatre Practitioner: Konstantin Stanislavski

1	**Naturalism:** Stanislavski's style of theatre was naturalistic, close to real life and did not include abstract techniques.
2	**The Magic If:** This means an ability to imagine oneself in a set of fictional circumstances and to imagine the consequences of facing that situation in terms of action. This involves imagining 'what if… I was this character?'

Theatre Practitioner: Bertolt Brecht

1	**Epic theatre:** The is what Brecht's style of theatre was known as. It was not about entertainment but about provoking thought about social and political issues/ injustices.
2	**Gestus:** A German word for the Brechtian technique of using gestures and attitude to explore or convey a social or political message.
3	**The Verfremdungseffekt:** Also known as 'the V effect', 'distancing' or 'alienation.' Sometimes described as 'making the familiar strange.' This is a way of preventing the audience from losing themselves in the play but instead, remaining an actively thinking, critical observer.
4	**Showing the mechanics of the theatre:** Another way of stopping the audience from getting 'lost' in the world of the play and making them remain conscious thinkers was to remind them that they are watching a play by having the 'stage hands' doing the curtains, lights or sound, visible and part of the play or to have the actors themselves operate these things.
5	**Placards:** In Brechtian theatre, signs or placards displaying facts would often be used to enhance a social or political message.
6	**Using the third person:** Actors in Brechtian theatre, may often say their lines or refer to themselves in the third person, using 'he' or 'she' rather than 'I.'

English – *The Crucible*, Arthur Millar

BACKGROUND

This story is about witches. It takes place in Salem, Massachusetts in 1692. Salem was a town where the people were Puritans and really strict. You would be arrested for acting at all strange or different. Tons of things were considered witchy things, singing some song, being sexy, wearing freaky clothes, being smart, or anything that didn't fit in with the typical way of life. The play is about hunting for witches, but it's also about being chased down for being your own person. Arthur Miller wrote this during the 1950's. The big action in this book is witch-hunting. Keep in mind that when the book was written there was a big hunt in the USA for people who were communists. Arthur Miller was involved with some commies. So, he wrote this book about being hunted down for whatever it is you believe or do, whether it's chant out loud or are part of some political party.

PLOT

This story takes place in Salem, MA in 1692. It starts out with the whole town in a frenzy. Betty, the daughter of Rev. Samuel Parris, is in some sort of coma, and Ruth, the Putnam's daughter, is walking around in a trance. The night before, Rev. Parris heard some noise in the woods. When he went to see what it was, he found his black slave (Tituba) dancing around a big black cauldron (one of those big witch cooking pots). She was dancing with some other girls, including Betty and Ruth. When Rev. Parris tried to go near them, everyone took off except for Betty, who passed out.

Everyone thinks Betty's in a coma because of witchcraft. Rev. Parris doesn't want to think that but he calls for some witch expert dude. He gets Rev. John Hale from some town called Beverly. Hale tries to wake Betty up but he can't. Then the book talks about how some people in Salem don't believe in witchcraft, and they think it's just girls being stupid. One of the non-believers is John Proctor. His servant was with the girls when they were dancing.

Then Tituba spills the beans and tells Hale that they were dancing to communicate with the dead. Then she starts naming everyone who was dancing around the cauldron. Then this chick named Abigail (who was one of the witch dancers) also starts giving names. Then Betty wakes up and she starts telling names. So then they get the names of all these chicks and they arrest fourteen girls who are witches. The townspeople arrange to have a trial in court. John Proctor is scared because Abigail is like the leader of the group. She used to be his servant, and when his wife (Elizabeth Proctor) got sick, he cheated on her and did it with Abigail. But he felt really bad and apologized to his wife and kicked Abigail out of his house. He is afraid that Abigail will do something for revenge. But he remembers that he doesn't believe in witchcraft so he goes to the court to badmouth her. But then John's wife gets arrested because Abigail tells everyone that she (Elizabeth) is a witch.

The whole town is paranoid and crazy and a lot of people are arrested because people think they are witches. John Proctor brings his servant, Mary Warren, to the court to tell everyone that the whole witch thing is fake. The judges ask for proof, and John tells them about his affair with Abigail. They ask his wife about it but she denies it because she doesn't want to poop on his good name. Then Abigail rats out Mary Warren as being a witch. Mary turns on John and tells the court that her and John's whole thing about witchcraft being bull is not true. She tells the judges that he forced her to say that. Then John gets arrested.

Eleven Witches are hanged. Then the day John Proctor is supposed to be hanged, Rev. Hale has returned to see him. Rev. Hale is the only one who thinks John is innocent (he IS innocent). Rev. Hale tries to get the other prisoners to confess to something (even though they didn't do anything wrong). If they confess, they won't die. Then Abigail escapes and steals her uncle's money. Then some rumours go around about how the witches might be innocent. This scares the judges because then they would have killed eleven innocent people. The judges try to get John Proctor to confess (even though it would be a lie, since he didn't do anything wrong). They get his wife to try and make him confess. So Proctor confesses, but then realizes what the hell is going on, and he doesn't want to lie just to help out the judges. So he tears up the confession and chooses to be killed.

MAIN CHARACTERS

John Proctor: John is a really cool guy. Everyone in Salem likes him. He's an honest farmer… almost too honest. His lives a moral life, except for his big sin which was cheating on his wife. His enemy is Rev. Parris.

Elizabeth Proctor: Elizabeth is an okay wife. She's still a little mad at John because he cheated on her. Throughout this book she's jealous, and a bit obsessive, but she's also brave and smart.

Abigail Williams: Abigail is a bitch. She is the leader of the witches. She organized the big witch dance. She is mad at Elizabeth Proctor because after John and Abigail got it on, John kicked her out and stuck with Elizabeth. So Abigail is jealous and wants to kick Elizabeth's ass. She lies a lot and does evil stuff.

Mary Warren: Mary doesn't have a strong will. She's afraid of Abigail, and she's afraid of being killed because she is a witch. She is a good person, but not very bright.

Ruth Putnam: Witchy chick.

Betty Parris: The Reverend's daughter, she's a witch.

Reverend John Hale: Hale is a smart dude. He's an expert on the subject of witchcraft. He's a little cocky about how smart he is. He comes to help the town of Salem with their witch problem but screws everything up.

Reverend Samuel Parris: He is not a nice guy. Greedy and mean, he hates John Proctor. He will do anything to help himself. His daughter, Betty, is a witch, and his niece is Abigail is the mean witch. She takes his money in the end and he ends up poor.

Deputy Governor Danforth: He's a powerful man in the justice system. He decides who gets executed. He's pretty strict about rules and stuff

Rebecca Nurse: No, she's not a nurse. Rebecca is a cool gal, and everyone likes her. Everyone is surprised when they find out she's a witch.

Tituba: Black slave of Rev. Parris.

Giles Corey: Giles is a jerky old man. He dies in the end.

Key Themes

Loyalty, Fear, Identity and Reputation, Envy and Revenge, Conflict, Religion, Courage and Integrity, Lies and Betrayal Greed.

Food Preparation & Nutrition: Nutritional Needs and Health

Introduction

You will need to know how to make informed choices to enable a varied, healthy and balanced diet

Keywords

1. Basal Metabolic Rate (BMR)
2. Physical Activity Level (PAL)
3. Estimated Average Requirement (EARs)
4. Energy Density
5. Amino Acids
6. High Biological Value (HBV)
7. Low Biological Value (LBV)
8. Protein Complementation
9. Kwashiorkor
10. Fatty Acids
11. Glycerol
12. Saturated Fats
13. Unsaturated Fats
14. Fat Soluble vitamins
15. Water Soluble Vitamins
16. Cholesterol
17. Hydrogenation
18. Dietary Fibre
19. Constipation
20. Diverticular Disease

Key Points

Saturated fats are considered to be more harmful to health because they raise levels of cholesterol.

Most of our energy should come from complex starchy foods.

Vitamins are micronutrients, required in small amounts to do essential jobs in the body.

Water makes up two thirds of the body, so it is vital to drink regularly to stay hydrated.

Nutritional needs change throughout life, but everyone needs to consider the current healthy eating guidelines when planning meals.

Energy balance is the balance of energy consumed through eating and drinking compared to energy burned through physical activity.

Macronutrients are needed by the body in large amounts.

Carbohydrates

Provides the body with energy.
Most of our energy should come from complex starchy food.
One third of your diet should come from starch foods.
If the diet contains more carbohydrates than the body needs, it will turn into fat and be stored in the body.

Fats

Animal fats are usually saturated **(solid)** and vegetable fats are usually unsaturated **(liquid).**
Saturated animal fats have been linked to increased cases of heart disease.
Fat provides us with energy.
It keeps the body warm.
It protects and cushions internal organs by covering them.

Protein

Essential for growth, repair, maintenance and energy.
High biological value (HBV) proteins come from animals.
Low biological value (LBV) proteins come from mainly plant foods.

Food Preparation & Nutrition: Micronutrients, Vitamins and Minerals

Introduction

Demonstrate the knowledge and understanding of the sources and functions of vitamins and minerals.

Keywords

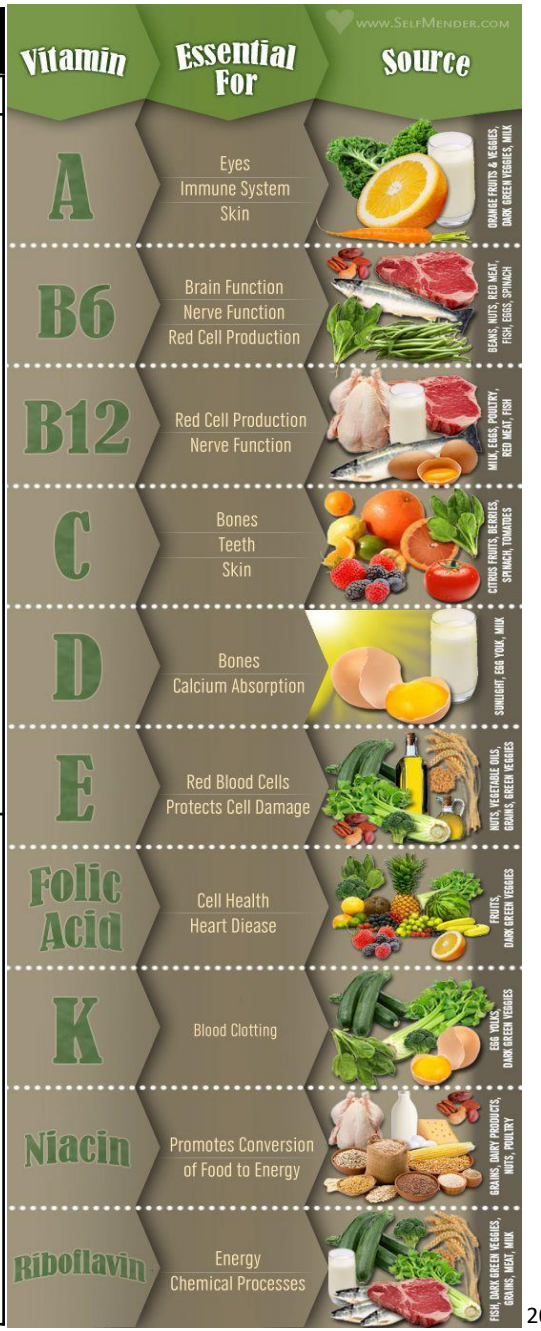
1. Fortified
2. Rickets
3. Antioxidant
4. Thiamin
5. Riboflavin
6. Spina bifida
7. Ascorbic acid
8. Haemoglobin
9. Anaemia
10. Thyroid

Key Points

1. Vitamins are micronutrients, required in small amounts to do essential jobs in the body.
2. Water soluble vitamins are easily destroyed during preparation and cooking. Vitamin **A** and **C**
3. Fat soluble vitamins are **A and D**
4. Water makes up two thirds of the body, so it is vital to drink regularly to stay hydrated.
5. Nutritional needs change throughout life, but everyone needs to consider the current healthy eating guidelines when planning meals.

Key Points

Type	Benefits	Sources	Quantity
Calcium	Calcium is vital for building strong bones and teeth. The time to build strong bones is during childhood and the teen years, so it's very important to get enough calcium now to fight against bone loss later in life. Weak bones are susceptible to a condition called osteoporosis, which causes bones to break easily.	Milk and other dairy products – such as yogurt, cheese, and cottage cheese – are good sources of calcium. You'll also find this mineral in broccoli and dark green, leafy vegetables. Soy foods and foods fortified with calcium, including some kinds of orange juice and soy milk, are also good sources.	Teen boys and girls need 1,300 mg (milligrams) of calcium each day.
Iron	Iron helps red blood cells carry oxygen to all parts of the body. Symptoms of iron-deficiency anaemia include weakness and fatigue, light headedness, and shortness of breath.	Iron-rich foods include red meat, pork, fish and shellfish, poultry, lentils, beans and soy foods, green leafy vegetables, and raisins. Some flours, cereals, and grain products are also fortified with iron.	Teen boys need 11 mg of iron a day and teen girls need 15 mg. Girls need higher amounts because they lose iron through blood during menstruation.



LEARN VOCAB — French — BUILD SENTENCES

Time Expressions

Samedi soir,	On Saturday night,
Le weekend dernier,	Last weekend,
Quand j'étais plus jeune,	When I was younger
Maintenant	Now,
En ce moment,	At the moment,
À l'avenir,	In the future,
Un jour,	One day,

Adjectives (describing)

sage	wise
Courageux/euse	brave
Beau	handsome
Belle	beautiful
Insouciant(e)	happy-go-lucky
À la mode	fashionable
drôle	funny
Fort(e)	strong
Travailleur/ euse	hard-working
Fiable	trustworthy
Poli (e)	polite
Un peu	a bit
très	very
extrêmement	extremely
assez	quite
chouette	awesome
barbant	boring
Qui s'appelle	who is called
(il) est le sosie de…	(he) looks just like…

Verb Phrase (past tense)

Je suis allé(e)…	I went…
J'ai fait…	I did…
J'avais…	I used to have…
On a vu…	we saw…
Je suis sorti(e) avec…	I went out with…
Je suis resté(e)…….	I stayed…
C'était…	It was…

Verb Phrase (present tense)

Je m'entends bien avec…	I get on well with…
Je me dispute avec…	I argue with…
Je sors avec…	I go out with…
Je fais la fête avec…	I party with…
On s'amuse bien	We have a good laugh
On me dit que je suis…	People tell me I am…
J'ai	I have
Il n'est pas	He is not
Elle a	She has

Verb Phrase (future tense)

J'aimerais bien…	I'd really like…
Elle aurait…	She would have…
Elle serait…	She would be…
Il aurait…	He would have…
Il serait…	He would be…

Core Questions

1) Qu'est-ce que tu as fait le week-end dernier?	What did you do last weekend?
2) Est-ce que tu t'entends bien avec ta famille? Pourquoi (non) ?	Do you get on well with your family? Why (not)?
3) Comment serait ton (petit) ami idéal/ta (petite) amie idéale ?	What would your perfect (boy) friend or (girl) friend be like?

Nouns (places)

À la patinoire	to/in the ice rink
À la piscine	to/in the swimming pool
En ville	to/in town
Au stade	to/at the stadium
Au musée	to/at the museum
Aux magasins	to/at the shops
Chez moi	at my house

Nouns (transport)

À pied	on foot
En vélo	by bike
En voiture	by car

Nouns (people)

Mon copain	my (boy) friend
Ma copine	my (girl) friend
Mes ami(e)s	my (girl) friends
Ma belle-mère	my step-mum
Mon demi-frère	my half-brother
Ma meilleur(e) ami(e)	my best friend (girl)
Mon idole	my role model

Nouns (appearance)

Les cheveux (bouclés)	(curly) hair
Les cheveux (ondulés)	(wavy) hair
Les cheveux (lisses)	(straight) hair
Les yeux (verts)	(green) eyes

Nouns (activities)

Un défilé	a parade
Un spectacle	a show
Des magasins	some shopping
De la natation	some swimming
De l'équitation	some horse riding

Geography

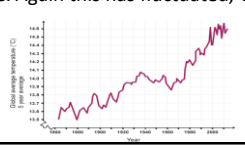
Evidence of climate change: The world's climate has always changed – in Medieval Times grapes were grown in London, by the time of the Stuarts the River Thames would freeze.

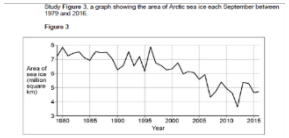
Since 1880 the world's climate has increased by **0.8°C**.

However, the increase in climate has **not been steady**. The graph shows that this increase **fluctuates.**

Sixteen of the 17 warmest years in the 136-year record all have occurred since 2001, with the exception of 1998.

Other evidence is that since the 1980's the **Arctic Sea Ice has been in decline**. Again this has fluctuated, with the lowest km^2 recorded in 2012.





1. **Human factors causing climate change: cars (other transport)** burn fossil fuels increasing CO_2.
2. **Coal and gas power plants** give off CO_2 while burning fossil fuels.
3. **Industry growth** means more electricity so more CO_2.
4. **Increase in standard of living** means more electricity so more CO_2.
5. **Farming** (pastoral) means more dung so more methane.
6. **Deforestation** means less trees to absorb CO_2.
7. **Developed countries** are the **biggest contributors** to the greenhouse effect, this is because developing countries do not have the same level of technology

What are the environmental impacts of climate change?

1. **Warmer climate** means glaciers and **ice sheets melt** (Greenland) so rising sea levels.
2. **Sea ice shrinking** means lost habitats, **polar bears** risk **extinction.**
3. **Rising sea levels**, coastal areas flooded, **lost habitats,** e.g. Norfolk broads.
4. **Sea temperature rising**, so **coral reefs bleached** and habitats lost, e.g. the Great Barrier Reef.

What are the social impacts of climate change?

1. **Temperature rise**, so **droughts & deaths** from dirty water, e.g. in the Sahel
2. **Rising sea levels**, means coastal areas flooded, leading to migration, for example **Shanghai** with 24.5 million people
3. **Lower yields of crops** e.g. Maize, due to warmer temp, means farmers go bankrupt.
4. Drought causes **crop failure**, so starvation.
5. **Sea temperature increases**, causing more **tropical storms**, so death / homelessness

Benefits:

1. Some places will see **warmer climates** and a greater variety of crops e.g. **grapes in Scotland**.
2. The **UK** is predicted to have **more tourists** due to a **Mediterranean climate**, leading to more jobs.

Developing countries are the biggest losers because:

1. They do not have the money to fund projects to protect against changes
2. They are often in warmer parts of the world, so impacts are greater here.

Methods to find out what the climate was like in the past: Since the 1850's, global temperature has been measured. **Thermometers** are used and prove to be very **accurate**. There is only a **small amount of data** though.

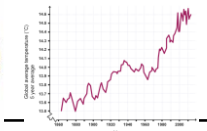
As a tree grows a **new ring** is formed each **year**. These are thicker in warm, wet conditions. Tree rings can go back 10,000 yrs.

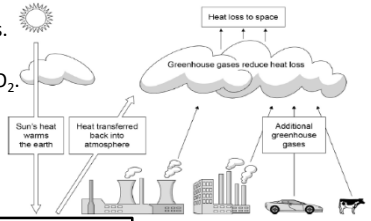
Ice cores are **cylinders of ice** drilled out of an ice sheet or glacier. The ice **encloses small bubbles of air** that contain a **sample of the atmosphere,** from these it is possible to measure directly the past concentration of gases (including carbon dioxide and methane) in the atmosphere.

Ice cores

Tree Rings

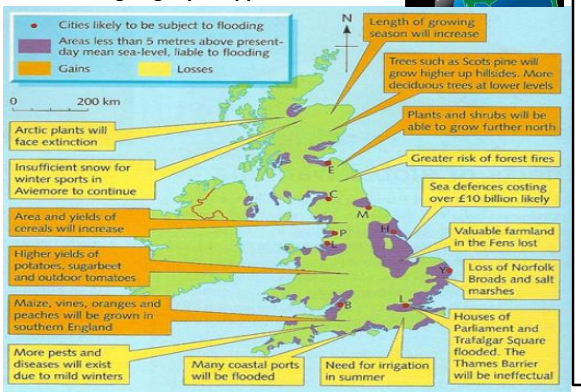
Temperature records





Manmade (enhanced) greenhouse effect

1. **Sun rays** travel through the **atmosphere.**
2. As they **reflect** of the **earth** some of the outgoing rays **escape** back out of the atmosphere.
3. **Some** are **trapped.**
4. This balance is needed to keep the earth warm enough for life.
5. The atmosphere is made up of many gases, but two important gases are carbon dioxide **(CO_2)** and **methane**.
6. **Human activity** e.g. driving cars and using electricity means **fossil fuels** such as oil and coal are used, these give off **CO_2**.
7. These **greenhouse gases** are released into the **atmosphere**.
8. Making the **atmosphere thicker**.
9. **More outgoing rays trapped**.



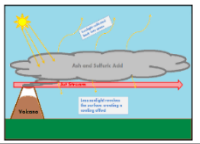
Physical cause of climate change

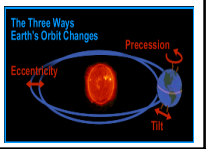
Orbital change: means that over 100,000 years the proximity of the **earth's orbit** will move from **circular to oval**. During **circular rotation** the earth is **closer** to the sun so the **temperature** will be **higher.**

Sun spots: These are **dark spots** that appear on the sun's surface. They are **solar storms**! The **more** of these the **greater** the **heat** produced. They increase over **11 years** and then decrease from here. Known as **sun spot cycles**.

Volcanic eruption theory

Large amounts of **material** is released into the **atmosphere** during an eruption. **Reflects sun rays back out** (do not reach earth). This leads to **cooling,** e.g. after Mt Pinatubo (1991)





Adaption:

Coping with rising sea levels:

Sea levels are predicted to rise by 82 cm by 2100. Physical barriers – flood embankments (levees) could be built e.g. The Thames Barrier, this will hold the water back.

Bad – Very expensive, so developing countries will unlikely be able to prevent floods and the people will be forced to move.

Changing agricultural systems:

1. Crop patterns are charging and some crops in places are failing. In Kenya drought resistant crops are being used, to provide food even when rainfall is low, reducing the risk of starvation.
2. Bad – Can be expensive, so the cost of food increases, resulting in the poor going without.

Managing water supply:

1. Areas will get drier – so adding water meters may reduce use and using water storage facilities, so people have clean water during times of low rainfall.
2. Water meters may not change use in rich countries. Both have little impact if there is not enough rain, so the impacts of droughts, e.g. drinking dirty water will remain.

Mitigation:

International agreements:

Countries agree to reduce their carbon emissions (carbon footprint) by setting emission targets. Reduces CO_2, stops negative impacts e.g. flood

Not all countries agree to this e.g. USA pulled out of the Paris Acord. China has not engaged = C02 still increases as these are the biggest contributors.

Alternative energies:

1. Using wind farms, solar energy, nuclear and tidal. Reduced CO_2 and associated effects, also it won't run out.
2. unreliable so will need fossil fuels when it's not working and expensive

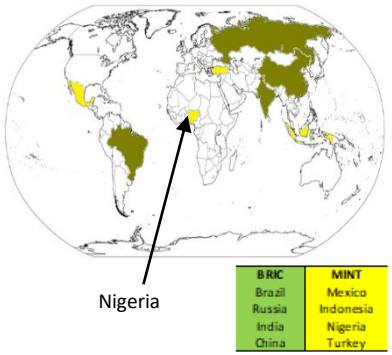
Carbon Capture:

1. Power plants that can capture the CO_2. Once caught it is placed underground. Reduces CO_2, so stops consequences e.g. flooding.
2. Expensive = higher bills. There is also a chance that cracks in the ground cause the CO_2 to escape.

Geography

Life in Emerging Countries **Nigeria and Lagos**

Where are the emerging countries and what are their characteristics?



Fastest growing economies in the world
BRICs were 1st, MINTs more recent
Many are in Asia
Large land masses with large, young populations
Play a key role in world trade
Quality of life in rapidly improving (Higher GDP, life expectancy and HDI score)
Governments are improving infrastructure and services
Urban areas are growing rapidly

Rapid urbanisation is a key feature of NEEs

The world's population is becoming **more urbanised**.
The **fastest rates** of urbanisation are taking place in the **NEEs.**
People are moving from the rural areas to the urban areas; the pace of this movement is **rapid**- this is call **rural to urban migration**

Push factors: Rural areas	Pull factors: Urban
1. **Mechanisation** of primary industries (farming) – means few jobs. 2. 2. Drought – lack of food and clean water. 3. 3. Lack of schools – means little chance for children to get an **education**/ good job later in life. 40% don't go. 4. 4. Lack of medical care – illnesses cannot be treated.	**1. New manufacturing industries,** with improved wages attract many people from rural areas**.** 2. Reliable food and water source 3. Better access to medical care, education 4. Incomes 4x higher than rural areas

In Nigeria people are moving to Lagos (south coast.) The 'city that never sleeps' In 1950 only 300,000 people lived there, now there is an estimated 21 million. It is the social and commercial hub of the country. Many TNCs locate there which provide jobs.

Key Terms

Import	The products which a country buys in from elsewhere.
Export	The goods which a country sells to other places.
Urbanisation	The process by which an increasing percentage of a country's population comes to live in towns and cities.
Mechanisation	The process of changing from working largely or exclusively by hand or with animals to doing that work with machinery.
Industrialisation	Development of industries in a country/region on a wide scale.
Tax breaks	Governments reduce the tax a company should pay for a certain amount of time to attract TNCs to their country
Subsidies	Incentives given to TNCs to set up. Eg. They may lower the cost of exporting goods.

Developing Emerging Developed countries

Employment structures		In emerging economies…
Primary	Gathering raw materials from the earth. ie Farmer, fisherman	Decreased due to mechanisation
Secondary	Manufacturing ie factory workers	Increased, attracting people to cities
Tertiary	Provide a service ie teachers, shop assistants	Increased as people become more wealthy

How did Nigeria become a NEE?

Low minimum wage	Very **low minimum wage** compared to developed countries (N18,000)– this encourages TNCs to set-up there as products can be made cheaply = **greater profits**.
Independence	Nigeria gained its independence from the UK in 1960.
Debt cancelled	In 2005 they had their debt cancelled as part of the Millennium Development Goals. This meant they had extra money to spend developing infrastructure and things like health care and education.
Lack of health and safety laws	There are few environmental laws in Nigeria. This means that industry can operate more cheaply resulting in big profits.
Tax breaks	TNCs are given tax holidays. This encourages TNCs to set-up.

Impacts of Shell, a TNC, locating in Nigeria

TNC **Transnational corporation**. A company which operates in more than one country around the world.
1 of 40 TNCs in Nigeria . Oil discovered in 1958 in the Niger Delta

Social	Economic	Environmental	Political
Companies invest in the area improving services like roads Tax paid can be spent on health / education Working conditions often poor Gas flares used can affect people's health	Major contributor through taxes 65,000 direct jobs, 250,000 indirect 91% of contracts given to Nigerian companies Oil theft / sabotage costs billions Fishermen / farmers lost jobs after oil spill TNC profit mostly goes back overseas	Bodo oil spill in 2008/09 (11 million gallons) Oil pollution kills fish and damages farmland Gas flares contribute to global warming	Militant groups disrupt oil supply creating conflict

Living in Lagos (21million)

Opportunities	Challenges
More hospitals / schools. 68% have a secondary education Electricity for people to cook and have lighting (+ develop businesses) Water treatment plants provide safe water piped to the city Rapid growth of Lagos = jobs in construction (Eko Atlantic). Job opportunities. 80% Nigeria's industry is here: 2 major ports, banks, factories	Rapid population growth means population density is now 20,000 people per km2.. 2/3 people live in slums. 60% of the population live in slums like **Makoko** - Communal toilets shared by 15 households > waste into lagoon > health problems ie cholera - Communal water point can be 3km away, illegal electricity connections often get cut off, only 1 school Limited formal jobs. 60% work in informal jobs like scavenging in the Olusosun dump Waste disposal and emissions are not controlled > air and water pollution. 10,000 illegal industries Traffic congestion is really bad (2 hour commutes) 'Go slow'

Time expressions

Am Samstagabend	On Saturday night,
Letztes Wochenende	Last weekend,
Als ich junger war,..	When I was younger
Jetzt	Now,
Im Augenblick	At the moment,
In der Zukunft	In the future,
eines Tages	One day,

Adjectives (describing)

klug	clever
mütig	brave
gutaussehend	handsome
schön	beautiful
locker	relaxed
modisch	fashionable
lustig	funny
verrückt	crazy
fleißig	hard-working
ehrlich	honest
höflich	polite
ein bißchen	a bit
sehr	very
total	totally
ziemlich	quite
sympa	kind
süß	sweet
Er/sie sieht....aus	he/she looks..

Verb Phrase (past tense)

Ich bin.....gegangen	I went...
Ich habe..... gemacht	I did...
Ich hatte	I had
Ich war	I was
es gab....	there was / were...
es war	it was
Ich habe....getragen	I wore

Verb Phrase (present tense)

Ich komme gut mit.... aus	I get on well with...
Ich streite mit....	I argue with...
Ich gehe mit.... Aus	I go out with...
er geht mir auf die Nerven	he gets on my nerves
wir amusieren uns	We have a good laugh
Man sagt, ich bin....	People tell me I am...
Ich habe / er hat	I have
Ich bin / er ist	I am / he is
Ich trage / er trägt	I wear / he wears

Verb Phrase (future tense)

Ich möchte	I would like...
Ich hätte gern	I would like
Ich/er /sie wäre	I/he/she would be...
Ich/er/sie hätte	I/she/he would have...
es gäbe	there would be...

Core Questions

1) was hast du letztes Wochenende gemacht?	What did you do last weekend?
2) kommst du gut mit deiner Familie aus? Warum / warum nicht?	Do you get on well with your family? Why (not)?
3) wie wäre dein idealer Freund / deine ideale Freundin?	What would your perfect (boy) friend or (girl) friend be like?

Nouns (places)

ins Kino gehen	to go to the cinema
in den Park gehen	to go to the park
in die Stadt gehen	to go to town
bei mir	at my house

Nouns (transport)

zu Fuss	on foot
mit dem Rad	by bike
mit demAuto	by car

Nouns (people)

Mein Freund	my (boy) friend
Meine Freundin	my (girl) friend
Meine Freundinnen	my (girl) friends
Meine Stiefmutter	my step-mum
Mein Halbbruder	my half-brother
Mein bester Freund	my best friend (boy)
Mein Vorbild	my role model

Nouns (appearance)

lockige Haare	curly hair
eine Glatze	bald head
glatte Haare	(straight) hair
grüne Augen	(green) eyes

Nouns (activities)

Karneval	carnival
ein Schauspiel	a play
Geschäfte	Some shopping
eine Fest	festival / party
ein Feiertag	bank holiday

Causes of WW1

The M.A.I.N. Causes of WWI

Imperialism – domination by one country of the economic, political and/or cultural life of another.

Militarism – to glorify armed strength and the idea of war.

Alliance – agreement made between two or more countries to give each other help if it is needed.

Nationalism – having extreme pride in one's country.

Causes of WW1 Key Dates

20th May 1882: Triple Alliance (Italy, Germany, Austria Hungary

10th Feb 1906: The British navy launched the Dreadnought, a new and very efficient battleship. The introduction of this new vessel sparked a naval race between Britain and Germany.

31st Aug 1907: The signing of the Russian Britain Alliance created what was known as the Triple Entente and provided for mutual aid guarantees if any country were attacked.

17th March 1908: The SMS Nassau, the first German dreadnought ship was launched

29th November 1912: Germany announced that if Austria-Hungary were forced into a war then Germany would stand with her.

28th June 1914: Assassination of Archduke Franz Ferdinand and his wife Sophie were assassinated by Gavrilo Princip.

Where can I revise online?

- https://www.bbc.com/bitesize/articles/znhhrj6
- https://www.bbc.com/bitesize/clips/z7sw6sg
- https://www.youtube.com/watch?v=24i4ncHuf6A

Key people involved in causing WW1

Kaiser Wilhelm II – Leader of Germany. His imperialist nature caused tension between Germany and Britain, resulting in tension that lead to WW1.

Archduke Franz Ferdinand and his wife Sophie – Assassinated by the Black Hand Gang as a result of Serbian nationalism.

Gavrilo Princip – The Assassin of FF and his wife.

Tsar Nicholas II – Led Russia into WW1.

Where can I revise online?

- https://www.bbc.com/bitesize/guides/z8q6qty/revision/1
- https://www.bbc.com/bitesize/articles/z8sssbk
- https://www.youtube.com/watch?v=HY8064npgls
- https://www.youtube.com/watch?v=SIwOSXcVQm8
- https://www.youtube.com/watch?v=_G4ZY66BG38
- https://www.bbc.com/timelines/ztngxsg

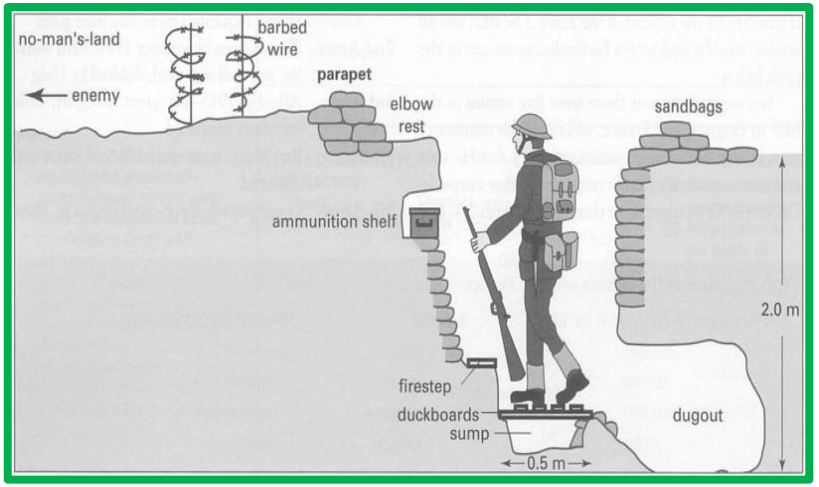
Events of WW1 (1914–1918

Key events of WW1

The Schlieffen Plan (1906–1914)
Germany's plan of war. It had not prepared for a war against France and Russia at the same time

The Battle of Verdun (21st Feb 1916–15th Dec 1916)
A massive attack by German soldiers on France. The goal was to "bleed France white". It was ordered by German Chief of General Staff, von Falkenhayn.

The Battle of the Somme (1st July 1916–19th Nov 1916)
The Battle of the Somme, fought in northern France, was one of the bloodiest of World War One. The British and French armies fought the Germans. It's purpose was to relieve the troops fighting the Germans in Verdun.



Percentages and multipliers

Introduction

Percent' means 'out of 100'. If 70 percent of the population own a pet, this means that 70 out of every hundred people own a pet. The symbol % means percent.

Key words

Multiplier	The decimal equivalent of a percentage; it can be used to solve % problems
Increase	The product of the original amount and a multiplier greater than 1
Decrease	The product of the original amount and a multiplier between zero and 1
Reverse percentage	To find the original percentage
Profit	To sell an item for greater than cost
Loss	To sell an item for less than cost
Interest	Money paid regularly at a rate either from money borrowed or money lent
Simple interest	The interest paid out by banks each year for money borrowed or invested. The amount of interest received is the same every year.

Further links

Hegartymaths (Clips 84-88, 90-92, 93, 96)
MathsWatch (Clips 86, 108, 109,110, 111, 164)
Corbett Maths (Clips 234-240)

Decimal multipliers

The decimal equivalent of a %. It is found by dividing the % by 100 as in the following examples:

72% = 0.72
9% = 0.09
2.7% = 0.027
163% = 1.63

Finding a % using a multiplier

1) Find 27% of 4573.

0.27 x 4573 = 1234.71

2) Find 8.7% of 365.

0.087 x 365 =31.755

% increase or decrease

Original amount x multiplier = new amount

(Think of the original amount as *100%*)

If we ***increase*** by ***12%*** then the multiplier is the decimal equivalent of ***100 + 12*** = ***112%*** which is ***1.12***

1) Increase £3000 by 12%.

1.12 x 3000 = £3360

If we ***decrease*** by **12%** then the multiplier is the decimal equivalent of ***100 – 12*** = ***88%*** which is ***0.88***

2) Decrease £3000 by 12 %.

0.88 x 3000 = £2640

Percentage profit and loss

$$\% \text{ profit} = \frac{\text{actual profit}}{\text{original amount}} \times 100$$

$$\% \text{ loss} = \frac{\text{actual loss}}{\text{original amount}} \times 100$$

Reverse %

This means finding the original amount when we are given the new amount after a % increase or decrease.

Original amount x multiplier = new amount

If an item costs £560 *after* a 20% discount (***decrease***), then the decimal multiplier is 0.8

(***remember***: 100% – 20% = 80%)

Original x 0.8 = 560
Original = 560 ÷ 0.8
= £700

If a person receives £1260 after a pay rise (***increase***) of 5%, then the decimal multiplier is 1.05

(***remember***: 100% + 5% = 105%)

Original x 1.05 = 1260
Original = 1260 ÷ 1.05
= £1200

Repeated % increase/decrease

1) ***Increase*** £22 500 by 3% and then 3% again.

22 500 x 1.03 x 1.03 = £23 870.25
(or more simply 22 500 x 1.03^2)

2) ***Decrease*** £22 500 by 3% and then 3% again.

22 500 x 0.97 x 0.97 = £21 170.25
(or more simply 22 500 x 0.97^2)

Fractions and the 4 operations

A fraction is a numerical quantity that is not a whole number (e.g. 1/2, 0.5).

Key words

Operations	Addition, subtraction, multiplication and division
Numerator	The number above the line in a fraction.
Denominator	The number below the line in a fraction
Common denominator	A common denominator of a set of fractions may be found by multiplying all the denominators of the fractions together.
Reciprocal	Any non-zero number multiplied by its reciprocal is equal to 1. e.g. 5/3 is the reciprocal of 3/5. 5/3 x 3/5 =15/15=1
Top heavy (improper) fraction	A fraction whose numerator is bigger than the denominator
Mixed number	A top-heavy fraction written as a whole number and a proper fraction

Further links

Hegartymaths (Clips 63, 64, 65, 66, 67, 68, 69, 70, 71, 72)
MathsWatch (Clips 71, 73, 74, 76)
Corbett Maths (Clips 132, 133, 134, 139, 140, 142)

Addition/Subtraction

These operations require a common denominator

1) $\frac{4}{5} + \frac{3}{7}$

(A common denominator is 5 x 7 = 35)

$$\frac{4}{5} + \frac{3}{7} = \frac{4 \times 7}{5 \times 7} + \frac{3 \times 5}{7 \times 5}$$

$$= \frac{28}{35} + \frac{15}{35}$$

$$= \frac{28 + 15}{35}$$

$$= \frac{43}{35} \quad (= 1\frac{8}{35})$$

2) $\frac{4}{5} - \frac{3}{7}$

$$\frac{4}{5} - \frac{3}{7} = \frac{4 \times 7}{5 \times 7} - \frac{3 \times 5}{7 \times 5}$$

$$= \frac{28}{35} - \frac{15}{35}$$

$$= \frac{28 - 15}{35}$$

$$= \frac{13}{35}$$

Multiplication/Division

These operations ***DO NOT*** require a common denominator.

1) To multiply two or more fractions, simply multiply the numerators together and multiply the denominators together.

$$\frac{4}{7} \times \frac{9}{11} = \frac{4 \times 9}{7 \times 11}$$

$$= \frac{36}{77}$$

2) To divide two fractions, you multiply the first fraction by the ***reciprocal*** of the second.
Sometimes this is known as ***keep-change-flip***
(***Keep*** the first fraction the same
Change ÷ to x
Flip the second fraction over)

$$\frac{4}{7} \div \frac{9}{11}$$

$$= \frac{4}{7} \times \frac{11}{9}$$

$$= \frac{4 \times 11}{7 \times 9}$$

$$= \frac{44}{63}$$

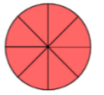
Useful *fraction* ↔ *decimal* ↔ *%* conversions

$0.25 = 1 \div 4 = \frac{1}{4} = \frac{5}{20} = \frac{25}{100} = 25\% =$ 

$0.3\dot{3} = 1 \div 3 = \frac{1}{3} = \frac{3}{9} = \frac{9}{27} = 33.3\dot{3}\% =$ 

$0.6\dot{6} = 2 \div 3 = \frac{2}{3} = \frac{6}{9} = \frac{18}{27} = 66.6\dot{6}\% =$ 

$0.75 = 3 \div 4 = \frac{3}{4} = \frac{15}{20} = \frac{75}{100} = 75\% =$ 

$1 = 1 \div 1 = \frac{1}{1} = \frac{2}{2} = \frac{3}{3} = \frac{4}{4} = \frac{9}{9} = 100\% =$ 

Music

Rehearsal Skills

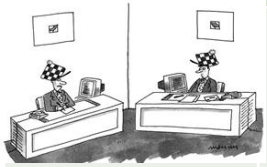
1. Practice every day – Help your long-term memory, improve your learning curve
2. Have specific goals – Create specific, attainable goals before you practice
3. Begin with the basics – Go over technique first. Always have a warm-up plan
4. Focus on the tough stuff – Spend your time on what you cannot play. Turn fear into confidence
5. Write it down – Get the most from your practice log. See your goals and accomplishments
6. Slow it down – Muscle Memory: never make mistakes. Learn it right the first time
7. Break it down – Identify musical sections. Don't always start at the beginning. Help memorization
8. Use a metronome – Always work on improving your time. Don't stretch time for the Tough Stuff
9. Accentuate the positive – Use positive language in the practice room. Focus on solutions, not problems.
10. Challenge yourself – Don't give up, and don't always go for the 'easy' option.

Film Music Devices

Theme
A theme is a recurring piece of music used through out the film that is associated with a mood or a big idea... e.g., a love theme, tragedy theme, hero theme....

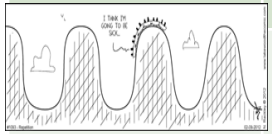
Leitmotif
A 'leitmotif' is a sort of mini theme, associated with a character in the film... i.e., it will play when the character appears on screen.

Ostinato
An ostinato is a repeating rhythmic pattern.



Imitation
Imitation is where one instrument copies what another has just played.

Sequence
A sequence is a series of notes that either 'climbs' up in pitch or 'falls' down in pitch.



Repetition
Repetition is where an instrument repeats what it has just played.

Keywords

Dynamics	Symbol	Definition
Fortissimo	*ff*	Very Loud
Forte	*f*	Loud
Mezzoforte	*mf*	Moderately Loud
Mezzopiano	*mp*	Moderately Quiet
Piano	*p*	Quiet
Pianissimo	*pp*	Very Quiet
Crescendo	<	Becoming gradually louder
Decrescendo	>	Becoming gradually quieter

Tempo	Definition
Lento	Slowly
Largo	Slow and stately
Adagio	Leisurely
Andante	At a walking pace
Allegro	Fast
Vivace	Lively
Presto	Very Quickly

Physical Education

Training Methods

1	**Flexibility Training**	static, ballistic, PNF
2	**Strength Training**	free weights, circuit, plyometric
3	**Speed Training**	hollow, acceleration, interval
4	**Aerobic Endurance Training**	continuous, fartlek, interval

Fitness Tests

1	**Body Composition**	BMI, BIA, skinfold callipers
2	**Aerobic Endurance**	multi-stage fitness test, forestry step test
3	**Speed**	35 m sprint
4	**Strength**	grip dynamometer
5	**Flexibility**	sit and reach
6	**Muscular Endurance**	sit up/press up
7	**Agility**	Illinois agility
8	**Power**	vertical jump

Principles of Training

1	**Frequency**	How often do you train? (How many times a week)
2	**Intensity**	How hard do you train? (Heart rate/pyramid, BPM, BORG scale RPE)
3	**Time**	How long you train for? (min. 30mins)
4	**Type**	What type of training method (e.g. weight, circuit, interval…?)

Additional Principles of Training

1	**Specificity**	training specific to the individual needs of athlete
2	**Progressive Overload**	Make training gradually harder so body gradually improves and adapts
3	**Adaptation**	Body adapts in response to training
4	**Reversibility**	Body will reverse back if training is stopped for a prolonged time
5	**Variation**	Training must be varied to avoid boredom
6	**Individual Differences**	Training must be suited to each persons needs
7	**Rest and Recovery**	avoid injuries due to fatigue/tiredness

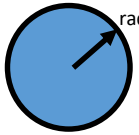
Components of Fitness

1	**Aerobic Endurance**
2	**Muscular Strength**
3	**Muscular Endurance**
4	**Flexibility**
5	**Speed**
6	**Body Composition**
7	**Power**
8	**Agility**
9	**Power**
10	**Balance**
11	**Coordination**
12	**Reaction Time**

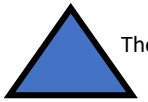
Product Design – Maths, Drawing and Evaluation

Area: the two-dimensional space taken up by something; for example, the area of a sheet of material like card
Measured in a size appropriate to the problem: either cm^2 or m^2 for larger problems.
Area of a rectangle = width × length

Area of a circle = πr^2

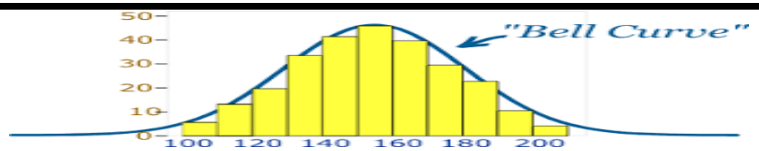


π = 3.142
The radius is half the diameter
The circumference of a circle = πD



The area of a triangle = $\frac{\text{base} \times \text{height}}{2}$

Distribution curve.
You need to be able to graphically represent data like this.
This is a good way of showing a collecting of measurements. For example you could have collected the heights of all the students in your year group and represented the data in the yellow graph. From this you could easily see what the average and the sizes either side to help you design products better.



Average or Mean
The is adding up all the data you have and dividing by the number of sets of data you have.
Example: you want to know the average head size so you can design a hat that would fit an average person.

Person 1	head size 420 mm	Person 3	head size 520 mm
Person 2	head size 480 mm	Person 4	head size 360 mm

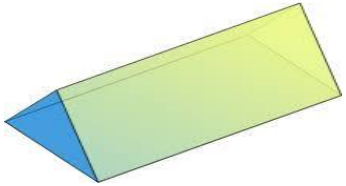
The Average = $\frac{420 + 480 + 520 + 360}{4}$ = 445

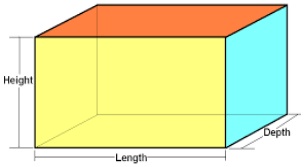
For you to do
1). What is the average bottle volume size? 140 ml, 210 ml, 183 ml, 189 ml, 112 ml, 439 ml
2). What is the mean shoe size? 10, 6, 9, 8, 15

You need to also understand that abnormal measurement could effect you averages. From those last examples can you spot the abnormal measurement that you may like to take out to get a better average?

Volume -
Description: the space taken up by something: for example, the volume of a material like wood or plastic – or even gas.
Measured in: a size appropriate to the problem: either cm^3 or m^3 for larger problems

Applications – this could be useful to work out the volume of a material and therefore its cost – or the amount of paint or other liquid used if we use litres or ml instead of cm or metres
For any solid with a linear cross section (the same shape all way along, the volume is just the end area times the length! Easy.

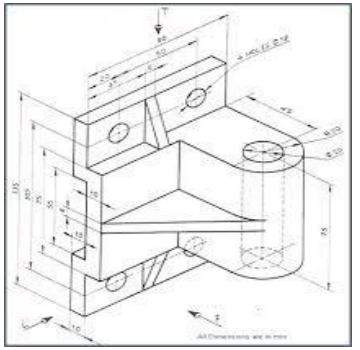




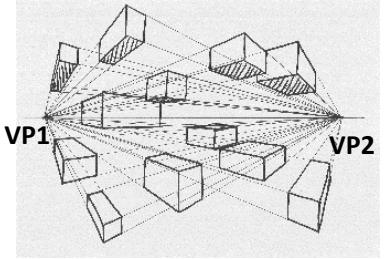
Volume: examples
For the shapes above, put together some examples and work out the volumes.

Stretch: what if you have a more complex shape like a house – how would you work out the volume now? Would it not be just the area of a rectangle and that of a triangle times the length?

Estimation
You must be able to estimate (accurate guess) **roughly** what the answer to a problem may be. For this you could round figures up or down and work the easier answer out in your head so you know if your calculator answer is correct later.



Isometric drawing: used for practising drawing in 3D for design ideas. Ask for isometric paper to practise on!



Perspective drawing:
Often used architecture. All lines that are not vertical go back to vanishing points.

Literacy – Be Able to Write an Evaluation

- What skills have you learnt during this project?
- What skills have you developed (improved)?
- What aspects (parts) of your project do you think have gone well?
- What aspects of your project do you think have gone badly?
- Compare your finished project to your final design drawing, what changed did you make and why?
- If you were given a chance to re do the project, what would you do differently?

Product Design – Tools

Tenon Saw For cutting straight vertical cuts. The depth of the cut is restricted by the brass spine. You must stretch the index finger out when using this saw to steady it and get a more accurate cut. Start cutting on a corner, drawing back several times. Use a bench hook

Fret Saw For cutting **curved** lines in **thin** material with a thin blade. Always keep your fingers clear. Make sure the guard is intact. Cut slowly. Use the clamp to stop wood rattling about. The manual equivalent is a **coping saw** – you can turn the blade around by unscrewing the handle then tightening up again.

Bench Hook and Clamp Use the bench hook to help cut wood with accuracy. Top tip – always cut all the way through your work into the bench hook to avoid splintering the back of your work. Use a clamp for shorter pieces of wood

Squares: 45 degree and 90 degree Take care of these – your work accuracy depends on them being accurate! You must keep the stock (wooden bit) tight against your work and your pencil must be sharp!

Bevel Edge Chisel For removing wood. Always chisel away from yourself. Use only for cutting wood – they must be razor sharp! Bevel edge facing down .

Vernier Measuring with accuracy. Accurate to .01 of a mm. Do not forget to zero it first! You will use this to check the sizes of drills and your work

Steel Rule Measuring with accuracy up to 1/2 mm depending on your eyes! It starts at zero on the end, unlike a ruler that has material on the end first. Make sure that you look at the measurements from above to get an accurate reading. You also need a sharp pencil!

Wood Plane For shaving slithers of wood off your work. The aim is to take a shaving cut that is complete and lasts the whole length of your work. Always rest it on its side so you don't blunt the blade or damage my desk. Usually we use a wood plane along the grain.

Pillar Drill

We use this for drilling vertical holes in material. Almost always you will clamp your work down first. Wear glasses, use the guard and know how to turn it off in an emergency. Do not use if you are unsure – ask!

Year 9 Product Design Knowledge Organiser – Plastics

Introduction: Polymers have a wide variety of uses in everyday life. You need to be able to name a range of different polymers and their uses.

Keywords

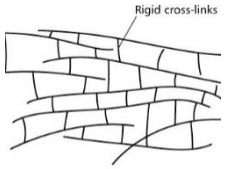
Synthetic polymer	**A synthetic material made mostly from oil**
Thermoforming (thermosetting) polymer	can be remoulded and re shaped, it can be recycled
Thermosetting polymer	cannot be re shaped or recycled
Insulator	a material with low conductivity preventing electrical current or heat to flow
Polymer	Plastic

Further Links

Page 43 to 46 in the Edexcel text book

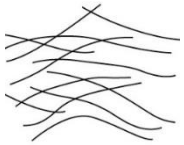
Exam Tips

Thermosets



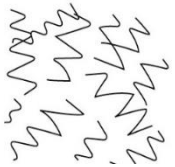
- Can't be Recycled
- Resist heat
- Rigid Cross links

Thermoplastics



- Easily moulded into shape
- Can be recycled
- Can be reheated and remoulded

Elastomers



- Good elasticity
- Can be thermosetting or thermo plastic

Exam questions

1. Explain why some plastics cannot be reformed with heat
2. Explain why we cannot make most products out of 100% recycled plastics
3. Explain why we cannot make most products out of 100% recycled plastics

Stretch

Symbol	Name of plastic	Properties	Uses
01 PET	Polyethylene Terephthalate	Strong, tough and a barrier to moisture and gas.	Drink bottles, salad dressing bottles, jam jars
02 PE-HD	High Density Polythene	Stiff, tough, resistance to moisture, permeability to gas	Milk, juice and water bottles, bin and shopping bags.
03 PVC	Polyvinyl Chloride	Versatile, strong and tough.	Juice bottles, cling film, PVC piping
04 PE-LD	Low density Polyethylene	Easy to process, strong, tough, flexible, barrier to moisture	Frozen food bags, squeeze bottles, flexible lids
05 PP	Polypropylene	Strong, tough, resistance to heat, chemicals or grease.	Microwave bowls, yogurt pots, margarine tubs, takeaway tubs
06 PS	Polystyrene	Versatile easy to form	Egg cartons, Styrofoam cups and burger/ chip boxes.
	Other Plastics		Baby milk bottles, electronic casing.

Product Design – Timbers

INTRODUCTION: Timber is wood that comes from tree trunks. Wood in various forms can be used to make sheet materials with better properties.

Keywords

Hardwood	Broad leaved trees which drop in the winter. Expensive due to slow growth times. Not necessarily hard!
Softwood	Evergreen needle leaves. Fast growing and cheaper.
Grain	Fibres that run the length of the tree to carry food and water. Leaves the patterns we see in wood.
Man-made (manufactured) board	Not limited to the size of a tree trunk, consistent properties.
MDF	Dust with a glue to hold it together
Veneer	Thin slice of wood used as a decorative surface for products
Durable	how long a material lasts – possibly when exposed to weather

Further Links

YouTube – manufacturing veneer

YouTube – sectioning of logs ready for use

Exam Tips

Know the difference between hardwood and softwoods and boards, including examples.

Hardwood: slow growing (100 years+) so more expensive especially if it need to be transported a long way. Broad leaves that drop in the winter. Can be more durable.

Softwood: fast growing (30 years) evergreens with needle leaves. Can be lighter and weaker but not always

Board: particles or thin layers of wood glued together, Consistent properties in any size. Surface finish to match any application. Can be stronger than plain wood.

Exam Questions

1. Give two advantages of manufactured board.
2. Do most softwoods keep their needles in winter?
3. What material is mostly wood dust glued together?
4. Name a traditional English wood used for house building for centuries.
5. Give two advantages and two disadvantages of MDF.

Stretch

6. Discuss the difference between hardwood and softwood. Pay particular attention to factors that may affect the durability of a product.

7. Choose a hardwood and a softwood and list why they could be a good choice for a coffee table material.

8. Explain what aesthetic advantages a wood has over a manufactured board for the product of your choice.

Hardwood examples

Type	Description	Advantages	Disadvantages	Common uses
Pine		• Very durable • Easy to work • Quite cheap as it grows quickly enough to be forested • Reasonably strong, lightweight and easy to work with	• Can warp, crack and splinter more than some other woods	• House construction, for roof joists and floorboards • Furniture, doors, interior woodwork
Cedar		• Natural oils make it resistant to water and fungal growth	• More expensive than pine and not as strong	• Outdoor furniture, fences, sheds, boats

Softwood examples

Type	Description	Advantages	Disadvantages	Common uses
Oak		• Strong and durable • Has an attractive grain when well finished	• Expensive • Becoming rarer • Harder to work with than some woods • Corrodes iron and steel	• Used a lot for building houses and boats in the past • Now used for high-end furniture and wine and whisky barrels
Mahogany		• Has a very attractive finish • Quite easy to work	• Expensive • Environmental problems with sourcing from tropical forests • Oils in the wood can give some people a skin rash or breathing problems	• High-quality furniture, jewellery boxes, windows
Beech		• A tough wood • Does not crack or splinter easily • Hard	• Expensive • Not very resistant to moisture • Not suitable for exterior use	• Toys, cooking implements, solid and laminated furniture
Balsa		• Very lightweight • Easy to cut	• Much too soft and weak for most products	• Model making, primary school projects, surf board cores • Used for rafts in ancient times

Manufactured boards

Type	Description	Advantages	Disadvantages	Common uses
Plywood	• A tree trunk is sliced into thin layers called veneer • These layers are glued together with the grain lines going in alternate directions	• Flat and structurally strong • Surface looks like wood • Resistant to warping, cracking and twisting	• Quite expensive • Edges can look rather rough • Susceptible to water damage if wrong grade is used	• Building and furniture panels that need some strength
Medium density fibreboard (MDF)	• Wood dust and fibres are mixed with a glue and pressed into flat sheets under extreme heat and pressure	• Cheap (made from waste wood) • Smooth ungrained surface is good for painting or staining • Easy to machine	• Does not look good, so needs coating • Weak compared to real wood or plywood • Tools blunt quickly due to the glue	• Cheap flat-pack furniture, wall panels, display cabinets, storage units

Religious Education

Theme F – Religion and Human rights – Justice, Prejudice and Discrimination

Keyword	Definition
Social justice	Ensuring that society treats people fairly whether they are poor or wealthy and protects people's human rights
Human rights	The basic rights and freedoms to which all human beings should be entitles
Justice	Fairness
Responsibility	Having a duty to do something
Duty	Having an obligation to do something
Equality	The state of being equal, especially in status, rights and opportunities
Prejudice	Unfairly judging someone before the facts are known; holding biased opinions about an individual or group
Discrimination	Actions or behaviour that result from prejudice
Positive discrimination	Treating people more favourably because they have been discriminated against in the past or have disabilities
Heterosexual	To be sexually attracted to members of the opposite sex
Homosexual	To be sexually attracted to members of the same sex
Disability	A physical or mental impairment which has an adverse effect on a person's ability to carry out normal day-to-day activities
Racism	Prejudice or discrimination directed towards a person or group of people based on race or ethnicity
Stereotype	An oversimplified image of a person or group of people

Problems related to the topic	Explanation
Social justice	Life is not always fair. There are some things which are unfair which are beyond human control; there are other situations which we could call injustices and these occur when people increase or cause the unfairness upon others.
What are human rights?	In 1948 the United Nations General Assembly adopted The Universal Declaration of Human Rights (UDHR), which sets out the basic human rights that everyone should be entitled to, regardless of their nationality.
What do Christians say?	The Bible teaches that God is a God of justice: 'all his ways are just' (Deuteronomy 32:4), and is full of teachings about the importance of social justice, and the duty to care for others. Jesus said that the second most important commandment is to 'love your neighbour as yourself'. Many Christians have campaigned for social justice. In the nineteenth century, the anti-slavery campaigner, William Wilberforce, the prison reformer, Elizabeth Fry, and the politician, Lord Shaftesbury (who worked to improve factory conditions and to educate poor children), were all inspired by their faith.
Equality – Christian view	Christians believe that people are special and precious, because, according to Genesis 1:27, they have been created in God's image. People are born into different circumstances but all are equally valuable and can have a relationship with God.
Gender Prejudice and Discrimination - Christian view	Catholic and Orthodox churches do not support women becoming priests. They argue that men and women are equal but have different roles. In Britain in 1993 the Church of England allowed women to be ordained as priests and in 2014 a woman became a Bishop for the first time.
Sexuality – Christian view	In the Bible, heterosexual relationships are portrayed as natural and what God intended. Much more controversial are homosexual relationships. Within Christianity there is a diversity of opinion, from condemning homosexual acts as sinful to seeing homosexuality as morally acceptable.
Disability – Christian view	Christians oppose discrimination against disabled people because it does not show Christian love (agape). Jesus healed the sick and disabled and taught his followers to 'love your neighbour as yourself'.
Racism – Christian view	Most Christians today oppose racism in all its forms, and Desmond Tutu (South Africa) and Martin Luther King Jr (USA) are examples of Christians who have campaigned against racist beliefs and policies.

CHALLENGE Go to the links below and extend your knowledge on:
https://www.youtube.com/watch?v=T87DNKBvYIY,
https://www.youtube.com/watch?v=Eh_HXrurrTA&t=504s,

Religious Education

Theme F – Religion and Human rights – Religious Freedom

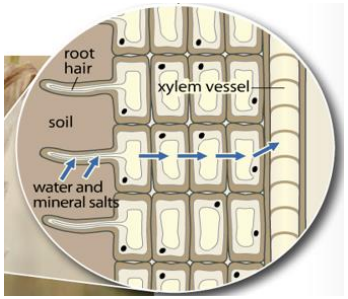
Keyword	Definition
Freedom of religion	The right to believe or practise whatever religion one chooses
Freedom of religious expression	The right to worship, preach and practise one's faith in whatever way one chooses
Human Rights	The basic rights and freedoms to which all human beings should be entitles
Evangelism	Spreading the Christian gospel by public preaching or personal witness
Key pieces of scripture or sacred writings	'Everyone has the right to freedom of… religion' – Article 18, The Universal Declaration of Human Rights 'Be completely humble and gentle; be patient, bearing with one another in love' 'Watch out for those who cause divisions… keep away from them' 'If it is possible as far as it depends on you, live at peace with everyone'
Examples of exam questions	Explain two contrasting beliefs in contemporary British society about freedom of religious expression. **(4 marks**) Explain two similar beliefs in contemporary British society about the right of freedom of belief. **(4 marks)** Explain two religious beliefs about freedom of religious belief. Refer to scripture of sacred writings in your answer. **(5 marks)** 'People should have the freedom to say whatever they want about religion'. Evaluate this statement. **(12 marks)** 'Freedom of religion and religious expression is not possible in the modern world'. Evaluate the statement. **(12 marks)** 'Rights are more important than responsibilities'. Evaluate the statement. **(12 marks)** 'Rights are more important than responsibilities'. Evaluate the statement. **(12 marks)**

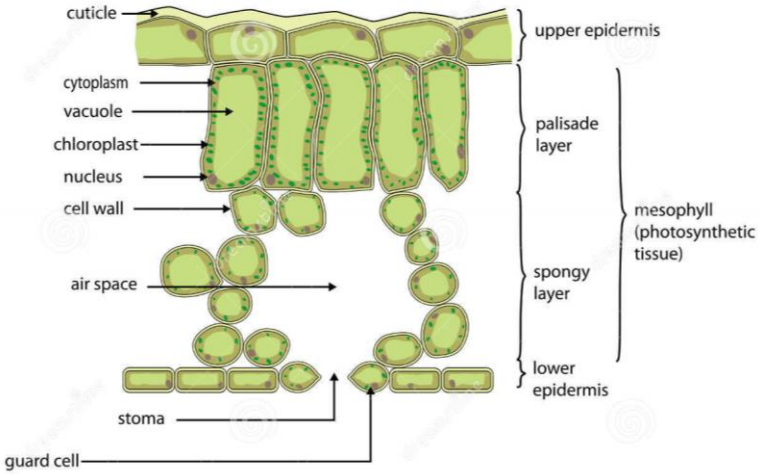
Problems related to the topic	Explanation
Religious Freedom	Article 18 of The Universal Declaration of Human Rights says: 'Everyone has the right to freedom of thought, conscience and religion; this right includes freedom to change his religion or belief, and freedom, either alone or in community with others and in public or private, to manifest his religion or belief in teaching, practice, worship and observance'. In Britain today, the official state religion is Christianity, and the Anglican Church is the official church in England. No one can be forced to join the Church. The government protects freedom of religious expression, which is the right of individuals to worship in whatever way they choose, or not at all, and laws forbid the persecution of members of other faiths or non-believers. Believers are free to evangelise providing that they do not preach hatred and intolerance. This freedom of religion in the UK has not always been the case; throughout history people have been fined, imprisoned or killed for worshipping in ways or following particular denominations or religions not supported by the government or monarch. In some places differing religious views have lead to conflict; for example, conflicts between Catholics and Protestants in Northern Ireland, and Crusades organised by Christian Kings in the Middle Ages to recapture the city of Jerusalem from Muslim control. In the 20th and 21st centuries, Christians have been persecuted by communist governments and by dictators, for example in North Korea, or in countries where Christians are the minority, for example in the Middle East and Pakistan.
Religious teachings on freedom of religion	Christian teaching encourages tolerance and harmony. When Christian denominations fight each other, they are not following what the Bible says. Ephesians 4:2 says, 'Be completely humble and gentle; be patient, bearing with one another in love'. Romans 12:18 says, 'If it is possible, as far as it depends on you, live at peace with everyone'. Romans 16:17 says 'Watch out for those who cause divisions… keep away from them'. No religion teaches religious intolerance. Religious freedom is encouraged by religions for different reasons. Islam teaches that religious freedom is part of God's design, and freedom of belief is taught in the Qur'an. Christians believe that Jesus taught religious freedom. The freedom to believe and worship, in public or private, to change religion or not follow any religion is regarded by most Christians as a fundamental human right.

CHALLENGE
Go to the links below and extend your knowledge on:
https://www.bbc.com/bitesize/guides/zcb42hv/revision/1,
https://en.wikipedia.org/wiki/Freedom_of_religion,

9BP Plants and Photosynthesis

The root hair cell helps to absorb water and minerals from the soil





1. Photosynthesis Keywords

Photosynthesis	The process by which plants make food using carbon dioxide, water and light.
Starch	Type of carbohydrate found in plants made from glucose. Used for storage.
Stomata	Openings in the leaves of plants. Opened and closed by guard cells allowing gases to enter and leave the leaf.
Diffusion	The spreading out of particles from and area of high concentration to an area of low concentration.
Chloroplast	The organelles in which photosynthesis takes place.
Biomass	The amount of biological material in an organism.
Glucose	A simple sugar.
Respiration	Process that occurs in all living cells that releases energy from food.
Carbon dioxide	A reactant used by plants during photosynthesis.
Xylem	Non living cells in plants that transport water from the roots to the leaves.
Palisade cells	Contain lots of chloroplasts.
Pollination	Transfer of pollen from the anther to stigma.
Fertilisers	Contains minerals that help plants grow.
Minerals	Needed by plants and animals for growth and development.
Producer	An organism that is able to make its own food.
Consumer	An organism that has to eat other organisms to survive.

2. Photosynthesis

Carbon Dioxide + Water → Glucose + Oxygen

$6CO_{2\,(g)} + 6H_2O_{(l)} \rightarrow C_6H_{12}O_{6\,(s)} + 6O_{2\,(g)}$

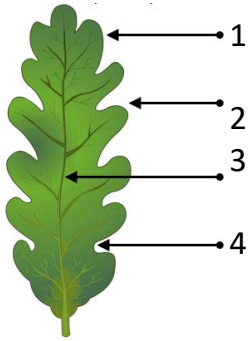
3. Testing for Starch

Testing for Starch Iodine solution will turn from brown to blue/black in colour.

Science – 9BP Plants and Photosynthesis

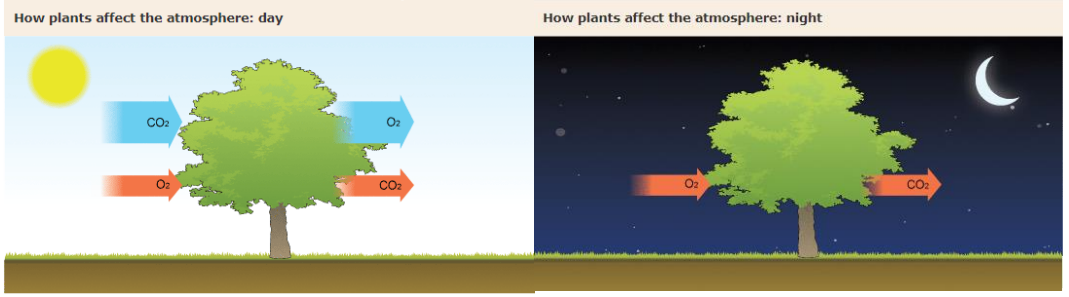
4. Leaf Adaptations

Structure	Function
Broad leaf	Large surface area for absorbing light.
Thin leaves	Gases have less distance to travel into the leaf (short diffusion distance).
Chloroplasts (containing chlorophyll)	Chlorophyll absorbs light for use in photosynthesis. Photosynthesis takes place in the chloroplast.
Veins	Water bought to the leaf in xylem. Products of photosynthesis taken away in phloem.
Air spaces	To allow diffusion of gases in an out of palisade cells.
Guard cells	Open and close stomata.



1. **thin** – this allows gases to reach cells easily
2. **wide and flat** – this create a large surface area to absorb as much light as possible
3. **veins** – these carry water to the cells and carry glucose away and also support leaves
4. **stomata** – these are pores on the underside of leaves through which gases move in and out. –

5. Plants and the Atmosphere



6. Minerals

Mineral	Use
Nitrate ions (NO_3)	Building proteins and growth
Phosphate ions (PO_4)	Respiration and growth
Potassium ions (K^+)	Respiration and photosynthesis
Magnesium ions (Mg^{2+})	Photosynthesis

7. Crop Pollination

Wild bees need:

- Food – pollen, nectar
- Nesting sites - trees, ground

Wild bees provide:

- Increased crop yield and quality
- Food security

Food security: all people have access to safe, nutritious food at all times

Science – 9CE Energetics and Rates

1. Keywords

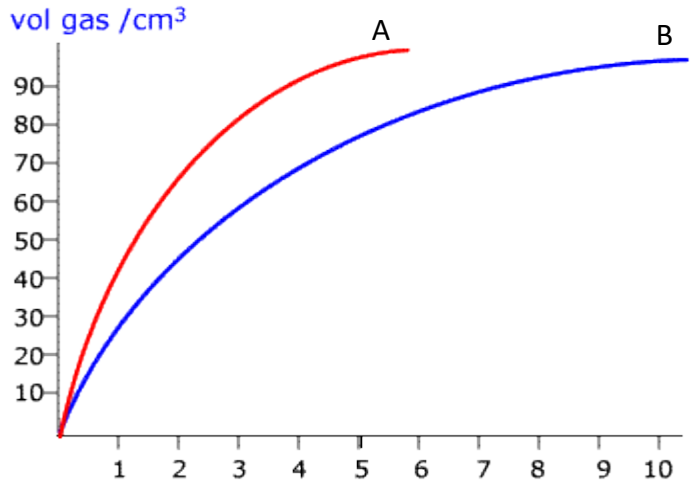
Thermal decomposition	Breaking down a compound by heating it
Oxidation	A reaction where oxygen is added to a substance
Complete combustion	Burning a substance in plenty of oxygen
Incomplete combustion	Burning where there is a limited supply of oxygen
Hydrocarbon	A compound that only contains carbon and hydrogen
Fuel	A material that is burned to release energy, e.g. coal
Catalyst	A substance that increases the rate of a reaction without being used up in the reaction
Exothermic	A reaction that transfers energy to the surroundings
Endothermic	A reaction that takes in energy from the surroundings

2. Combustion

Complete combustion	Incomplete combustion
Hydrogen combines with oxygen to make H_2O	Water and carbon dioxide still produced
Carbon combines with oxygen to make CO_2	Toxic carbon monoxide and carbon particles (soot) are also produced

3. Factors Affecting Rate of Reaction

Factor	Change	Effect on Rate	Reason
Temperature	Increase	Increase	The particles are moving faster so collide more often and with a greater proportion of successful collisions
Concentration	Increase	Increase	The are more particles so collisions are more frequent
Surface area	Increase	Increase	There are more particles available so more collisions
Catalyst	Add	increase	The lower activation energy means more particles can successfully collide



A – reaction with catalyst
B – reaction with no catalyst

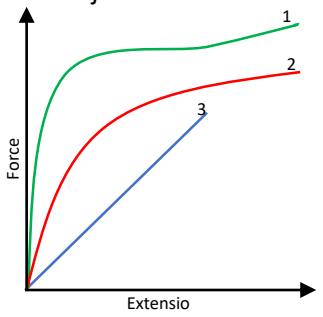
Science – 9PF Forces in Action

1. Keywords	Definition
Force	A push or a pull that can change the motion of an object. The unit for force is newtons (N)
Resultant force	The overall force acting on an object
Moment	A turning effect of a force
Pivot	Point around which something can rotate/turn
Force multiplier	Reduces the amount of force needed by increasing the distance that the force is applied over
Work done	The amount of energy it takes to do a task. Work done is measured in Joules (J) **Work = force × distance**
Equilibrium	When the opposing forces are balanced
Compression	When an object is squashed
Extension	Increase in length
Deformation	Changing shape or size as a result of a force
Elastic	An object that returns to its original shape after being deformed by a force
Hooke's law	The extension of an object is directly proportional to the force applied to the object **Force = spring constant × extension**

2. Hooke's Law and Energy Stores

Work is done by a force when it deforms an object, the energy is stored by the object as **elastic potential energy.**

The extension of an object increases as the force on the object increases.



1	Polythene strip	Obeys Hooke's Law?	No
2	Rubber band	Obeys Hooke's Law?	No
3	Steel spring	Obeys Hooke's Law?	Yes

3. To Calculate Extension

1. Measure the original length of the object
2. Measure the stretched length of the object
3. Extension = stretched length – original length

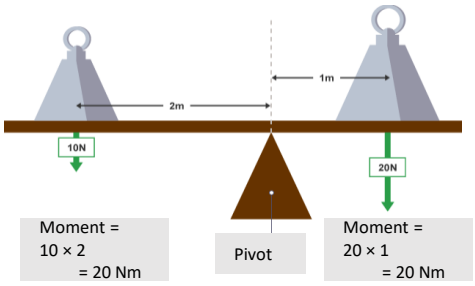
4. Moments

1. To calculate a moment you need to know:
- How much force is being applied (newtons, N)
- The distance from the pivot that the force is being applied (metres, m)

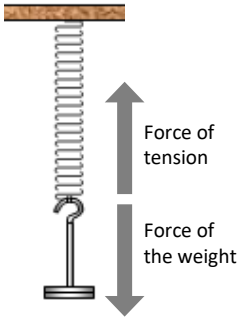
Moment = force × distance

2. The unit for moment is newton metre (Nm)

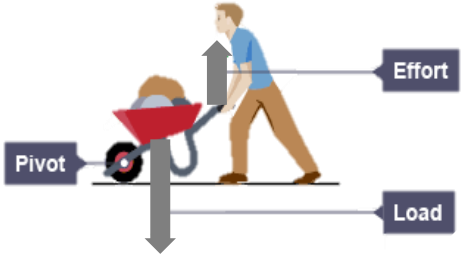
3. A small force over a large distance can generate the same moment as a large force over a small distance.



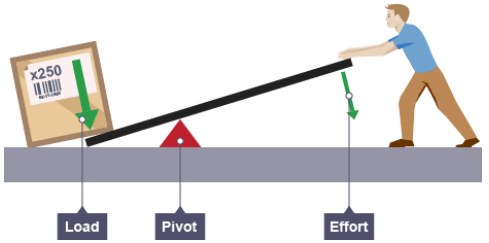
5. Balanced Forces of Weight on a Spring



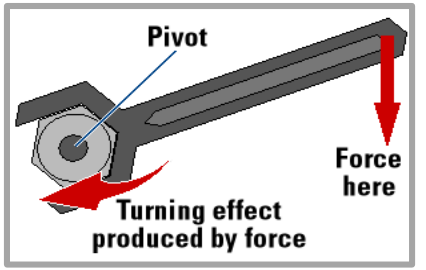
Simple machines give a bigger force with a smaller movement.



The load on a wheelbarrow is near the pivot. When force is applied to the handles they move a larger distance than the load does



The plank of wood is acting as a lever. Levers are simple machines that reduce the force needed to do a task.

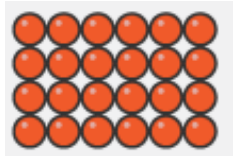
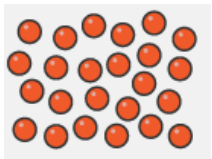


The spanner is acting as a **force multiplier** using moments

Science – 9PM Matter

1. Keyword	Definition
Pressure	Force divided by area
Density	The mass per unit of volume of a substance
Concentration	The amount of substance per unit volume of solvent
Melting	Solid changing to liquid
Sublimation	Solid changing to gas without changing to liquid
Freezing	Liquid changing to solid
Evaporation	Liquid changing to gas
Condensation	Gas changing to liquid
Dissolve	When a substance breaks up and mixes completely with a solvent to produce a solution
Diffusion	The movement of molecules from an area of higher concentration to an area of lower concentration
Brownian motion	The random movement of particles of gas due to collisions with other particles of gas
Reversibility	The ability of a substance to go back to its previous state
Upthrust	Upwards force exerted by a liquid on an object floating in it

2.

State	Solid	Liquid	Gas
Diagram			
Arrangement of particles	Regular arrangement Very close together	Randomly arranged Close together	Randomly arranged Far apart
Movement of particles	Vibrate about fixed position	Move around each other	Brownian motion
Energy of particles	Low energy	Higher energy	Very high energy
Density of substance	High density	Lower density	Very low density

3. The particles in a substance stay the same when it changes state: only their closeness, arrangement or motion change. This means the mass of the substance stays the same.

4.	Melting	Evaporation	Condensing	Freezing
Arrangement of particles	From regular and compact to random	Much further apart	Become much closer together	Stay close together and become regular
Motion of particles	Start to move around each other	Start to move quickly in all directions	Slow down and only move around each other	Stop moving around and only vibrate on the spot
Energy change	Particles gain energy	Particles gain energy	Particles lose energy	Particles lose energy

A Physical change in a substance does not change what the substance is and it can be reversed, e.g. melting ice then freezing water. In a chemical change a reaction occurs and a new substance is formed

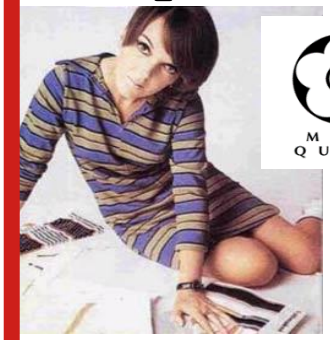
5. The pressure in liquids increases with depth as the weight of the liquid above is greater.

The jet coming from the lower hole is more sideways as there is more pressure

6. Liquid pressure is exerted on the surface of on object in a liquid causing upthrust.
As an object starts to sink in liquid the liquid pressure increases and upthrust increases. The object floats if the upthrust is equal and opposite to the objects weight. The object sinks if the weight is greater than the maximum uphtrust.

Textiles

Mary Quant



Mary Quant (born 11 February 1934) is a Welsh **fashion designer** and British fashion icon, who was instrumental in the mod fashion movement. She was one of the designers who took credit for inventing the **miniskirt and hot pants**. Born in Blackheath, London, to Welsh parents, Quant brought **fun** and **fantasy** to fashion in the 1960s.

Introduction

Textiles are highly adaptable and can be constructed to maximise different properties including a very high strength to weight ratio, which means less material can be used to make strong and robust products.

Textiles are available in any different forms including rolls, yarns and fibres. They can be made into a multitude of shapes and products using different processing methods.

WEAVING

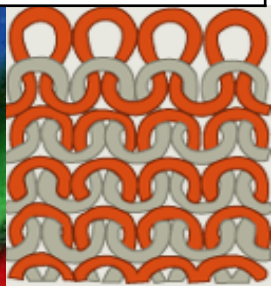
Woven fabrics are made from weaving two yarns together, using a loom. The yarn that is used from the top to the bottom of the loom is the warp thread. The yarn that goes under and over the warp yarn is known as the weft thread. Where the weft thread turns around at the edge of a fabric it is known as the selvedge.

KNITTING

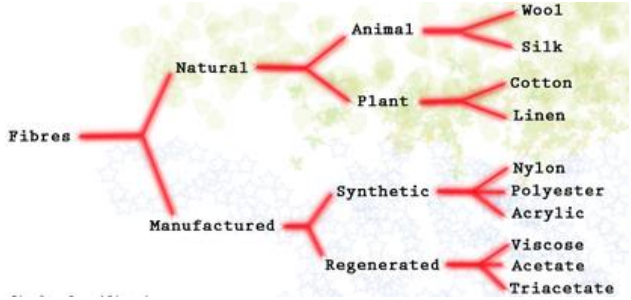
Knitting is forming loops on a set of needles and pulling a thread though the loops.

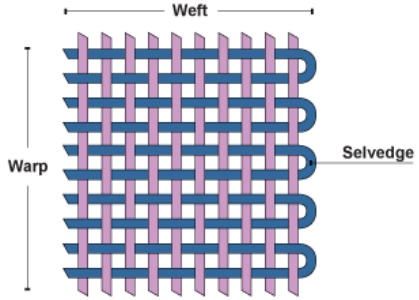
BONDING

Fibres are bonded together by heating, gluing or stitching the fibres together. A bonded fabric has no weft or warp threads and no right or wrong side. They are usually inexpensive fabrics that do not fray, such as felt.



Key Facts to Memorise





Textiles

Alexander McQueen

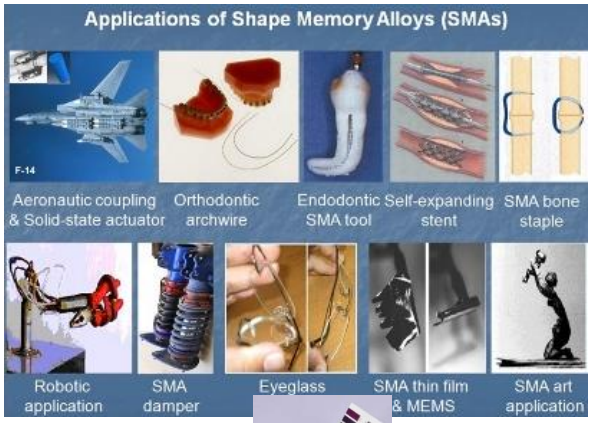
Lee Alexander McQueen
(March 1969 – February 2010) was a British fashion designer and couturier best known for his in-depth knowledge of **bespoke British tailoring**, his tendency to **combine strength and fragility** in his collections, as well as the **emotional power** and **raw energy** of his **provocative fashion shows**. He is also known for having worked as chief designer at **Givenchy** from 1996 to 2001 and for founding his own label under the name **Alexander McQueen**. His achievements in fashion earned him **four British Designer of the Year awards.**

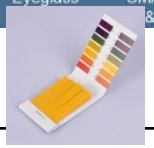
Introduction

A smart material is one that reacts to an external stimulus or input. This group of materials can react to heat, pressure, moisture, stress, PH level, lights and electricity.

Keywords

Shape Memory alloy – can remember a pre-set shape and return to it even after being dramatically reshaped. The stimulus for returning to the pre-set shape is heat or electricity.





Litmus paper

Key Facts to Memorise

Thermochromic – heat effects the change in pigment colour.

Photochromic – this is the **ultra violet** rays that effects the change in pigment.

Polymorph – a non-toxic and fully biodegradable polymer in small granules. When heated to 62 degrees the granules fuse to become a mouldable substance and cool to be a solid. Can be reheated and remoulded.

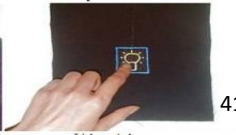
Piezoelectric material – It is not a conductor, but produces an electrical voltage when squeezed or put under pressure. Can create a spark to ignite gas. Can be used to create sound.

Quantum tunnelling composite – can be a conductor or insulator. QTC varies its electrical resistance depending on the amount of pressure or stress applied to it.


Wearable audio keypad


Denim piano


Games pad


Light switch

Textiles

Introduction

Sewing joins fabrics together with stitches, by hand or by machine.

Keywords

Embroidery

CAM embroidery

Laminated fabrics – Gore-Tex, PVC, faux leather

Piping – used along the edges or seams of a fabric to strengthen, protect, neaten or highlight.

Applique

Batik – wax and tjanting tool

Stiffening/interfacing

Rivets

Webbing

Key Facts to Memorise