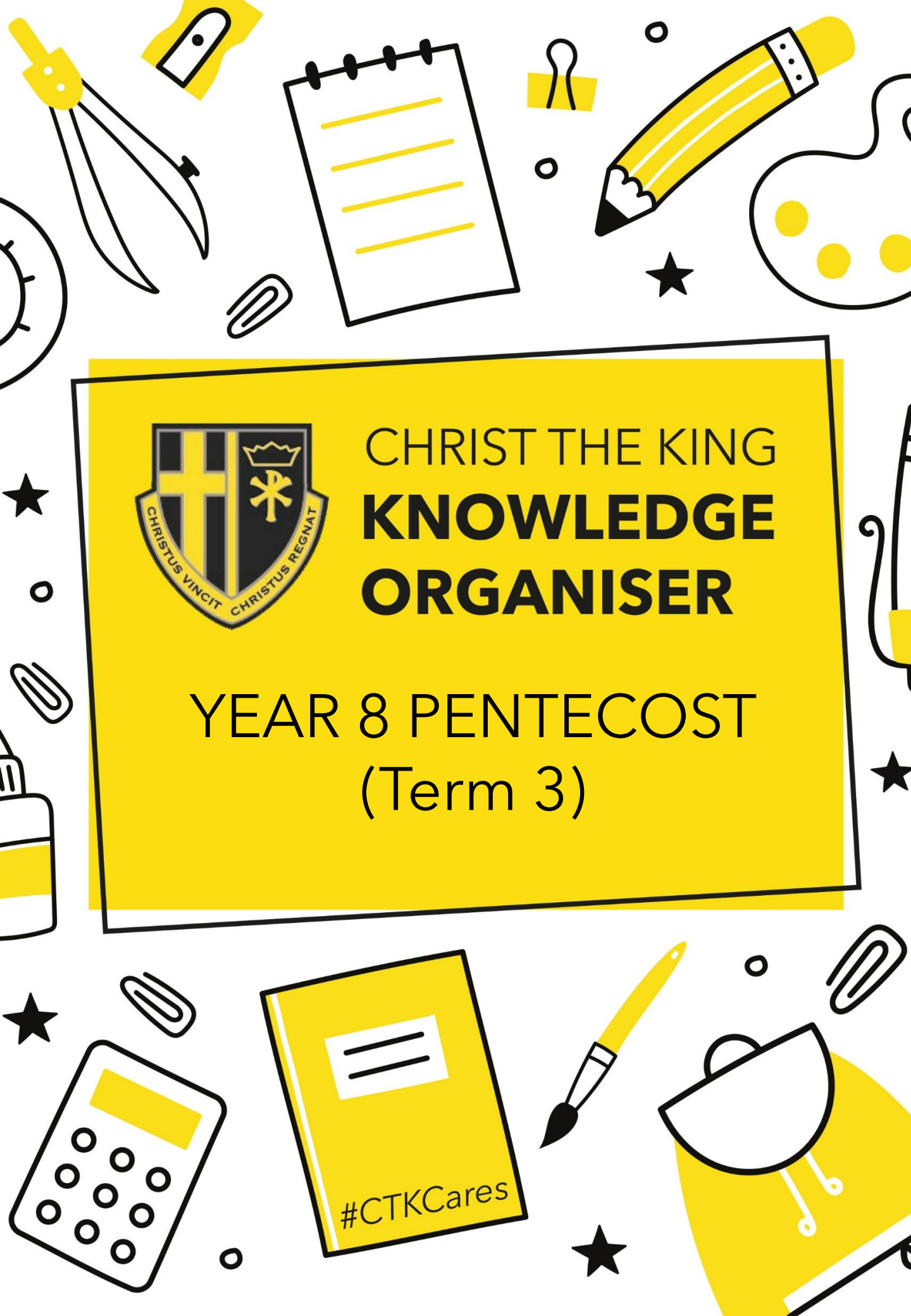
CHRIST THE KING
KNOWLEDGE ORGANISER
YEAR 8 PENTECOST
(Term 3)
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#CTKCares

Why should I self-quiz?

Your mind is split into two parts: the working memory, and the long-term memory. Everybody's working memory is limited, and therefore it can be very easily overwhelmed. Your long-term memory on the other than is effectively limitless.

You can support your working memory by storing key facts and processes in long term memory. These facts and processes can be retrieved to stop your working memory becoming overloaded.

This booklet contains knowledge organisers for each of your subjects. Each organiser has the key information that needs to be memorised to help you master the subject and be successful in lessons.

How often should I self quiz?

Research shows that regular self-testing improves knowledge retention; in order to learn the information in your knowledge organiser, you will need to work with it more than once! There are many ways to learn the material in your knowledge organiser.

How to use your Knowledge Organiser

- **Cover – Write – Check:** Cover up one section of the knowledge organiser and try to write out as much as you can from memory. Check the knowledge organiser to see if you are right; correct any mistakes and fill in any missing information in a different coloured pen.

  Repeat this process at least twice to fill your page. You could also include content from the previous week's homework, especially if there were some parts that you struggled with.

- **Draw a mind map:** Jot down everything that you can remember from the knowledge organiser. Check accuracy, correct in a different coloured pen and repeat.

- **Revision Clock:** Draw a clock and add the topic in the middle. Break the clock face into 10-minute sections. Add notes from the knowledge organiser in each section. Cover the clock ands recite the information aloud.

- **Create Flashcards:** Use the information from your knowledge organiser to create flashcards – these could be double sided, with a question on one side and the answer on another, or a keyword on one side and the definition on the other.

DID YOU KNOW?

Research shows a student remembers 50% more when they test themselves after learning something.

Homework Schedule

You should complete at least one hour of Home Learning per school day.

This will consist of:

- Knowledge Organiser and Online Learning as directed by your teachers.
- If you have no tasks set, carry out Knowledge Organiser activities as per the Knowledge Organiser timetable below.
- Two periods of 20 minute reading each week.

Week 1					
20 Minutes Per Subject	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Subject 1	English	Science	Maths (Mymaths)	Maths	English
Subject 2	RE	PE	RE	Science	Geography
Subject 3	Music	History	Technology / IT	MFL	Art

Week 2					
20 Minutes Per Subject	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
Subject 1	Science	English	English	Maths (MyMaths)	Science
Subject 2	RE	Maths	RE	Drama	Geography
Subject 3	Music (Practical)	History	Technology / IT	MFL	Art (Practical)

Read 20 minutes a day and you'll read 1,800,000 words per year.

Reading for 6 minutes a day reduces stress by 68%.

Children learn 4,000 to 12,000 words per year through reading,

What are the homework expectations?

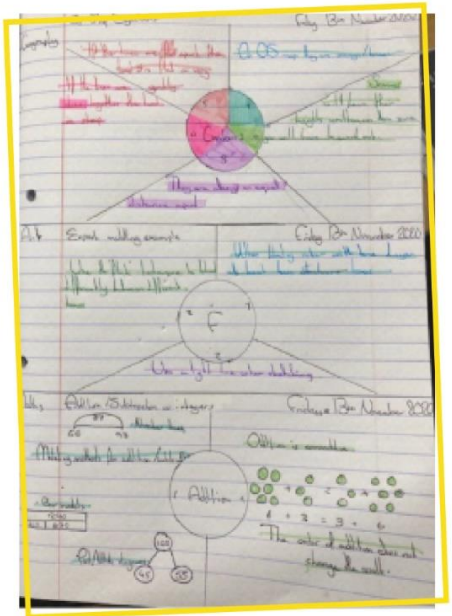
Each homework must meet the following 5 requirements:

- Write the complete title and date in full *e.g Wednesday 7th June 2023* on each page and underline.
- You should include minimum of words to summarise the topic. Do not copy the words from the text.
- Make full use of the page for each topic by scaling your notes and images appropriately to use all the space.
- You must include diagrams, sketches, or cartoon doodles to visually represent the topic, try to use humour.
- Highlight key words and phrases, using underlines and highlighter pens, and explain technical terms.

How should I present my work?

Please remember that the same rules apply to the presentation of your homework as applies for your class work: **dates and titles** (which should be the name of the subject) **need to be underlined with a ruler** and you should **present your work as neatly as you are able to.**

If you are self-quizzing correctly, there should be **evidence of green pen on your page**. Here are some examples of how to set out your work:



DON'T FORGET!

Always record the date, topic, and page number in your Home Learning Book!

Landscape Project

Landscape Art can come in many different forms such as paintings, drawings, photographs, prints and even sculptures. They often show images of nature such as the countryside but also can depict cities and urban areas. Landscape Art can be **abstract** and **realistic** and can document factual events or can be used to express the feelings and emotions of the artist. created

1. Perspective	a techniques which attempts to create the illusion of depth and 3 dimensions in a drawing or painting.
2. Background	usually at the top and back of the painting or drawing and appears to be further away.
3. Foreground	can be seen at the front or bottom of a landscape which appears to be closer.
4.Post Impressionism	started in Europe in the late 19th century, characteristics include bright colours and thick brush stokes.
5. Brush strokes	can shape and form and direction in a painting.
6. Composition	how you arrange and place the different parts of a piece of art work
7. Horizon line	used to show where the land disappears In the distance
8.Vanishing point	used when drawing in perspective to create a 3D effect
9. Cityscape	A landscape which shows 'urban' areas including buildings and streets.

Brush strokes and use of **line** are a key characteristicof **'Post Impressionism'**

Famous Van Gogh painting 'Stary Night'

'Post Impressionism'

- *Began in Europe in the late 19th century.*
- *Paintings would show scenes of 'everyday life' such as people at work, the countryside and nature.*
- *Paintings would use brighter vivid colours and thick brushstrokes.*
- *Post Impressionist painters tried to capture natural light and 'emotion' in their work.*
- *Vincent van Gogh, Paul Gauguin, Paul Cezanne and George Seurat are considered original Post Impressionist artists.*

Vincent van Gogh (born 30 March 1853 – 29 July 1890) was a Dutch post -impressionist painter. His work had a great influence on modern art because of its striking colours and emotional power. He suffered from anxiety and fits of mental illness and famously cut off his ear lobe. During a 10 year painting career, he produced over 1000 pieces of work. Although he only sold one painting in his life time, his work is now extremely valuable and popular sells for millions.

Kuda Mushanga (born 1995 Nottingham) now based in London, Kuda is a painter and architectural assistant. He is a previous CTK student who completed his GCSEs and A Levels before studying Architecture at John Moore's University in Liverpool. Kuda's art is influenced by many traditional and contemporary artists from all over the world. He paints portraits, interiors and landscape. Kuda's work often reflects his feelings and thoughts about society and his heritage. His landscape paintings have a strong connection to Post Impressionistic painting.

WHAT AM I DOING WELL ? WHAT DO I NEED TO DO TO IMPROVE ? HOW ARE THE AUDIENCE IMPACTED BY THE ACTING AND DESIGN CHOICES ?

YEAR 8 wonder.land

Physical and vocal Key words

CHARACTERISATION
Using a range of physical and vocal skills to show a character who is different to you.

TONE OF VOICE
The emotion behind what your character says e.g. an angry tone, a surprised tone.

PITCH
How high or low your character's voice is.

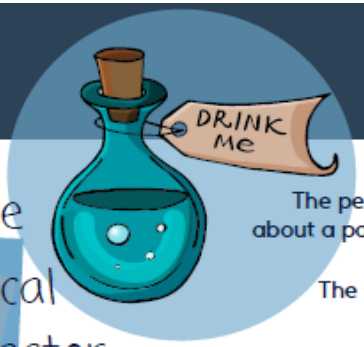
PACE
The speed at which your character speaks or moves.

GESTURES
Using your hands (or sometimes eyes and head) to communicate meaning with other characters and the audience e.g. pointing/winking.

BODY LANGUAGE
Showing emotion through the way you sit, stand or position yourself.

FACIAL EXPRESSION
Showing emotion through your face- eyes, mouth, eyebrows...

moment effect scene
script stage skills physical
suggests **words we use to talk about theatre** actor element
choices story
successful dialogue
design character
movement
engaging audience line
director performance vocal



Writing structure

WHAT? Explain **which** element was successful.

HOW? Explain exactly **how** this moment was created.

WHY? **Why** was it successful? What impact did it have on the audience?

JUSTIFY How did **you** feel about this particular moment?

Design Key words

DESIGNER
The person in charge of making decisions about a particular element of the production.

SET
The scenery and furniture on the stage throughout the production.

PROPS
The items held or used by actors on stage to make the action more realistic.

COSTUME
What the actors wear when performing. Costume can denote character, historical era and the style of the production.

MUSIC AND SOUND
Live or recorded sound used to enhance a production and create a certain atmosphere.

LIGHTING
Lighting is used to make sure the audience can see the actors and set, focus their attention on what is important and to create a mood.

LEVELS
Used to create different locations or to show status on stage.

COLOUR/FIT/STYLE
Can suggest a character's personality, occupation or status.

- One moment that stood out for me was...
- This helped to communicate to the audience that...
- This effect was created by...
- This could have been communicated more effectively by...
- The actor/designer used... effectively to create...
- The impact of this on the audience was...
- This created an atmosphere/ feeling of...
- Overall the cast & crew successfully communicated...

ACT 1

Extreme hatred exists between the Montague and Capulet families.
A brawl breaks out in streets in the opening scene between the two families.
Romeo meanwhile is missing (busy being lovesick for Rosalind) who does not return his love.
Paris visits the Capulet household and asks to marry Juliet. Paris is invited to the Capulet ball.
Benvolio persuades the lovesick Romeo to 'gatecrash' the Capulet ball.
Lady Capulet and the nurse try to convince Juliet that Paris would make a good husband.
At the ball, Tybalt spots Romeo and wants to confront him. Lord Capulet prevents the fight.
Romeo and Juliet meet and it's love at first sight.

ACT 2

Romeo scales the garden wall – desperate to see Juliet. They exchange love vows on the balcony and plan to marry.
Romeo asks Friar Lawrence to arrange the marriage. The Friar only agrees as he hopes it will unite the families and end the feud.
The Nurse acts as a go between helping the young lovers.
Romeo and Juliet are married in secret.

ACT 3

Benvolio is with Mercutio. Tybalt is looking for a fight with Romeo. However, Romeo refuses to fight back. Mercutio thinks Romeo is behaving in a cowardly way and he fights Tybalt instead. Mercutio is stabbed after Romeo tries to intervene and prevent the fight.
Mercutio curses the two families: "a plague on both your houses." The Prince arrives and condemns Romeo to exile as he killed Tybalt in revenge for his friend's death.
Romeo is banished.
Paris arrives to marry Juliet. Lord Capulet wants the marriage to go ahead.

ACT 4

Juliet is given a potion by Friar Lawrence to make her appear dead. He then sends a message to Romeo to hurry back to Verona.
Juliet's family are devastated when they learn of her death and they take her body to the family tomb.

ACT 5

Romeo learns that Juliet has died. He returns to Verona to visit the tomb.
The messenger who was sent to tell Romeo that Juliet was not really dead admits to Friar Laurence that he was prevented from leaving the city and delivering his message by an outbreak of disease.
Paris visits Juliet's tomb. Romeo meets him there but does not know who he is. Seeing each other they fight. Romeo kills Paris.
Romeo takes the poison. Juliet wakes and sees Romeo dead she takes Romeo's dagger and kills herself.

	LITERARY TERMS		KEY CONCEPTS
	**Soliloquy:** a long speech expressing the thoughts of a character alone on stage.		Courtly love: courtly love' sees love as ideal, not real. Rather than meeting the loved one, lovers exchanged letters and poems comparing their lover to beautiful, exaggerated ideas like angels or goddesses.
	Sonnet: a 14 line poem in rhyming couplets. It traditionally is about the topic of love. There is a change in meaning or twist in the final lines.		Fate: the idea that higher powers such as God or fate controlled the events in a person's life . The prologue about 'star-crossed lovers introduces the role of fate from the start.
	Dramatic irony: when the audience knows something that the characters don't.		Honour code: a sense of family honour at the time meant that any small insult had to be repaid with revenge. This could lead to violence, death and civil unrest (large brawls across a city.)
	Hyperbole: an over exaggeration - not meant to be taken literally		Patriarchy : whereby men hold the power and women are excluded from it. For example, the father was the ruler of the household, and women had no rights in law. Daughters were regarded as 'property' and often married off very young as a way to join wealthy and powerful families.
	Foreshadowing: the playwright gives us hints or clues to suggest what will happen later in the plot.		Catholicism: the Italy in which the play is set was a catholic society, which believed that suicide was a mortal sin, punished by an eternity in hell.

CHARACTERS	
ROMEO	The only son of Lord and Lady Montague. More interested in love than violence.
JULIET	The only daughter of Lord and Lady Capulet. Young and extremely protected by her family.
FRIAR LAWRENCE	A priest who Romeo and Juliet go to for advice when they want to marry.
MERCUTIO	Part of the Montague family. He is a friend of Romeo who likes to laugh and have fun. He can also be hot headed.
TYBALT	Juliet's cousin. He is a very proud man and loyal towards his family. He is a great sword fighter.
BENVOLIO	Romeo's friend and cousin. He likes to try to keep the peace and to resolve conflicts.
PARIS	A wealthy and well respected man who has come to offer to marry Juliet.
LORD CAPULET	Juliet's father who controls and rules his family.
LADY CAPULET	Juliet's mother. She has not brought up her daughter she has relied on the nurse.
NURSE	The main person who has cared for Juliet all her life. She is a trusted servant of the family.
LORD MONTAGUE	Romeo's father . He is a bitter enemy of the Capulet's.
LADY MONTAGUE	Romeo's mother who loves her son and is heartbroken when he is banished from Verona.
PRICE ESCALUS	The Prince of Verona whose responsibility it is to maintain peace in the city.

VOCABULARY

WEEK 1
Feud- *long standing argument*
Transgress - *disobey*
Honour - *respect*
Equality - *fairness*
Destiny - *fate*

WEEK 2
Archetype – *typical example*
Naïve- *innocent, trusting*
Idolise – *love greatly*
Hence - *away from here*
Reckless- *careless*

WEEK 3
Obedience – *obeying powerful people*
Demure- *modest, quiet, reserved*
Passion- *strong feelings*
Futile- *pointless*
Subsequent- *following*

WEEK 4
Revise vocabulary from previous weeks

WEEK 5
Submissive – *obeys easily*
Rebellious- *disobedient*
Tragedy – *downfall of main character*
Vindictive- *seeking revenge*
Portray – to *show/ to represent*

WEEK 6
Oppression- *cruel/unjust treatment*
Patriarchy- *system of male power*
Nemesis – *hated enemy*
Passive - *accepting*
Betrayal - *disloyal*

QUOTATIONS

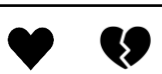
"Two households both alike in dignity"
When - Prologue

"A pair of star crossed lovers take their lives"
When - Prologue

" Younger than she are happy mothers made."
Who - Paris
When - Act 1

"if looking liking move: But no more deep will I endart mine eye Than your consent gives strength to make it fly."
Who - Juliet
When - Act 1

My lips two blushing pilgrims"
Who – Romeo
When – At the Capulet ball



"My only love sprung from my only hate"
Who – Juliet
When – After the ball

"What's in a name? That which we call any rose by any other name would smell as sweet."
When - Act 2
Who - Juliet

"Arise, fair sun, and kill the envious moon"
Who - Romeo
When - Balcony scene

"A plague on both your houses"
When - Act 3
Who - Mercutio after the fight where he is accidentally stabbed and lies dying

"For I will raise her statue in pure gold,"
When - Act 5:
Who – Montague assures Capulet that he will erect a gold statue in her memory

Geography Topic 9: Climate Change

1. Climate Change key words	
Climate Change	Changes in climate as a result of natural causes or human activity
Global warming	The recent increase in global temperatures
Greenhouse effect	Trapping of the sun's warmth in our lower atmosphere which warms the earth
Greenhouse gases	Gases such as carbon dioxide and methane, which absorb heat from Earth
Anthropogenic	Environmental change caused by humans
Mitigation	To reduce or eliminate the effects of something from happening
Adaptation	Do not aim to reduce or stop global warming – actions taken to adjust to natural events

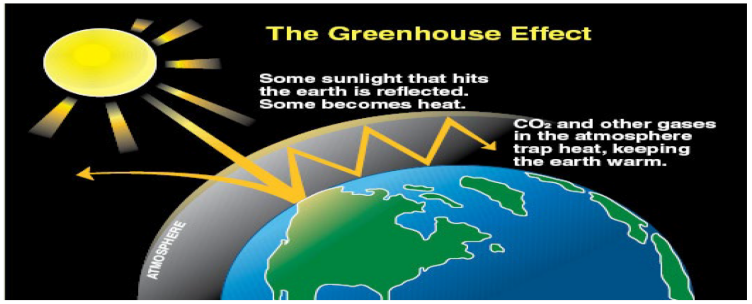
4. Causes of Climate Change	
Natural	**Anthropogenic**
Changes in the orbit and tilt of the Earth	Burning of fossil fuels
Volcanic activity	Deforestation
Solar output	Dumping waste into landfill
	Agriculture

5. Natural Resources	
Natural Resource	Substances that are found in nature which can be used by humans for our benefit e.g. water, soil, coal, minerals, wood, animals
Energy Mix	The proportion of energy that comes from different sources e.g. coal, wind, solar
Fossil Fuels	Non-renewable energy sources e.g. coal, oil and natural gas
Renewable	Sources of energy that can be replaced when they are used
Non-renewable	Sources of energy that cannot be replaced once they are used
Resource security	Plentiful supply of a resource

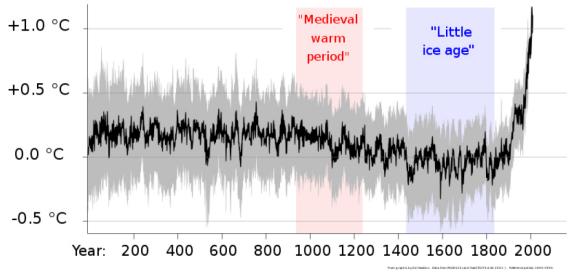
8. Effects on small island developing states (SIDS)
Increase in storms
Relocation of populations
Loss of biodiversity
Coastal erosion

9. Climate Change impacts in the UK
Severe water shortages in the summer
Risk of flooding will double to 1.9 million people
Increase in sea levels by one metre and as much as two metres by coasts
Increase in heat related deaths in the summer

2. The greenhouse effect
The natural process of trapping the sun's warmth in our lower atmosphere which warms the earth



Global Average Temperature Change



3. Evidence of Climate Change	
Short-term	**Long-term**
Glacier retreat	Ice cores
Rising sea levels	Pollen analysis

6. Sources of Energy	
Renewable	**Non-renewable**
Solar	Oil
Wind	Coal
Hydro-electric power (HEP)	Gas
Biomass	Nuclear
Geothermal	

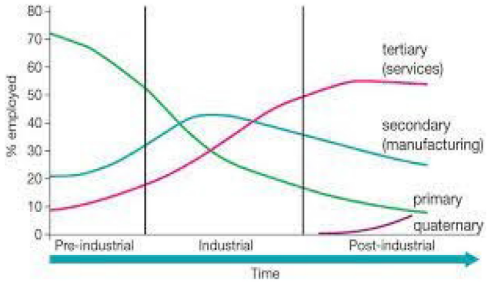
7. Global Consequences of Climate Change
Droughts
Storms
Heat waves
Rising sea levels
Melting glaciers
Warming oceans

10. Managing global climate change	
Mitigation	Adaptation
Alternative energy	Agriculture
International agreements	Water supply
Planting trees	Reducing risk from sea level rise

Geography Topic 10: Economic Geography

Economy	The wealth and resources of a country in terms of the goods that are produced and consumed there

1. Clark Fisher Model – showing sectors of industry over time

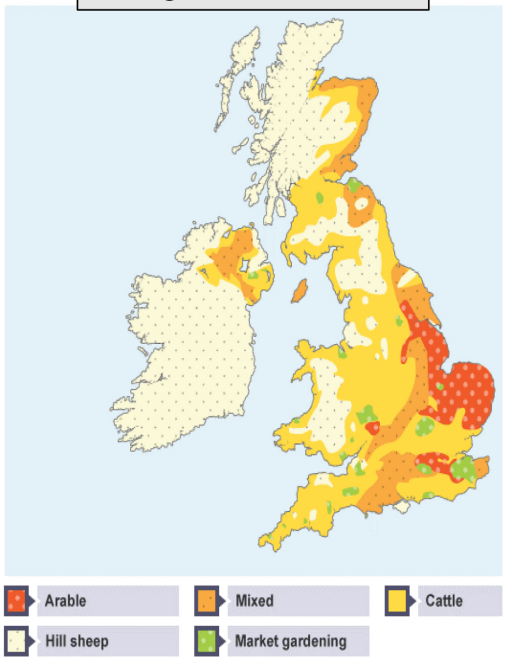


2. Agriculture	
Arable farming	Where crops are grown e.g. wheat and barley
Pastoral farming	Where animals are raised e.g. cattle and sheep
Mixed farms	Where crops are grown and animals kept
Market gardens	Where fruits, vegetables and flowers are grown

3. Factors in determining factory locations	
Costs	Buying/leasing land, equipment, wages, training, taxes
Capacity of the workforce	Availability of local labour with the right skills
Capability of the region	Raw materials available, availability of road/rail connections
Culture of the region	Ability to attract talented workforce, government policies supporting industry
Customers	Close by to the markets
Physical Landscape	Flat land/space for expansion

4. Retail change in the UK	
Convenience goods	Goods bought nearly everyday such as bread, milk. Readily available from the majority of shops
Comparison goods	Higher value goods purchased less often such as electrical goods, clothes. People go to several shops to compare before buying .
Clone town	A town where the high street is dominated by chain stores
Out of town retail parks	Areas of shops located away from the traditional CBD

Agriculture in the UK



5. Globalisation & trade	
Globalisation	The increasing links between countries around the world as a result of the movement of goods, services, and money.
Containerisation	A system of transporting products by using freight containers (usually on ships)
Balance of trade	The difference in value between a country's imports and exports
Trade link	A connection between two countries to allow the movement of goods and services

6. Economic advantages of tourism
Supports employment, for example in hotels, restaurants and shops
Boosts local farming to supply hotels and restaurants
Encourages improvements in road networks and the environment
Brings income for the local economy, which can be spent on improving public services

7a. Benefits of TNCs
Creation of jobs
Improved education and skills
Investments in infrastructure e.g. roads
Help exploit natural resources

7b. Costs of TNCs
Poorer working conditions
Damage to the environment
Profits go to companies overseas, not locals
Natural resources may be over-exploited

8. Migration	
Migrant	A person who moves from one place to another
Emigrant	A person who leaves a country to move to another one
Immigrant	A person who moves to a country from another country
Illegal Immigrant	A person who moves to another country without proper clearance
Economic Migrant	Someone who moves for money
Origin country	Where a migrant is from
Host country	Where a migrant moves to

Y8 HISTORY - Challenges

1. Key words	
Evacuation	Organised removal of children from cities to the countryside.
Blitz	Nighttime bombing of key British cities
Dunkirk	Port in France where British troops were evacuated from.
Pearl Harbour	Japanese kamikaze attacks on the American Naval base
Hiroshima	Japanese city destroyed by the 1st atomic bomb
Nagasaki	Japanese city destroyed by the 2nd atomic bomb.
Penicillin	First antibiotic, mass produced for the first-time during WW2

2. Dunkirk	
Causes	Nazi Blitzkrieg tactics pushed the British army back to the sea
Events	British navy and little ships evacuated soldiers off the beaches
Short term consequence	Presented as a victory to the general public
Long term consequence	Narrowly avoided destruction of entire army. Loss of vehicles, horses and ammunition

3. Blitz and evacuation	
Air raid warning siren	Alarm would go off to warn of incoming Nazi planes
Air raid shelter	Underground areas of safety to hide in during the bombings
Evacuee	A child who was evacuated to the countryside

4. Atomic Bomb	
Causes	Pearl Harbour. Desire to end the war. Arms race with the Russians. Wanted to test the bombs.
Events	6th and 9th August 2 bombs dropped – Fat Man and Little Boy. Plutonium and Uranium.
Short term consequences	Up to 126,000 immediate civilian deaths at Hiroshima and up to 80,000 at Nagasaki. Radiation burns, extreme heat which incinerated people, and later nuclear fallout.
Long term consequences	Increase in deaths due to cancer. Genetic deformities in newborn babies.

5. Medicine and WW2	
Surgery	Archibald McIndoe used pioneering plastic surgery techniques on pilots suffering horrendous burn injuries.
Antibiotics	Scientist Alexander Fleming discovered penicillin. This was the first antibiotic and was mass produced in America.
Blood transfusions	Blood storage facilities improved, and thousands of civilians stepped forward to donate blood for blood transfusions for injured service men and women.

6. Holocaust	
Holocaust	Destruction or slaughter on a mass scale
Antisemitism	Prejudice against Jewish people
Genocide	Killing of a whole ethnic group with the aim of destroying them
Ghettos	Jewish segregation into the most run-down areas of cities.
Einsattzgruppen	Mobile killing units
Extermination camp	Concentration camp that specializes in mass killing

7. Timeline of key dates	
1st September 1939	Germany invaded Poland. Start of WW2.
1st September 1940	The evacuation of children to the countryside began
7th September 1940	The Blitz began
May/ June 1940	Dunkirk
December 1941	America entered the war after the Japanese attack on Pearl Harbour
6th August 1945	Atomic Bomb dropped on Hiroshima
9th August 1945	Atomic Bomb dropped on Nagasaki
2nd September 1945	End of WW2

1. key features	
Migration	Leaving the country that you live in
Immigration	Coming to live in a new country
Racism	Prejudice and discrimination against people due to skin colour and culture
Welfare State	Where the government looks after the health and well being of the nation
National Health Service	A publicly funded healthcare system of the UK
Public health	A government acting to prevent disease, prolong life and promote health

2. Migration	
Pull factors	Offers of jobs and education in the UK e.g. in the armed services
Push factors	A lack of jobs in the Caribbean.
Nations involved	Mostly the Caribbean but also Poland and the Ukraine.
British Empire	The British government invited all Empire citizens to work and live in Britain after WW2.

3. Immigration	
Housing	Often in the poorest areas of inner cities e.g. Notting Hill in London
Employment	Many returned to military service. Others took below the level of their qualifications
Worship	Many different faiths found solace in collective worship.

4. Windrush	
Windrush	The name of the ship that brought the first immigrants from the Caribbean to dock at Tilbury, Essex in 1948.
Passengers	On board were almost 500 experienced labourers, cleaners, nurses etc, including one stowaway found a week into the journey.
Plans	Many of them did not plan on staying in the UK but intended to return to the Caribbean once there had been an economic recovery there.
Problems	The immigrants experienced racism from the white people in Britain. They were not made welcome in the country. In 1958 there were the Notting Hill Riots between the white 'Teddy Boys' and the Caribbean community.

5. Local History – Nottingham and Windrush	
ACNA Centre	Afro Caribbean National Artistic Centre. Community based centre providing support and public information to the Caribbean community and beyond.
1212 Afro Caribbean food shop	Oldest Caribbean food store in Nottingham. Started in 1960 for the Windrush generation.
Windrush Day	Nottingham's annual celebration to recognise the achievements and contributions of the Windrush generation and their descendants.

6. Modern medicine and the NHS	
Arguments FOR	Many poor people were falling ill and dying because they could not afford to see a doctor.
Arguments AGAINST	The British Medical Association did not like the idea. Doctors voted against it due to loss of wages.
SUCCESSES	The health of the nation improved dramatically. Some people saw a doctor/ dentist for the first time ever. Hundreds of thousands of lives have been saved and people live on average 10 years longer.
PROBLEMS	So many medical problems were discovered that the government was forced to introduce a fee to pay for prescriptions. Today there are long waiting lists for surgery.

7.. Key concepts	
Causation	The reasons why something happens
Consequence	The result of something happening
Similarity and difference	Thing that have characteristics that are mostly the same or mostly different
Change	A reform or departure from the usual
Continuity	When things stay the same

8. Timeline of key dates	
1945	WW2 comes to an end
1948	The British Nationality Act
1948	The NHS is launched
22nd June 1948	Windrush arrived in the UK
1968	UK's first heart transplant
1972	CT scanners used for the first time in the UK
5th January 2018	NHS celebrates 80 years
22nd June 2021	Nottingham celebrates Windrush Day

What do I need to be able to do?

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

- Solve problems and explain direct proportion
- Use conversion graphs to make statements, comparisons and form conclusions
- Understand and use scale factors for length

Keywords

Proportion: A statement that links two ratios

Viable: a part that the value can be changed

Axes: horizontal and vertical lines that a graph is plotted around

Approximation: an estimate for a value

Scale factor: the multiple that increases/decreases a shape in size

Currency: the system of money used in a particular country

Conversion: the process of changing one variable to another

Scale: the comparison of something drawn to its actual size

Direct Proportion

As one variable changes the other changes at the same rate

This is a multiplicative change

4 cans of pop = £2.40

4 cans of pop = £2.40 → 12 cans of pop = £7.20 (x 3, x 3)

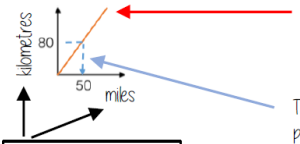
4 cans of pop = £2.40 → 2 cans of pop = £1.20 (x 0.5, x 0.5)

This multiplier is the same in the same way that this would be for ratio

Sometimes this is easiest if you work out how much one unit is worth first e.g. 1 can of pop = £0.60

Conversion Graphs

Compare two variables



This is always a straight line because as one variable increases so does the other at the same rate

To make conversions between units you need to find the point to compare – then find the associated point by using your graph

Using a ruler helps for accuracy

Showing your conversion lines help as a "check" for solutions

Labelling of both axes is vital

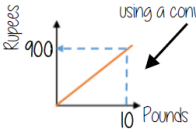
Conversion between currencies

£1 = 90 Rupees ← Currency is directly proportional

For every £1 I have 90 Rupees

£1 = 90 Rupees → £10 = 900 Rupees (x 10, x 10)

Currency can be converted using a conversion graph



Convert 630 Rupees into Pounds

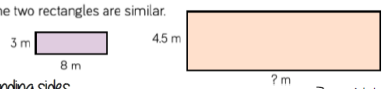
£1 = 90 Rupees → £7 = 630 Rupees (x 7, x 7)

630 ÷ 90 = 7

Ratio between similar shapes

Angles in similar shapes do not change. e.g. if a triangle gets bigger the angles can not go above 180°

The two rectangles are similar.



Corresponding sides

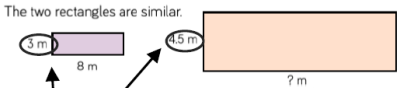
3m : 4.5m → 1m : 1.5m (÷ 3, ÷ 3)

8m : 12m → 1m : 1.5m (÷ 8, ÷ 8)

Note: Simplify to the same ratio

Understand Scale Factor

The two rectangles are similar.



3 x 1.5 = 4.5

This is a multiplicative change

Missing length: 8 x 1.5 = 12m

Use corresponding sides to calculate a scale factor

Scale factor can also be calculated by: Bigger corresponding side ÷ Smaller corresponding side

Small corresponding side → Big corresponding side: x SF

Big corresponding side → Small corresponding side: ÷ SF

Draw and interpret scale diagrams

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

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

The car image is 10cm

Image	Real life
1cm	30cm
10cm	300cm

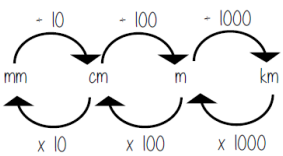
(x 10, x 10)

The car in real life is 210cm

Image	Real life
1cm	30cm
7cm	210 cm

(x 7, x 7)

Interpret maps with scale factors



1 cm : 250 m

Ratios need to be in the same units

1 cm : 250m

1 cm : 25000cm

250 x 100 = 25000

For every 1cm on my map is 25000cm in real life.

CHRIST THE KING - KNOWLEDGE ORGANISERS

Y8 MATHS – RATIO AND SCALE

What do I need to be able to do?

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

- Simplify into a given ratio
- Share an amount in a given ratio
- Solve ratio problems given a part

Solutions should be modelled, explained and solved.

Keywords

Ratio: A statement of how two numbers compare

Equal parts: all parts in the same proportion, or a whole shared equally

Proportion: a statement that links two ratios

Order: to place a number in a determined sequence

Part: a section of a whole

Equivalent: of equal value

Factors: integers that multiply together to get the original value

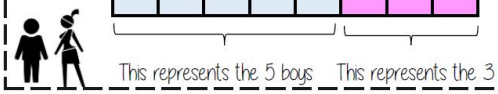
Scale: the comparison of something drawn to its actual size

Representing a ratio

"For every 5 boys there are 3 girls"

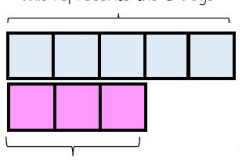
5:3

This is the "whole" – boys and girls together



This represents the 5 boys | This represents the 3 girls

Double Number Line



This represents the 5 boys

This is the "whole" – boys and girls together

This represents the 3 girls

Order is Important

"For every dog there are 2 cats"

Dogs: Cats

1:2

The ratio has to be written in the same order as the information is given.

e.g. 2:1 would represent 2 dogs for every 1 cat. ✕

Simplifying a ratio

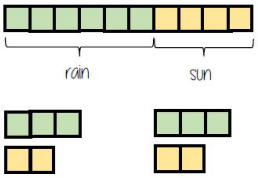
Cancel down the ratio to its lowest form

"For every 6 days of rain there are 4 days of sun"

6:4

÷ by 2

3:2



rain | sun

Find the biggest common factor that goes into all parts of the ratio

For 6 and 4 the biggest factor (number that multiples into them is 2)

"For every 3 days of rain there are 2 days of sun" – when this happens twice the ratio becomes 6:4

Ratio 1:n (or n:1)

This is asking you to cancel down until the part indicated represents 1

Show the ratio 4:20 in the ratio of 1:n

The question states that this part has to be 1 unit. Therefore Divide by 4

4 : 20

1 : 5

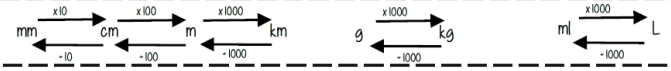
This side has to be divided by 4 too – to keep in proportion

H the n part does not have to be an integer for this type of question

Units are important:

When using a ratio – all parts should be in the same units

Useful Conversions



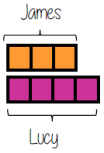
Sharing a whole into a given ratio

James and Lucy share £350 in the ratio 3:4
Work out how much each person earns

Model the Question

James: Lucy

3 : 4



James

£350

Lucy

Find the value of one part

Whole: £350
7 parts to share between
(3 James, 4 Lucy)

£350 ÷ 7 = £50

□ = one part
= £50

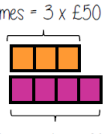
Put back into the question

James: Lucy

(x 50) 3 : 4 (x 50)

£150 : £200

James = 3 x £50 = £150



£350

Lucy = 4 x £50 = £200

Finding a value given 1:n (or n:1)

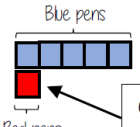
Inside a box are blue and red pens in the ratio 5:1
If there are 10 red pens how many blue pens are there?

Model the Question

Blue : Red

5 : 1

□ = one part
= 10 pens



Blue pens

Red pens

One unit = 10 pens

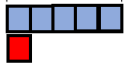
Put back into the question

Blue : Red

(x 10) 5 : 1 (x 10)

50 : 10

Blue pens = 5 x 10 = 50 pens



Red pens = 1 x 10 = 10 pens

There are 50 Blue Pens

Ratio as a fraction

Trees: Flowers

3 : 7

Trees

Flowers

Ratio

There are 3 parts for trees

Fraction of trees

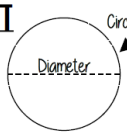
Fraction

Number of parts of in group / Total number of parts

3 / 10

Tree parts 3 + Flower parts 7 = 10

Pi π



Circumference

Diameter

The ratio of a circles circumference to its diameter

CHRIST THE KING - KNOWLEDGE ORGANISERS

Y8 MATHS - SHAPES

What do I need to be able to do?

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

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

Keywords

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

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

Vertex: a point where two or more line segments meet

Edge: a line on the boundary joining two vertex

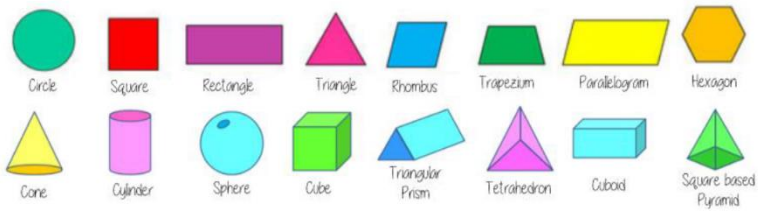
Face: a flat surface on a solid object

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

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

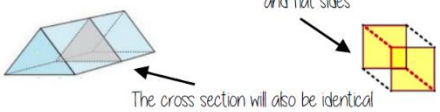
Perspective: a way to give illustration of a 3D shape when drawn on a flat surface

Name 2D & 3D shapes



Recognise prisms

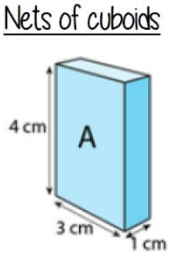
A solid object with two identical ends and flat sides

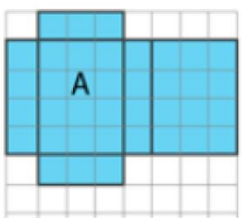


The cross section will also be identical to the end faces.

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

Nets of cuboids

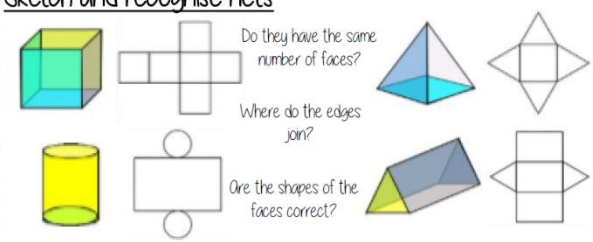




1cm grids help to draw accurately

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

Sketch and recognise nets

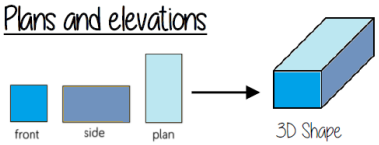


Do they have the same number of faces?

Where do the edges join?

Are the shapes of the faces correct?

Plans and elevations



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

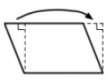
Area of 2D shapes

R

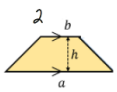
Rectangle
Base x Height

Triangle
½ x Base x Perpendicular height

Parallelogram/ Rhombus
Base x Perpendicular height



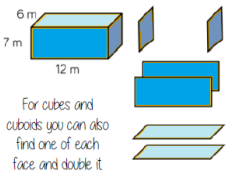
Area of a trapezium
$\frac{(a+b) \times h}{2}$



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

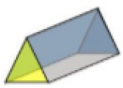
Surface area

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



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

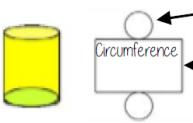
Sides	6 x 7 6 x 7	Sum of all sides = surface area
Front and back	12 x 7 12 x 7	
Top and Bottom	12 x 6 12 x 6	



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

Surface area - cylinders

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



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

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

Volumes

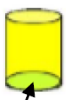
Volume is the 3D space it takes up – also known as capacity if using liquids to fill the space

Counting cubes

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

Cubes/ Cuboids = base x width x height

Remember multiplication is commutative



Cross section

Cross section

Prisms and cylinders = area cross section x height

Height can also be described as depth

Areas – square units
Volumes – cube units

Areas and volumes can be left in terms of pi π

What do I need to be able to do?

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

- Understand and use mean, median and mode
- Choose the most appropriate average
- Identify outliers
- Compare distributions using averages and range

Keywords

Spread: the distance/how spread out/variation of data

Average: a measure of central tendency – or the typical value of all the data together

Total: all the data added together

Frequency: the number of times the data value occur

Represent: something that show's the value of another

Outlier: a value that stands apart from the data set

Consistent: a set of data that is similar and doesn't change very much

Mean, Median, Mode

The Mean

A measure of average to find the central tendency… a typical value that represents the data

24, 8, 4, 11, 8,

Find the sum of the data (add the values) 55

Divide the overall total by how many pieces of data you have 55 ÷ 5

Mean = 11

The Median

The value in the center (in the middle) of the data

24, 8, 4, 11, 8,

Put the data in order 4, 8, 8, 11, 24

Find the value in the middle 4, 8, 8, 11, 24

Median = 8

NOTE: If there is no single middle value find the mean of the two numbers left

The Mode (The modal value)

This is the number OR the item that occurs the most (it does not have to be numerical)

24, 8, 4, 11, 8,

This can still be easier if it the data is ordered first

4, 8, 8, 11, 24

Mode = 8

Choosing the appropriate average

The average should be a representative of the data set – so it should be compared to the set as a whole - to check if it is an appropriate average

Here are the weekly wages of a small firm

£240	£240	£240	£240	£240
£260	£260	£300	£350	£700

Which average best represents the weekly wage?

The Mean = £307

The Median = £250

The Mode = £240

Put the data back into context

Mean/Median – too high (most of this company earn £240)

Mode is the best average that represents this wage

It is likely that the salaries above £240 are more senior staff members – their salary doesn't represent the average weekly wage of the majority of employers

Identify outliers

Outliers are values that stand well apart from the rest of the data

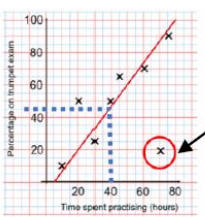
Outliers can have a big impact on range and mean. They have less impact on the median and the mode

Sometimes it is best to not use an outlier in calculations

Height in cm

152 150 142 158 182 151 153 149 156 160 151 144

Where an outlier is identified try to give it some context. This is likely to be a taller member of the group. Could the be an older student or a teacher?



Outliers can also be identified graphically e.g. on scatter graphs

Comparing distributions

Comparisons should include a statement of average and central tendency, as well as a statement about spread and consistency

Here are the number of runs scored last month by Lucy and James in cricket matches

Lucy: 45, 32, 37, 41, 48, 35

James: 60, 90, 41, 23, 14, 23

Lucy

Mean: 396 (1dp), **Median:** 38 **Mode:** no mode, **Range:** 16

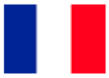
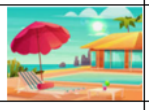
James

Mean: 418 (1dp), **Median:** 32, **Mode:** 23, **Range:** 76

James has two extreme values that have a big impact on the range

"James is less consistent that Lucy because his scores have a greater range. Lucy performed better on average because her scores have a similar mean and a higher median"

Où vas-tu en vacances ?

D'habitude je vais en vacances en France pour une semaine avec mes parents à mon avis c'est génial 	1	*Usually I go on holiday to France for a week with my parents in my opinion it is great!*
 Nous voyageons en avion car c'est rapide mais je préférerais voyager en ferry car j'adore la mer 	2	*we travel by plane because it is fast but I would prefer to travel by boat because I love the sea.*
Normalement nous restons dans un camping au bord de la mer ce que je trouve vraiment nul ! 	3	*Normally we stay in a campsite by the seaside which I find really rubbish!*
 En général, je vais à la plage tous les jours. Parfois, je fais de la planche à voile ou je joue au volley, c'est reposant 	4	*In general, I go to the beach every day Sometimes, I do sailing or I play volleyball, it's relaxing.*
Par contre l'année dernière , je suis allée aux alpes pendant une semaine avec mes amis 	5	*However, last year, I went to the Alps for a week with my friends*
 J'ai visité un grand lac et j'ai fait beaucoup de sports d'hiver	6	*I visited a big lake and did lots of winter sports*
J'ai fait du ski tous les jours avec mon meilleur ami, J'adore ça c'est mon sport préféré. 	7	*I did skiing every day with my best friend, I love that it's my favourite sport.*
cependant à la fin des vacances c'était un peu fatigant 	8	*However at the end of the holiday it was a bit tiring.*
 L'année prochaine, je vais aller à Marseille avec mes grand-parents et mes cousins	9	*Next year, I am going to go to Marseille with my grand-parents and my cousins*
Nous allons rester dans un hôtel de cinq étoiles avec une grande piscine et des bons restaurants 	10	*We are going to stay in a five star hotel with a big swimming pool and good restaurants.*
 J'aimerais voir le vieux-port et visiter les marchés, ça sera vraiment cool	11	*I would like to see the old port and visit the markets, that will be really cool.*
Si je pouvais je visiterais aussi la cathédrale et je mangerais la bouillabaisse 	12	*If I could I would visit also the cathedral and I would eat bouillabaisse*

YEAR 8 FRENCH – LES VACANCES!

A. LES PAYS	
En Angleterre	to England
En France	to France
En Espagne	to Spain
En Italie	to Italy
En Allemagne	to Germany
en Australie	to Australia
En Irlande	to Ireland
au Pays de Galles	to Wales
Au Portugal	to Portugal
Aux Etats- Unis	to the USA

ALLER	TO GO
Je vais	*I go*
Tu vas	*You go*
Il / elle /on va	*He /she /one goes*
Nous allons	*We go*
Vous allez	*You go*
Ils / elles vont	*They go*

C. COMMENT VOYAGES-TU?	
Je voyage en...	I travel by..
Avion	Plane
Bateau / ferry	Boat / ferry
Voiture	Car
Car	coach

D. Où LOGES-TU?	
Je loge dans	I stay in
Nous logeons dans	We stay in
Un hôtel (de cinq étoiles)	A (five star) hotel
Une caravane	A caravan
Un camping	A campsite
Un appartement	An apartment

Chaque été nous allons en France avec mes grand-parents. Je voyage en ferry et je loge dans une caravane, c'est genial!

Souvent je fais de la voile, c'est vraiment chouette!

E. LES ACTIVITÉS	
Je fais de la natation / je nage	I do swimming / I swim
Je fais des sports aquatiques	I do water sports
Je vais à la plage	I go to the beach
Je mange la cuisine locale	I eat local food
Je visite des sites touristiques	I visit the sights
Je vais au marché	I go to the market
Je danse dans les boites	I dance at nightclubs

YEAR 8 FRENCH –LES VACANCES

The Perfect Tense (*le passé composé*)

This is used to describe a completed action in the past, e.g: **I played** football last week.

	SUBJECT	AVOIR	PAST PARTICIPLE
I have	j'	ai	'-er' verbs - Remove *r* - Add an *accent* on the last *e* → é
You have	tu	as	
He/she has	il/elle	a	'-ir' verbs - Remove *r*
We have	nous	avons	
You have	vous	avez	'-re' verbs - Remove *re* - Add *u*
They have	ils/elles	ont	

JE SUIS ALLÉ(E) – I WENT

J'AI VISITÉ	I VISITED
J'AI LOGÉ	I STAYED
J'AI MANGÉ	I ATE
J'AI NAGÉ	I SWAM
J'AI JOUÉ	I PLAYED

L'année dernière je suis allé en Allemagne et j'ai visité le musée, c'était vraiment cool!

Connectives

et	and	car	because
mais	but	parce que	because
ou	or	cependant	however

Near future tense (Going to …)

This is formed by using the verb 'aller' + the infinitive

Je vais
Tu vas
Il /elle va
Nous allons
Vous allez
Ils / elles vont

+

Manger – to eat
Jouer – to play
Aller – to go
Boire – to drink
Faire – to do
Visiter – to visit
Danser – to dance
Regarder – to watch

Dans l'avenir, je vais aller au pays de galles et je vais faire des promenades à la campagne, ce sera tout à fait sensass!

OPINIONS

Génial	great
Sensass	amazing
Cool	cool
Rapide	quick
Confortable	comfortable
branché	trendy
nul	rubbish
terrible	terrible
affreux	awful
ennuyeux	boring

Definitions

The Definition...

*Much of the music in the charts is seen as 'pop' music. Pop music means music that is 'popular!' - people are buying it and it has popular appeal and a general audience

*Much pop music has been professionally produced, marketed well, promoted by concert and radio programmes such as *Radio 1* and provided by record companies to make money

*A *'hit'* is a song that sells many copies and latest hits are listed in the *charts*. To get in the charts, a song must be released as a *single*

*Pop music changes over time.

*Pop music incorporates many styles such as R and B, rap, funk, soul, dance, rock and country

*Michael Jackson is often referred to as the King of Pop and Madonna as the Queen of Pop

Brit Pop...

Britpop is a type of rock music that came out of the British Indie music scene of the 1990s. Indie is a word that is short for independent. When people talk about indie music, they mean music that is created independently from major record labels. In the 90s, there was a huge chart battle between two bands called **Blur** and **Oasis.** It was nicknamed 'The Battle of Britpop.'

Best selling hits—you decide. Listen to:

Oasis—*Wonderwall, Don't Look Back in Anger, Half the World Away*

Blur—*Coffee and TV, Girls and Boys, Song 2*

Key music and artists to listen to...

1980s

Whitney Houston—I Wanna Dance with Someone

Madonna—Crazy For You

Michael Jackson—Billie Jean

1990s

Spice Girls—Wannabe

Britney Spears—Hit Me Baby One More Time

Backstreet Boys—Everybody

2000s

Beyonce—Single Ladies

Black Eyed Peas—I Gotta Feeling

2010s

Daft Punk—Get Lucky

Ed Sheeran—Shape of You

How to compose pop/rap music

The Pop Music Formula...

Songs have a good rhythm, a catchy melody, are easy to remember and sing along to

Songs usually have a chorus that repeats several times and two or more verses

Songs are between 2 and 5 minutes long

The lyrics are usually about love and relationships

Pop stars have a style that teenagers associate with

Pop/Rap Awards

Brit Awards...

There are many music awards that celebrate musical achievement. The BRIT Awards celebrate British popular music. In 2020, **Stormzy** won the award for Best Male Solo artist and **Mabel** for Best Female Solo artist. **Lewis Capaldi** won awards for Best Song of the Year with *Someone You Loved* and also Best New Artist. Ten years ago, **Dizzee Rascal** and **Lily Allen** won the award for Best Male and Female Solo artists. The BRIT Awards have been going since the 70s. **Robbie Williams** holds the record for the most BRIT Awards.

Key Words

Articulation: how certain notes or passages are sung or played.

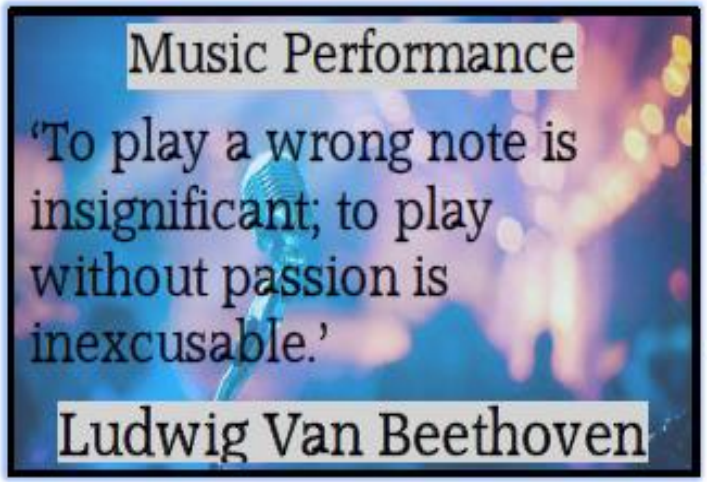
Fluency: performing music accurately, quickly and with expression.

Diction: how a singer vocalises and pronounces the words of a song.

Interpretation: how a performer will present the material and how emotions are communicated through the performance.

How am I being assessed?

- Accuracy of performance.
- Communication and teamwork.
- Interpretation and fluency of music.
- Technical control of an instrument.



X Factor Performance Task

- √ Decide whether you are going to perform as a group, or solo.
- √ Practise and rehearse at home, ready to give a good X Factor performance.
- √ Perform something that you are confident with.

What does '**intonation**' mean?

❖ Intonation is the pitch accuracy of the instrument.

What does '**timing**' mean?

Timing is the ability to keep in time and accurately perform a rhythm.

What does '**timbre**' mean?

❖ Timbre is the tonal quality and sound of an instrument.

Music Performance Tips

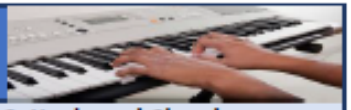
- √ Your performance does not have to be perfect.
- √ Keep going.
- √ Practice makes perfect!
- √ Be confident and let loose.
- √ Be unique.

Why is **constructive criticism** important?

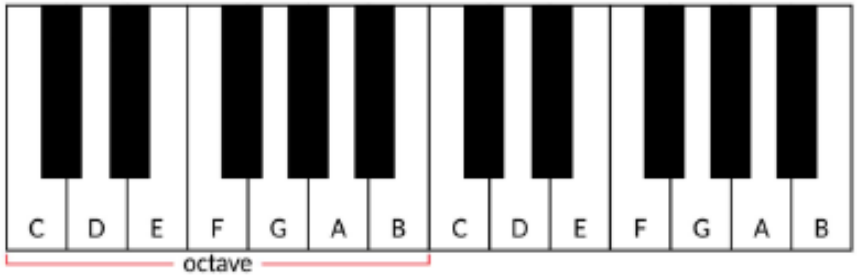
- √ It helps you to improve.
- √ It helps you to identify was to improve.
- √ It is crucial to share opinions with others.
- √ Verbal feedback is essential to help support and develop as a musician.

KEYBOARD SKILLS

Exploring Treble Clef Reading and Notation



A. Layout of a Keyboard/Piano

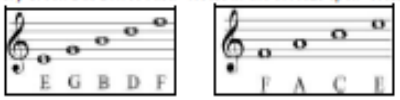


A piano or keyboard is laid out with **WHITE KEYS** and Black Keys (see section G). C is to the left of the two Black Keys and the notes continue to G then they go back to A again. Notes with the same letter name/pitch are said to be an **OCTAVE** apart. **MIDDLE C** is normally in the centre of a piano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

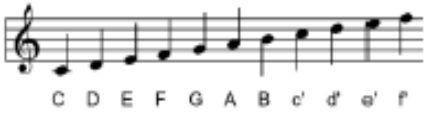
B. Treble Clef & Treble Clef Notation

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

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



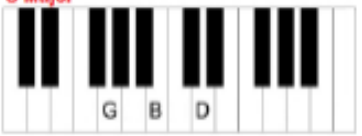
Notes from **MIDDLE C** going up in pitch (all of the white notes) are called a **SCALE**.



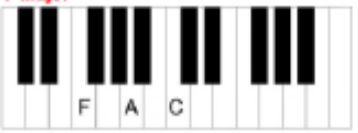
C. Keyboard Chords

C Major

G Major



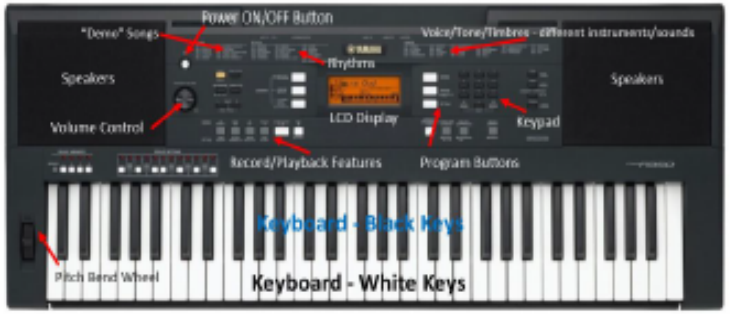
F Major



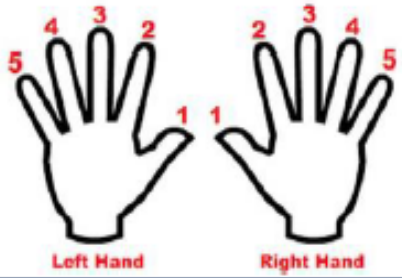
A Minor

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

D. Keyboard Functions

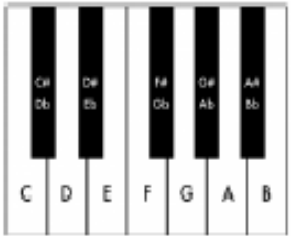


E. Left Hand/Right Hand (1-5)



F. Black Keys and Sharps and Flats

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



Musical knowledge : Listening

When you are listening to a piece of music:

- Does it sound **happy** (**major tonality**) or **sad** (**minor tonality**)?
- Which **instruments** can you hear?
- How would you describe the **rhythm**?
- What are the **key features** of the piece?
- Which words could you use to describe the **tempo**? Is it fast or slow?

Question using key words

How are **melodies** used? Are they simple or complex?

- Are the notes high or low in **pitch**? Do the notes make sudden leaps or move in small steps?
- Are the **dynamics** (volume) loud or soft?
- How would you describe the **structure**? How many different sections of music can you hear?
- How would you describe the **style** of
- music? Which **genre** of music would you describe it as?

LISTENING SKILLS

Appraisal

*'an act of **assessing** something.'*

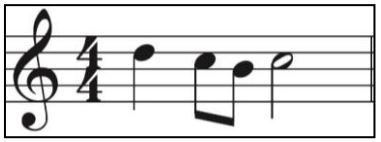
"What am I hearing?"

Definitions

T.DRIPS

Use **TDRIPS –**
Tempo, Dynamics, Rhythm, Instrumentation, Pitch, Structure to describe music.

Key words Notes



Tempo Fast Allegro Slow Lento

Dynamics Forte Piano

Rhythm Straight Syncopated

Instrumentation

Pitch Treble Clef Bass Clef High or Low

Structure Strophic Rondo Ternary

Table Tennis

Key Words:
Attack
Block
Reaction
Deceive
Positioning

Skills:
Serve
Forehand
Backhand
Topspin
Backspin

Famous table tennis players:

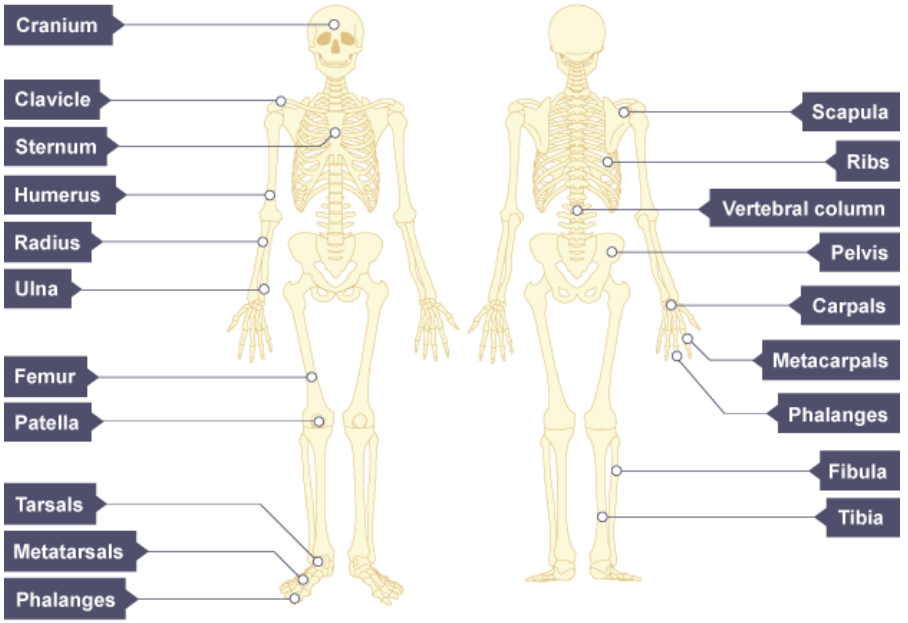
Ma Long

Desmond Douglas

Ready Position:
- Be positioned in the middle of the table
- Hold the bat with one hand using the hand shake grip
- Your feet need to be shoulder width apart
- Knees need to be bent so you are lower to the table
- As your opponent strikes to ball you need to bounce so that you are in the best position to react to the ball
- After striking the ball, you need to return to the ready position as soon as possible.

Service Rules:
- The ball must be 'presented' to your opponent so that they can see it during the entire serving action
- The ball must be held in the flat of your palm to prevent any additional spin being applied
- The ball must be thrown up at least 6 inches before striking it
- The ball must bounce on your side of the table and then on your opponents side of the table
- In singles, you can serve the ball to any part of the table
- You only get one chance to serve. If you miss the table, miss the ball, or hit the net then you lose the point
- If a let occurs then you may retake your serve

Skeletal System



Classification of Bones

1. Long
A bone that is longer than it is wide. E.g. femur
2. Short
Weight bearing bones which are roughly the same size in length, width and thickness. E.g. carpals
3. Flat
Protect the vital organs in the body. E.g. ribs
4. Irregular
Odd shaped bones which protect. E.g. vertebral column

Striking and Fielding

Skills:
Throwing—a high elbow, the correct grip of the ball and power through the arm, achieves an effective throw
Catching—you can get someone out by catching their hit or by stumping them at a post after catching the ball. Get in position under the ball, hands in a cup shape. Bring the ball close into the body to ensure it is not dropped.
Fielding—using different techniques in order to get the ball back to the bowler or to a post e,g long barrier fielding for stopping the ball low
Batting—Stand sideways on to the bowler with the bat up and behind you. Swing through the hips and follow through with the swing. Move body and arm position to hit to a different area.
Underarm bowling—hold ball in dominant hand, step towards with opposite leg, swing arm to release the ball before shoulder height. Aim for the backstops hands.

Ball and socket

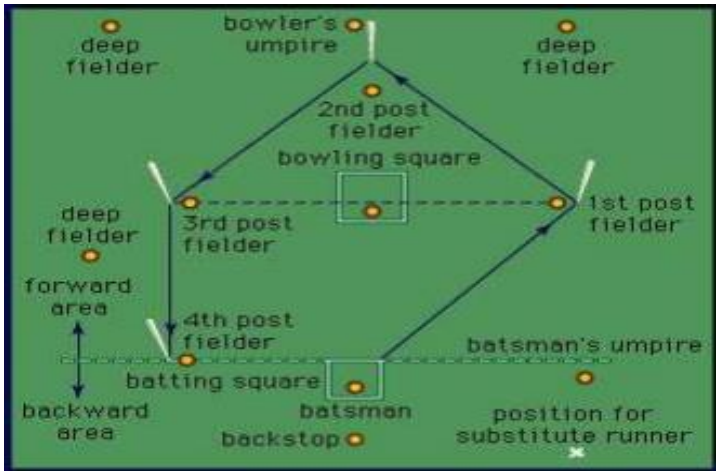
Rules:

You must start in the batting box and not step out of it.
You only get 1 ball bowled at you, after which you must run whether you hit it or not.
You must keep in contact with a post once you have decided to stop.
A no ball is—above the batters head, below the knee, the wrong side of the body, too wide and too close into the body.
If you hit a ball behind, then you must wait at first post until the ball comes forward of the batting box. You may then run.
If you hit the ball and get all the way around you score 1 Rounder.
If you get tp 2nd post you score 1/2 rounder.
If you do not hit the ball but get all the way round you score 1/2 a rounder. You also score 1/2 rounder if you get 2 no balls bowled at you.
You get 1/2 a rounder for obstruction if the fielders get in the way of your run to a post.

Famous rounders : Lizzie Beaver players:

Key Words:
Technique
Reactions
Awareness
Decision
Fingers ready
Catching
Throwing
Overarm
Bowling
Batting
Fielding
Coordination

A team consists of 15 players maximum and 6 minimum, but only 9 player on the field at any one time.



Skeletal System

Skeletal System – Classification of joints

1) Hinge Joints
This includes the knee and elbow. Allow flexion and extension movement to occur for example kicking a football
2) Ball and socket joints
This includes the hip and the shoulder. They allow abduction, adduction and rotation. For example abduction from shoulder when serving in tennis
3) Pivot
This is found in the neck – for example turning your head to look for the next pass in netball.

Type of movement
Joints that provide it
1) Flexion– bending movement that decreases the angle between body parts
Shoulder, hip, elbow
2) Extension– straightening movement that increases the angle between body parts
Shoulder ,hip
3) Adduction—movement that pulls towards the midline of the body
Shoulder, hip
4) Abduction—movement that pulls away from the midline of the body
Shoulder, hip
5) Rotation—movement around a single axis or pivot point
Shoulder, hip
6) Circumduction—moving in a circular shape
Shoulder, hip
7) Dorsi—flexion—bending or flexin the toes up, closer to the shin
Ankle
Examples in sport
Someone working out in the gym bends their arms when doing a bicep curl
A swimmer swings the arm backwards preparation for a racing dive
A golfer on the tee swings the club down towards the ball
A gymnast moves their arms out sideways at the shoulder when performing 'the crucix' on the rings
A tennis
A cricketer bowls a ball
A sprinter positions their feet in the starting blocks
8) Plantar –flexion—extending or pointing the toes down, away from the shin
Ankle
A floor gymnast points their toes

Rugby

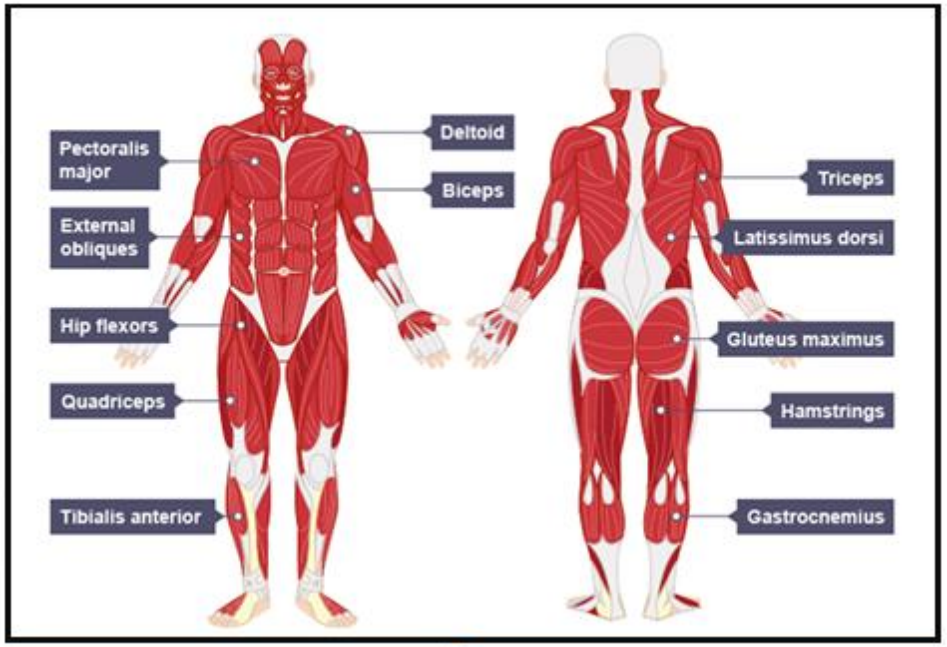
Key Words	
1	Lineout
2	Scrum
3	Try
4	Penalty
5	Pass
6	Conversion

Forwards
1 Loosehead Prop
2 Hooker
3 Tighthead Prop
4 Lock (Second Row)
5 Lock (Second Row)
6 Blindside Flanker
7 Openside Flanker
8 Number 8

Backs
9 Scrum Half
10 Fly Half
11 Left Wing
12 Inside Centre
13 Outside Centre
14 Right Wing
15 Full Back

Key Skills		
1	**Grubber Kick**	The grubber kick is a simple low kick that aims to move the ball past defences for attacking players to try and retrieve. It is very good at breaking defensive positions and forces defenders to turn around and chase
2	**Spin pass**	A spin pass enables a team to quickly pass a ball and help maintain possession.
3	**High ball catch**	A high ball catch is an attacking and defending skill. It is useful for attackers when completing an up and under kick or as a defender to stop an attacking team's momentum by safely winning possession back
4	**Drop Kick**	A drop kick is when a player kicks the ball from hand and the ball touches the ground between being dropped and kicked. If a drop

Lineouts	
1	A lineout is called if the ball travels past the side-line
2	A lineout consists of up to seven players and players can be lifted in order to catch the ball
3	At a lineout, both teams can compete to win the ball



Antagonistic Muscle Pairs	
One muscle relaxes for the other to contact. Examples:	
Muscle 1	**Muscle 2**
Biceps	Triceps
Hamstrings	Quadriceps
Gluteus maximus	Hip flexors
Gastrocnemius	Tibialis anterior

Muscle Fibres			
	Type I	Type IIa	Type IIx
Speed of contraction	Slow	Fast	Very fast
Force produced	Low	Medium	High
Resistance to fatigue	High	Medium	Low

Muscular System

Trampolining

Key Words:

- Routine
- Contacts
- Rotation
- Difficulty
- Execution

Skills:

- Full Twist
- Seat Drop
- Front Drop
- Back Drop
- Front Somersault

Famous trampolinists:

Karen Cockburn

Dong Dong

Trampoline Moves

- Tuck Jump
- Straddle Jump
- Pike Jump
- Half Twist
- Full Twist
- Seat Drop
- Front Drop
- Back Drop
- Turntable
- Cradle
- Cat Twist
- Seat to Front Drop
- Back to Front Drop
- Front Somersault
- Back Somersault

Trampolining is a competitive gymnastic sport

Rules

A competitor performs a routine of various moves.

Competitors must make only 10 contacts with the trampoline bed.

Competitors can only land on their feet, front, back, or in a seat position.

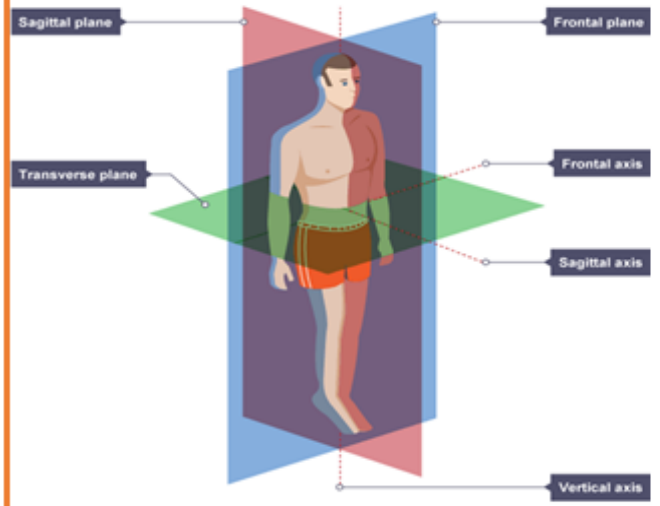
History of Trampolining

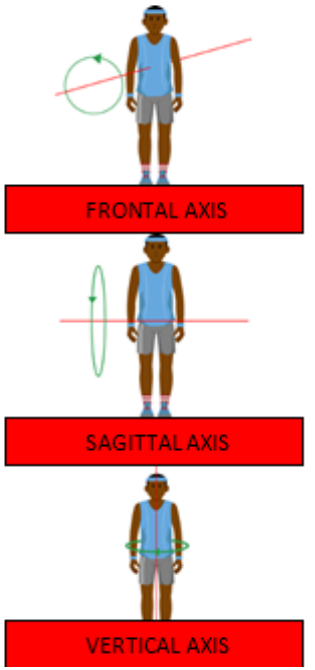
In the early 1930s, an American man, named George Nissen, observed trapeze artists perform a series of exciting tumbling tricks when bouncing of the safety net.

This experience inspired him and his friend, Larry Griswold, to build the first ever trampoline.

Movement Analysis

Type of Plane	Movement Available
Sagittal	Divides the left and right side of the body, vertically.
Frontal	Divides the front and the back of the body, vertically.
Transverse	Divides the top and bottom of the body, horizontally.





Netball

Key Words:

- Opponent
- Contact
- Over-a-third
- Feeding
- Possession

Skills:

- Passing
- Catching
- Footwork
- Attacking
- Defending
- Shooting

Famous netball players

Layla Guscoth

Beth Cobden

"When does contact occur?"

- When a player uses any part of the body to limit an opponent's ability to move freely .
- Knocking or hitting a player .
- Placing hands on the ball when held by an opponent.
- Removing the ball from an opponent's possession.
- While holding the ball, pushing it into an opponent.

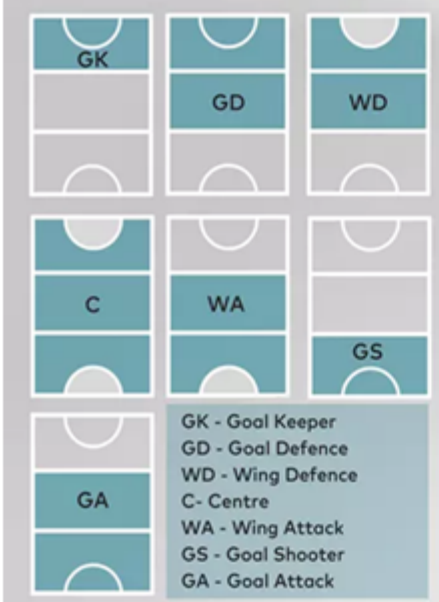
A netball game lasts for 60 minutes.

This is split into 4 quarters, with each quarter lasting 15 minutes.

OVER A THIRD!

The ball cannot be thrown over a complete third of the court without being touched or caught by a player

Netball Court Positions



GK - Goal Keeper
GD - Goal Defence
WD - Wing Defence
C- Centre
WA - Wing Attack
GS - Goal Shooter
GA - Goal Attack

The Role of the Positions:

GK—To work with the GD and to prevent the GA/GS from scoring.

GD– To win the ball and reduce the effectiveness of the GA.

WD—To look for interceptions and prevent the WA from feeding into the circle.

C—To take the centre pass and to link the defence and the attack.

WA—To feed the circle players giving them shooting opportunities.

GA—To feed and work with GS to score goals.

GS—To score goals and work in and around the circle.

Components of Fitness

Health Related Components

Cardiovascular Fitness	The ability to exercise the entire body for long periods of time without tiring
Muscular Endurance	The ability to use voluntary muscles many times without getting tired
Muscular Strength	The amount of force a muscle can exert against resistance
Flexibility	The range of movement possible at a joint
Body Composition	The relative ratio of fat mass to fat-free mass in the body

Skill Related Components

Agility	The ability to change the position of the body quickly while maintaining control of the movement
Balance	The ability to retain the body's centre of mass above the base of support
Coordination	The ability to use two or more body parts together
Reaction Time	The time it takes to respond to a stimulus
Power	The ability to do strength performance quickly (power = strength x speed)
Speed	The amount of time it takes to perform a particular action

Key Words:

Interval
Weight
Continuous
Plyometric
Circuit
Fartlek

Skills:

Lifting weights

Running for long periods

Sprinting

Jumping

Health and Fitness

Fitness Test	Component of fitness measured
12 minute cooper run	Cardiovascular Fitness
Vertical jump test	Power
30 metre sprint test	Speed
Illinois Agility test	Agility
Sit and reach test	Flexibility
Sit up test	Muscular Endurance
Hand grip dynamometer	Muscular Strength

A good level of fitness is important to maintain good cardiovascular health. This is the ability of the heart to pump blood around the body.

1	Cardiovascular Fitness	The ability of the heart, lungs and blood to transport oxygen
2	Power	The ability to perform strength performances quickly
3	Speed	The ability to put body parts into motion quickly
4	Agility	The ability to change the position of the body quickly and control the movement
5	Flexibility	The range of motion (ROM) at a joint
6	Muscular Endurance	The ability to use voluntary muscles repeatedly without tiring
7	Muscular Strength	The amount of force a muscle can exert against a resistance

Training Methods

1	Interval	Periods of exercise followed by periods of rest.
2		For example, sprint for 30m and then rest for ten seconds, before doing it again.
3		This is good for games players who require short bursts of sprinting.
4	Weight	This involves resistance training using weights aiming at improving strength and endurance of muscles.
5		You do a series of repetitions which makes up a set.
6		This is good for sprinters who want to build musde.
7	Continuous	This involves aerobic activity for long periods of time without stopping e.g. cycling, running, swimming.
8		To be classed as continuous training, the period of exercise must be 12 minutes without stopping.
9		This is good for long distance runners if the activity is running.
10	Plyometric	This is high intensity training where the athlete performs a series of explosive jump movements, lengthening and then shortening the leg muscles.
11		This is good for basketball and volleyball players who will benefit from jumping high.
12	Circuit	This involves performing a series of activities in a circuit to develop either aerobic or anaerobic fitness.
13		This is good for all sports, depending on what is in the circuit.
14	Fartlek	This is also known as speed play.
15		It involves working at different speeds across different terrains and distances. E.g. walk, jog, sprint
16		This is good for games players where different speeds are required.

Handball

Key Words:	
3 seconds on the ball	Players are only allowed to have possession of the ball for 3 seconds.
Contact	Contact is allowed in handball.
Goalkeeper	Goalkeeper can leave the D but not in possession of the ball.
Corners	Awarded if the ball comes off a defender and goes behind the goal.
Penalty throw	Awarded if a defender steps into the D.

Skills:	
Shooting	Players can shoot from outside of the D or by performing a jump shot.
Dribbling	Players can move with the ball by bouncing but only for 3 seconds.
Passing	Passing is done with one hand or two and can include a shoulder pass and bounce pass.

Famous Player

Heidi Loke is a Norwegian line player.

Rules:

A match consists of two periods of 30 minutes each.

Each team consists of 7 players; a goalkeeper and 6 outfield players.

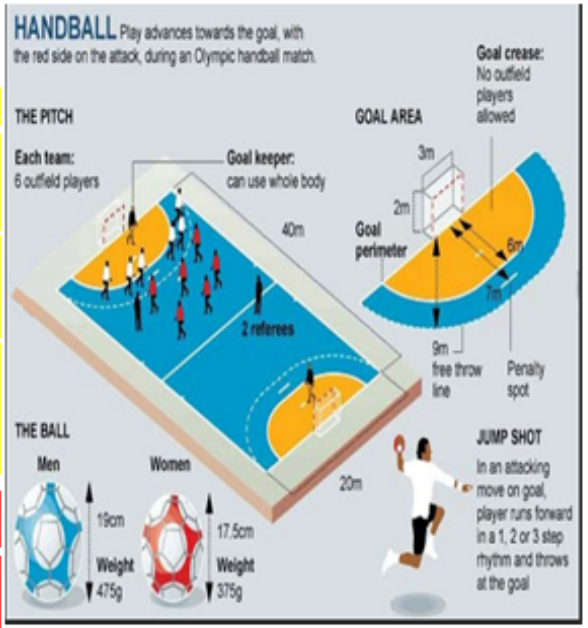
Outfield players can touch the ball with any part of their body that is above the knee.

Once a player receives possession, they can pass, hold possession or shoot.

If a player holds possession they can have the ball for up to 3 seconds, after they can dribble or take three steps (without dribbling).

Only the goalkeeper is allowed to come in contact with the floor of the goal area.

Goalkeepers are allowed out of the goal area but must not retain possession if they are outside the goal area.



Respiratory System

1) Respiratory System

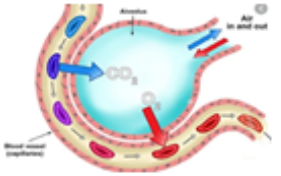
Function – to get OXYGEN in and CARBON DIXOIDE out.

Oxygen is transported around the body via the blood and pumped around the body by the heart.

2) Respiratory System and Cardiovascular System

The respiratory system (lungs) works with the cardiovascular system (heart and blood vessels) to increase the supply of oxygen and remove carbon dioxide efficiently.

GASEOUS EXCHANGE Occurs in the ALVEOLI



3) KEY TERMS

Tidal Volume (TV): the amount of air that is inspired and expired normally.
Breathing Rate (f): the number of breaths taken in a minute normally.
Lung Capacity: the amount of air (volume) the lungs can hold.
Minute Ventilation (VE): the volume of air that is inspired or expired in one minute.

$$VE = TV \times f$$ **(measured in 1/min)**

4) Breathing Rates

AT REST: breathing rate is slow and shallow (normal)

DURING EXERCISE: breathing rate increases and depth of breathing increases. Allows more air in.

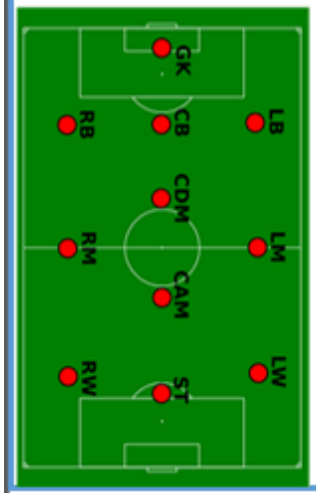
Football

Key Words:

1. Dummy
2. Cruyff Turn
3. Drag back
4. Swerve
5. Curl
6. One-touch
7. Pass and move
8. Jockeying
9. Step overs
10. Nutmeg

Formations:

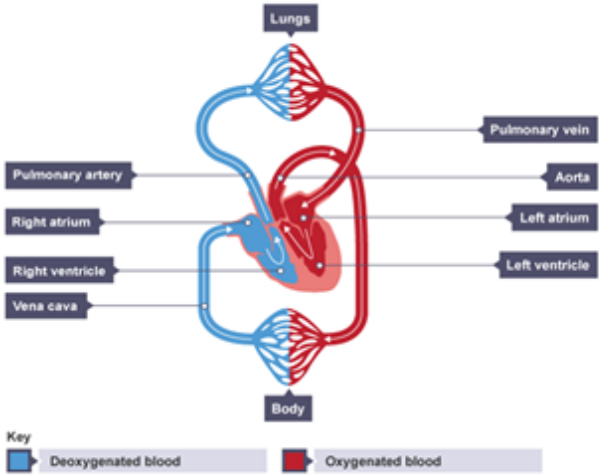
Formations will alter to suit a teams strengths/ counter an opponents threat



Key Skills		
1	**Short pass**	A short side foot pass enables a team to quickly pass a ball and help maintain possession. It is used for accuracy
2	**Long pass**	A long pass is an attacking skill that allows players to switch the direction of the attack very quickly to create space, find a teammate or to catch out the opposition.
3	**Control**	Good control of the football is an essential skill to maintain possession of the ball from the opposition and, if done accurately, gives the player more time to make the correct next decision
4	**Block tackle**	The block tackle is an essential skill for winning the ball back in football. It is mainly used when confronting an opponent head on and it is important to complete it with good timing and technique to prevent
5	**Throw-in**	The throw-in is the legal way to restart the game if the ball has gone out of play from either of the side-lines
6	**Heading**	The header can be an attacking or defensive skill and is used to try and win the ball when it is in the air

Striking the ball	
Chip	The play strikes the ball at the bottom and the ball goes over a player
Lob	A player strikes a bouncing ball from underneath the ball, sending it over a player
Curl	The player strikes the ball with the inside of their foot hitting the balls lightly to the side to create a curve
Swerve	The player strikes the ball with the outside of their boot to create swerve

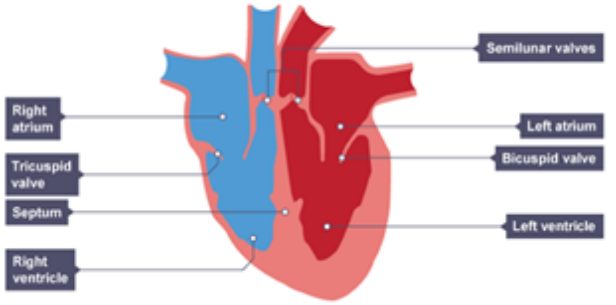
Cardiovascular System



Blood Pressure: when heart contracts it pushes the blood into blood vessels which creates blood pressure.

1. Systolic value – blood pressure whilst the heart is contracting

2. Diastolic value – blood pressure whilst the heart is relaxing



Key Words		
1	Artery	carries blood away from the heart (usually oxygenated blood, except for the pulmonary artery).
2	Vein	carries blood back to the heart (usually deoxygenated blood, except for the pulmonary vein)
3	Capillary	allows diffusion of gases and nutrients from the blood into the body cells
4	Heart Rate (HR):	number of times the heart beats per minute.
5	Red Blood Cells	transport oxygen around the body
6	White Blood Cells	fight infection
7	Platelets	clot to prevent blood loss during injury
8	Plasma	liquid part of the blood

Basketball

Key Words:

Drive

Charge

Key

Baseline

Side line

Skills:

Dribbling

Jumping

Passing

Catching

Shooting

Famous basketball players:

Kobe Bryant

LeBron James

Rules:

Team players/substitutions — Each team is allowed 5 players on court at one time. There is no limit on the amount of substitutions you are able to make in each game and each team can have a maximum of 12 players per squad.

Shot clock — When a team has possession and the ball is in court, they only have 24 seconds to shoot. If they don't shoot within this time the ball is turned over to the opposition.

Goaltending — You are not allowed to stay under the basket. You are only allowed in the 'key' for 3 seconds before having to come out.

Backcourt Violation — You are not allowed back into your own half after crossing the midcourt line.

Basketball Positions and Roles	
1. Centre	• Usually, the tallest and strongest player. • They are positioned under the basket to get rebounds and block shots.
2. Forward	• Usually, the second tallest and strongest players on the team. • Their role is to guard against bigger players on the opposition team. • They need to be able to score from all ranges on the court.
3. Guards	• Usually, the shortest players on the team. • They are the team's best shooters from three-point range. • Responsible for driving the ball down the court and setting up teammates. • Also known as the 'Coach on the Court' as they dictate what will happen.

Principles of Training

1. Specificity	Ensuring that the training is relevant and specific to the sport you are training for
2. Progressive Overload	Training frequency, intensity, time and type must be increased over time to ensure the body is pushed beyond its normal rhythm
3. Individual Needs	Training must be related to an athletes age, gender, injury status and fitness level
4. Reversibility	Systems and progress are reversed if training stops or is reduced
5. Rest and Recovery	Physical adaptations occur during the recovery and rest periods of the training cycle
6. Overtraining	If an athlete doesn't have sufficient rest periods then their body doesn't have time to adapt and overall fitness declines

FITT Principle

1. Frequency	This is increased by training a greater number of times each week
2. Intensity	This is increased by lifting a greater resistance when weight training, or training at a higher percentage of your maximum heart rate
3. Time	This can be when you train for longer periods or when you reduce recovery time between sets of exercise
4. Type	This is where you offer a variety of training types and experiences for the athlete by combining different training methods

Key Words:

Rings

Technique

Release

Momentum

Pacing

Skills:

Jump

Throw

Sprint

Pace

World Records:

Men's 100m: 9.58 secs

Women's 100m: 10.49 secs

Men's Javelin: 98.48m

Women's javelin: 72.28m

Athletics

Sprint Technique
1. Balls of your feet
2. Front Knee Drive
3. Arms pumping – 'hip to lip'
4. Head straight, looking forward. **Events**: 100m, 200m, 300m and 400m

Jump Technique
1. Take off foot behind the front of the board
2. Take off with one foot; land with two feet.
3. Triple Jump *(Hop, Step, Jump).*
4. Run up and swing arms when jumping to gather momentum.

Middle Distance Technique
1. Slightly leaning forward
2. Head position and looking forward
3. Arms swinging back and forward.
4. Front knee lift slightly (not as high as sprinter)
5. Foot– land on balls of feet.
6. Pacing – spreading out your energy across the whole race to have a strong finish with consistency throughout the event.

Throwing technique
1. Shot: Stand sideways on.
2. Clean palm, dirty neck, holding the shot in your fingers
3. Discus: Hold the discus in one hand.
4. Release the object at a 45* angle
5. Low to high release
6. Javelin: Hold in one hand with a choice of three grips to use
7. Twist the hips to gain more power

The Olympics

1.	The Olympics was an ancient tradition and originated in Greece.
2.	They were created by a French man called Baron Pierre de Coubertin.
3.	The first modern-day Olympics were held in 1896 and was hosted in Greece.
4.	Each Games' are held every four years and this allows a country to build ne facilities and show off their country to the world.
5.	The 5 Olympic rings represent the major regions in the world *(Europe, Africa, The Americas, Asia and Oceana).*
6.	Every national flag of the world has at least one of the 5 colours of the Olympic rings within it: *blue, black, red, yellow and green.*
7.	1936—The Games took place in Germany when Hitler was the leader of the country
8.	1984—The Los Angeles Olympics which a number of countries boycotted as American boycotted the 1980 Summer Olympics in Moscow
9.	2012—The London Olympics and the first event where Paralympic events sold out all of their tickets
10.	The Olympics are split into two: Summer Games and Winter Games
11.	The Paralympics runs after the Olympic Games and this is for athletes who have experienced a disability
12.	The word 'Para' means equal to as the games are equal to the Olympic Games
13.	During Paralympic events, athletes are graded depending on their disability so that they

Sprints	Middle distances	Throws	Jumps
100m, 200m, 400m Hurdles	800m 1500m	Javelin Discus Shot Put	Long Jump Triple Jump High Jump

Key Words		
1	Ascension	Jesus' return to heaven after his resurrection
2	Crucify	To kill a person by nailing them to a large wooden cross
3	Garden of Gethsemane	The garden where Jesus was arrested
4	Las Supper	Jesus' final meal with the disciples, where he predicts Peter's denial and Judas' betrayal
5	Palm Sunday	The day Jesus entered Jerusalem on a donkey
6	Pentecost	The day that the Disciples were filled with the Holy Spirit
7	Prophecy	A prediction that something will happen
8	Reconciliation	Repairing our relationship with God by accepting we have done wrong and asking for forgiveness

Key Quotes	
1	… he scattered the coins of the money-changers and overturned their tables. To those who sold doves he said, 'Get these out of here! Stop turning my Father's house into a market!' (John 2:15-16)
2	Saul…began to preach in the synagogues that Jesus is the Son of God. All those who heard him were astonished and asked, 'Isn't he the man who caused havoc in Jerusalem among those who call on this name? And hasn't he come here to take them as prisoners to the chief priests?' (Acts 9:19-21)

Unit 3: Biblical Literacy New Testament – Jesus in Jerusalem

Key Facts	
1	In the week before this death, Jesus rode into Jerusalem on a donkey and was greeted by crowds who put down palm leaves. Christians remember this on Palm Sunday.
2	The first three Gospel writers say that Jesus caused a disruption in the temple in the week leading up to his death, known as the 'cleansing of the Temple'. John places this story at an earlier point in Jesus' life.
3	According to the first three Gospels, Jesus ate a meal with his disciples the night before he died. He told them to eat bread and drink wine in remembrance of him. He also predicted that he would be betrayed Judas Iscariot and deserted by the other disciples.
4	Jesus was arrested in the Garden of Gethsemane by the Jewish authorities. The Jewish leaders could not kill Jesus themselves because they were living under Roman rule, so they accused Jesus of treason to Pontius Pilate, who sentenced him to death.
5	Jesus was mocked, tortured and killed by a method of called crucifixion. He dies with a sign above him saying 'King of the Jews'. According to Luke, Jesus promised a criminal on a cross next to him that he would be ion paradise with him that day.
6	The Gospel writers have differing claims that after Jesus' death he was resurrected. Christians believe that Jesus' death and resurrection made it possible for sins to be forgiven and be reconciled with God.
7	The growth of the Christian Church after Jesus' death is recorded in the book of Acts. After being filled with the Holy Spirit on the day of Pentecost, the disciples spread the message about Jesus.
8	A Pharisee named Saul/Paul originally persecuted Christians, but he converted to Christianity following a dramatic experience on the road to Damascus. He is credited with writing 13 of the books of the New Testament, although biblical scholars disagree about whether all 13 of them were actually written by him.

Unit 4 - Sikhism History and Belief

Key Words		
1	Caste	A series of social classes that determine someone's job and status
2	Gurdwara	The Sikh place of worship; it literally means 'doorway to the Guru'
3	Gurmukhi	A language created by the Gurus and used to write the Guru Granth Sahib
4	Guru	A religious teacher or guide who leads a follower from spiritual ignorance (GU, darkness) into spiritual enlightenment (RU, light)
5	Guru Granth Sahib	the Sikh holy book; the name means 'from the Guru's mouth'
6	Khalsa	the community of Sikhs founded by the 10th Guru, Gobind Singh
7	Khanda	the symbol of Sikhism, made up of two double edged swords, one sword in the middle and a circle
8	Sikh	A follower of Sikhism; it comes from the Sanskrit word shishya, which means 'disciple' or 'learner'

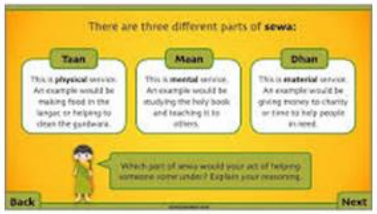
Key Quotes	
1	The Kings are butchers and cruelty is their knife. Their sense of duty has taken wings and flown. (Guru Granth Sahib 145:10)
2	If I had 100,000 tongues, and these were then multiplied twenty times more, with each tongue, I would then repeat, hundreds of thousands of times, the Name of the One, the Lord of the Universe. (Guru Granth Sahib 7:6-7)

Key Facts	
1	There are around 25 million Sikhs in the world today, most of them (19 million) living in India.
2	Sikhism began with a man called Nanak, who received a revelation when he was 30 in which he understood that although there are many different religions there is only one God. God loves all people equally no matter what religion they follow.
3	Nanak made four long journeys over a period of 20 years, spreading word of his revelation. He visited and talked to Buddhists, Muslims and Hindus.
4	The story of the miracle of milk and blood emphasizes one of Guru Nanak's important teachings – that of working hard and honestly.
5	Guru Arjan is famous for building the holiest site in the world for Sikhs, the Harmandir Sahib, and for being the first Sikh martyr after his death at the hands of the Mughals.
6	The Sikh symbol of the Khanda was established by Guru Hargobind, who put on two swords to indicate his spiritual authority (piri) and his worldly authority (miri).
7	The last of the human Gurus was Gobind Singh, who established the Khalsa, a brotherhood of Sikhs established to protect their people from persecution.
8	Before he died, Gobind Singh said that the collection of Sikh holy scriptures, the Guru Granth Sahib, would be the eleventh and final – eternal – Guru. It is a collection of scriptures collected over 150 years that is highly revered by Sikhs, who look to it for guidance and leadership and use it in worship services and special ceremonies.

Key Words		
1	Atma	The soul.
2	Diwan Hall	The main hall in the a gurdwara, where worship services take place.
3	Gurmukh	Someone who puts God and the teachings of the Gurus at the centre of their life.
4	Karma	The forces that influence people's future rebirth.
5	Maya	The temporary and illusory nature of the world.
6	Mukti	Union with Waheguru; to escape the world of illusion and the cycle of life, death and rebirth.
7	Nishan Sahib	A flag that flies over every gurdwara.
8	Sewa	Selfless service to others.

Key Quotes	
1	[There is] no Hindu nor Muslim, but only man. So whose path shall I follow? I shall follow God's path. God neither Hindu nor Muslim and the path which I follow is God's. (Guru Nanak)
2	When all efforts to restore peace prove useless and no words avail Lawful is the flash of steel. It is right to draw a sword. (Zafarnama (letter written by Guru Gobind Singh regarding Sikh beliefs on war))

Unit 4 - Sikhism In the Modern World

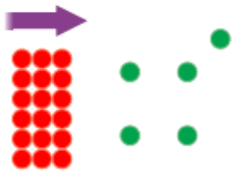


Key Facts	
1	Sikhs believe that we are all in a cycle of birth, death and rebirth. We can influence our rebirth by our actions in this life (karma). The ultimate goal is to reach mukti – freedom from this cycle and union with God.
2	The Sikh place of worship is called a gurdwara. An orange flag called a Nishan Sahib always flies above a gurdwara.
3	During Sikh services, the Guru Granth Sahib is placed on a throne in the Diwan Hall; the people all sit on the floor during the service.
4	The langar is a communal place for cooking and eating; every gurdwara must have a langar, which is open to everyone, whatever their gender, ethnicity or religion. In recent years, many non-Sikhs living in poverty have started to visit langars to have a meal each day.
5	Sewa, serving others, is a key Sikh belief. There are 3 forms of sewa; (tan (physical service), man (mental service) and dhan (material service, which includes giving to charity).
6	Sikhs believe it is acceptable to fight as long as this is a last resort and is in self-defence or in defence of innocent people.
7	Most Sikhs in the UK today are descendants of people who left the Punjab after the partition of India in 1949. However, there were Sikhs in the UK beforehand, and the first gurdwara was built in London in 1911.
8	In recent years there has been controversy over marriages between Sikhs and people of other faiths, with some Sikhs concerned that this may lead to the extinction of the Sikh religion in the long term. Other Sikhs stress the idea of equality that Sikhism embraces and say that Sikhs should be free to marry whomever they love.

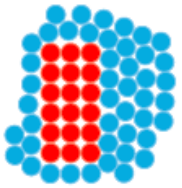
Friction and drag

- **Friction** is a force which will slow down a moving object due to two surfaces rubbing on one another
- The greater the friction, the faster an object will slow down, or the greater the force it will need to overcome the force of friction. For example, it is easier to push a block on ice than on concrete, as the ice is smoother and causes less friction

- When an object is moving through a fluid, either liquid or gas, the force which slows it down is known as **drag**
- The fluid particles will collide with the moving object and slow it down, meaning that more force is needed to overcome this
- Both drag and friction are **contact forces** as the two surfaces in friction, and the object and fluid particles in drag, come into contact with one another
- Both drag and friction are forces so they are measured in **Newtons** (N)



A solid moves through a gas.



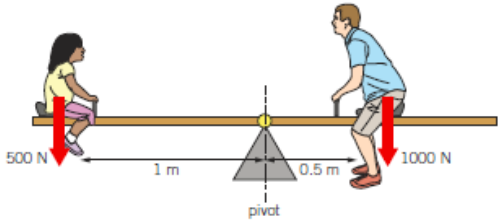
A solid moves through a liquid.

Turning forces

- A **moment** is the turning effect of a force, it is measured in Newton meters
- We can calculate a moment with the equation:

moment (Nm) = force (N) × distance from the pivot (m)

- The size of the moment will increase as the distance from the **pivot** or the size of the force increases
- When an object, such as a seesaw, is balanced, the clockwise and the anticlockwise moments will be equal and opposite, which is known as **equilibrium**
- When forces are equal and opposite to each other, there is no **resultant force**

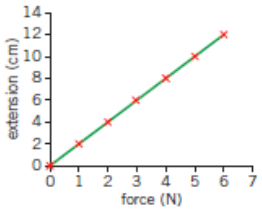


clockwise moment = force × distance on the right
= 1000 N × 0.5 m
= 500 Nm

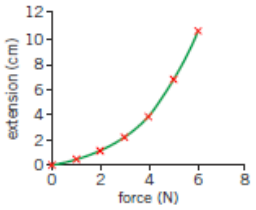
anticlockwise moment = force × distance on the left
= 500 N × 1 m
= 500 Nm

Hooke's law

- Some objects, like springs, can be stretched, the amount that they stretch is known as their **extension**
- A force needs to be applied to the spring for it to be stretched, we can achieve this by adding masses which exert the force weight
- A spring will continue to stretch until it passes it's **elastic limit**
- If an object obeys **Hooke's law** it will have a **linear relationship**: if the force applied to the spring is doubled, the extension will double too
- If an object does not obey Hooke's law, it will not have a linear relationship



This graph shows how the extension of a spring changes as you pull it



This graph shows the relationship between force and extension

Gas pressure

- **Gas pressure** is caused by the particles of a gas colliding with the wall of the container which they are in
- The more often that the particles collide with the wall of the container, the higher the pressure of the gas will be
- Gas pressure can be increased by:
  - Heating the gas so the particles move more quickly and collide with the container with a higher energy
  - Compressing the gas so there are the same amount of particles within a smaller volume meaning that there are more collisions
  - Increasing the amount of particles within the same volume so there are more collisions

- **Atmospheric pressure** is the pressure which the air exerts on you all of the time, nearer the ground there are more particles weighing down on you so the pressure is greater
- The higher you go, the smaller the atmospheric pressure, this is because there will be less particles weighing down on you

Pressure in solids

- The pressure which is exerted on a solid is known as **stress**
- The greater the area over which the force is exerted over, the lower the pressure, this is why snowshoes have a large area to prevent you sinking into the snow
- **Pressure** can be calculated using the following equation:

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

Pressure in liquids

- Liquids are **incompressible**
- The particles in a liquid are already touching, meaning that there is little space between them to compress
- Liquids will transfer the pressure applied to them, this is seen in hydraulic machines
- As the ocean gets deeper, the pressure will increase, this is because the pressure depends on the weight of the water above
- The greater the number of water molecules above, the higher the pressure will be

Key terms Make sure you can write definitions for these key terms.

air resistance · atmospheric pressure · contact force · drag · elastic limit · equilibrium · extension · friction · gas pressure · Hooke's law · incompressible · linear relationship · moment · newton · pivot · pressure · resultant force · stress

Y8 SCIENCE - FORSES

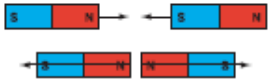
Keyword	Definition	Retrieval Question	Retrieval Answer
Air resistance	The force on an object moving through the air (also known as drag)	What is the unit of measurement for a force?	Newtons (N)
Atmospheric pressure	The pressure caused by the weight of the air above a surface	What is friction?	A contact force between two moving objects
Contact force	A force when 2 objects are touching	When is friction greatest?	On a rough surface
Drag	The force slowing down an object as it moves through a liquid or gas	Name 2 drag forces	Water resistance and air resistance
Elastic limit	The point beyond which a spring will not return to its original length when the force is removed	When does drag occur?	When an object moves through water or air, pushing particles out of the way
Equilibrium	When the moments are equal and opposite	How do you calculate resultant force?	The difference between the two forces
Extension	The amount of stretch in an object	What 2 things can be happening to an object when its resultant force is zero?	Steady speed or not moving
Friction	A force which will slow down an object due to 2 surfaces rubbing on one another	What are the 2 things a force can do to an object?	Change the shape of an object or the direction it moves in
Gas pressure	Caused by the particles of a gas colliding with the wall of a container	What force does a solid provide to an object?	Reaction force
Hooke's Law	A law that says that if you double the force on an object, the extension will double	How is compression caused?	When forces squash an object
Incompressible	Cannot be compressed	How is tension caused?	When forces stretch an object
Linear relationship	When 2 variables are graphed and show a straight line through the origin	State Hooke's Law	When you double the force, the extension doubles
Moment	A measure of the ability of a force to rotate an object about a pivot	What is the elastic limit of a spring?	The point at which the spring will not go back to its original length when the force is removed
Newton	Unit for measuring force (N)	How do you measure the extension of a spring?	Using a ruler, apply weights to the spring and measure the extension
Pivot	The point about which a lever or see-saw balances or rotates	What is a moment?	The turning effect of a force

Keyword	Definition	Retrieval Question	Retrieval Answer
Pressure	The ratio of force to surface area, in N/m^2 and how it causes stresses in solids	What is the unit of measurement for a moment?	Newton metres (Nm)
Resultant force	Single force which can replace all the forces acting on an object and have the same effect	State the equation for calculating a moment	Moment (Nm) = force (N) x perpendicular distance from the pivot (m)
Stress	The effect of a force applied to a solid Stress = force/area	What is a pivot?	The turning point

Retrieval Question	Retrieval Answer	Retrieval Question	Retrieval Answer
What causes liquid pressure?	Water molecules pushing on each other and on surfaces	What is the law of moments?	The sum of the clockwise moments is equal to the sum of the anticlockwise moments
What does incompressible mean?	Cannot be compressed	Describe what is meant by the centre of gravity	Where the weight of an object acts through a specific point
How does liquid pressure change as you go dive deeper in the ocean?	Increases the deeper you go	What is gas pressure?	The force that gases exert when they collide with the walls of a container
Describe why an object float	If up thrust balances the weight of an object	What happens to particles in gas when they are compressed?	They get closer together, collide more often and the pressure increases
Define up thrust	The pressure on the bottom of object that is submerged in water	How does atmospheric pressure change with altitude?	It decreases the higher up you go
What is the unit of measurement for stress?	Newtons per metre squared (N/m2)	Where on Earth does air have the greatest density?	Near the ground
State the equation for calculating stress?	Stress (N/m2) = force (N) ÷ area (m2)	What is the equation to calculate fluid pressure?	Fluid pressure (N/m2) = force (N) ÷ area (m2)
What happens to the stress as the area of an object increases?	Decreases	In which direction does stress act?	Downwards (on the ground)

Magnets

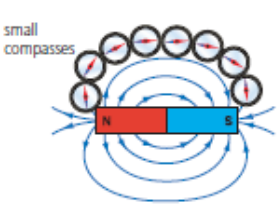
- A **magnet** has two poles, a north and a south pole
  - North poles **attract** south poles
  - South poles **attract** north poles
  - South poles **repel** south poles
  - North poles **repel** north poles



- **Magnetic materials** will experience a magnetic force when placed near a magnet, this is a type of non-contact force as the materials do not have to touch for the force to be apparent
- The three magnetic metals are iron, nickel and cobalt

Magnetic fields

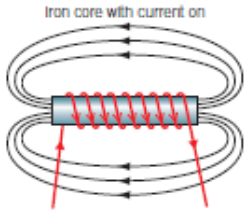
- A **magnetic field** is an area where a magnetic material will experience a force
- A **permanent magnet** will have it's own magnetic field
- **Magnetic field lines** represent the field, these always travel out of the north pole of the magnet, and into the south pole
- The closer together the magnetic field lines are, the stronger the magnetic field will be
- We can find out the shape of a magnetic field in two ways:
  - Using plotting compasses
  - Using iron filings



- The Earth has its own magnetic field, which acts like a giant bar magnet inside the centre of the Earth
- This magnetic field allows compasses to work when navigating around the Earth

Electromagnets

- **Electromagnets** are made by wrapping a coil of wire around a magnetic **core**
- Electromagnets only work when electricity is flowing through the coil, which means that they can be turned on and off
- Electromagnets are also stronger than **permanent** magnets
- The electromagnet will produce the same magnetic field shape as a bar magnet



- You can increase the strength of an electromagnet by:
  - Increasing the number of turns on the coil around the core of the electromagnet
  - Increasing the current which is flowing through the coil of wire
  - Using a more magnetic material for the core, e.g. iron rather than aluminium

Using electromagnets

Electric Bells

The electromagnet attracts the iron armature

↓

When it moves, it breaks the circuit, no longer allowing current to flow

↓

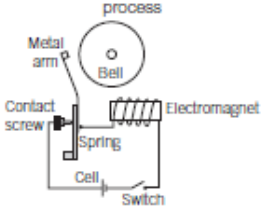
The coil and core are no longer magnetic meaning the spring is no longer attracted and returns to its original position

↓

The bell is rung once

↓

The circuit is complete again, restarting the process

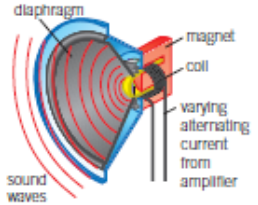


Circuit breakers

- Circuit breakers detect large changes in current in a house, and will break a circuit
- When a large current flows, the electromagnet becomes strong enough to attract an iron catch which will break a circuit
- They can then be reset and used again
- This makes them suitable as an electrical safety device in a home

Loudspeakers

- Loudspeakers use an electromagnet in order to generate sound
- A current passes through the coil and creates an electromagnet, this repels another permanent magnet which moves the cone in and out creating sound



Key terms Make sure you can write definitions for these key terms.

attract · core · circuit breaker · electromagnet · electric bell · loudspeaker · magnet · magnetic pole · magnetic field lines · magnetic material · permanent magnet · repel

Keyword	Definition	Retrieval Question	Retrieval Answer
Attract	Objects moving towards one another due to a magnetic force	Name the 2 poles found on a magnet?	North and South
Core	Soft iron metal which the solenoid is wrapped around	State 2 ways you can find the shape of a magnetic field	Using plotting compasses, using iron filings
Circuit breaker	A device that uses an electromagnet to break a circuit	What happens when you put like poles of a magnet close together?	They repel
Electromagnet	A non-permanent magnet turned on and off by controlling the current through it	What happens when you put unlike poles of a magnet close together?	They attract
Electric bell	A device that uses an electromagnet to make sound using a "make and break circuit"	How do you create an electromagnet?	Make a circular loop of wire and pass a current through it
Loudspeaker	A device that uses an electromagnet. It turns an electrical signal into a pressure wave of sound	What is a solenoid?	A loop of wire made into a coil
Magnet	A material with a magnetic field around it in which a magnetic material experiences a force	What can an electromagnet core be made from?	A magnetic material, usually iron
Magnetic pole	The ends of a magnetic field, called north-seeking and south-seeking poles	Name 3 factors that will change the strength of an electromagnet	Increase the number of turns of wire, increase the current, the material used as a core (magnetic)
Magnetic field lines	Imaginary lines that show the direction of the force on a magnetic material	Give 3 uses of electromagnets	Ringing bell, circuit breaker, loudspeakers
Magnetic material	A material that experiences a magnetic force when placed near a magnet	What is a motor?	
Permanent magnet	A object that is magnetic all of the time	Describe how a motor uses electromagnetism to work	
Repel	Objects moving away from one another due to a magnetic force	What is the difference between a permanent magnet and an electromagnet?	You can turn electromagnets on and off and make them stronger

Y8 SCIENCE - GENES

Natural selection

- Scientists believe that the organisms which we see on Earth today have gradually developed over millions of years, this is known as **evolution**
- Charles Darwin came up with the concept of **natural selection**, he said that only the best adapted animals will survive to pass on their **genes**, weaker animals will die out

Organisms show variation in characteristics caused by their genes → Organisms with the best adaptations survive and reproduce, weaker organisms die out and do not pass on their genes → Genes from the successful organisms are passed onto the next generation, passing on their successful characteristics → Over a long period of time the best adaptations continue to be passed on which can lead to a new species being formed

- One example of natural selection can be seen in giraffes, only the giraffes with the longest necks would be able to eat from trees, the ones with shorter necks would not be able to eat and die out
- This would mean that only the gene for long necks would be passed on, leading to all giraffes having long necks

Extinction

- A species will become **extinct** when all of a species die out
- The **fossil record** shows us that animals have existed in the past which have now become extinct
- Extinction can be caused by:
  - Changes to the environment
  - Destruction of habitat
  - New diseases
  - Introduction of new predators
  - Increased **competition**
- When a species becomes extinct, the variety of species within an ecosystem is reduced, this is also known as a reduction in **biodiversity**
- The more diverse a **population** is, the more likely they are to survive environmental changes

Punnet squares

Possible alleles from father

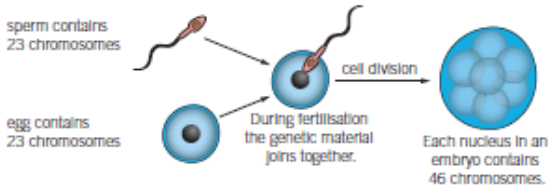
Possible alleles from mother	B (dominant allele for browneyes)	b (recessive allele for blue eyes)
b (recessive allele for blue eyes)	Bb Offspring will have brown eyes as B is dominant	bb Offspring will have blue eyes as both alleles are recessive
b (recessive allele for blue eyes)	Bb Offspring will have brown eyes as B is dominant	bb Offspring will have blue eyes as both alleles are recessive

Genetic modification

- **Genetic modification** is the process which scientists can use in order to alter the genes of an organism
- Examples of this include altering cotton to produce higher yields, altering bacteria genes to produce medicines and altering crops to produce their own insecticides

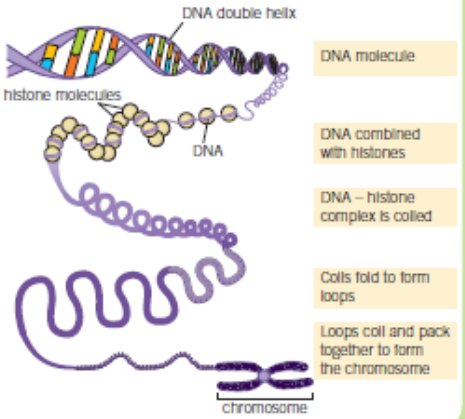
Inheritance

- **Characteristics** are passed along from parents to their offspring
- Half of the genetic information comes from each parent, this is passed on through the sex cells in the process of fertilisation



- **DNA** is the material which contains all of this genetic information

DNA – in the shape of a double helix → Genes – a section of DNA which hold the information for a particular characteristic → **Chromosomes** – long strands of DNA which hold many genes, humans have 46 of these in the nucleus of cells



Genetics

- For every characteristic an organism will have two **alleles**, this is two different genes which can code for the same characteristic, one is inherited from each parent
- **Dominant** alleles will cause the characteristic to be displayed even if they are with another allele, this is represented by a capital letter
- **Recessive** alleles will not be displayed as characteristics unless there are two of the same allele, they are the characteristic least likely to be shown, this is represented by a small letter
- We can predict the inheritance of characteristics using a **Punnet square**

Key terms Make sure you can write definitions for these key terms.

allele biodiversity characteristics chromosome competition DNA dominant evolution extinct fossil record gene genetic modification mutation natural selection population punnet square Punnet square recessive

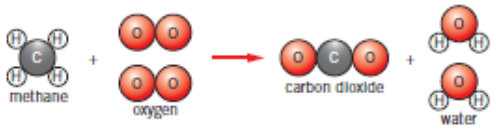
Keyword	Definition	Retrieval Question	Retrieval Answer
Allele	Different forms of a gene	What is evolution?	the development of species on Earth over millions of years
Biodiversity	A measure of the variety of all the different species of organisms on earth or within a particular ecosystem	How do we know some species of organism are now extinct?	fossil records
Characteristics	Features of an organism passes from parents to offspring via genes	What is a fossil?	the remains, or traces, of plants and animals that lived many years ago
Chromosome	Thread-like structure containing tightly coiled DNA. It contains the genes	Why might a plant or animal change over time?	to become better adapted to their environment
Competition	When 2 or more living things struggle against each other to get the same resource	Name the process by which organisms evolve?	natural selection
DNA	A molecule found in the nucleus of cells that contains genetic information	Which organisms did Charles Darwin study on the Galapagos islands?	finches (a type of bird)
Dominant	A dominant allele will always be expressed if it is present	What is meant by "peer review"?	where a scientist's work is checked by another scientist who works in a similar area of science
Evolution	Theory that animals and plant species descended from species in the past	Which other scientist "peer reviewed" Darwins work?	Alfred Wallace
Extinct	When no more individuals of a species remain anywhere in the world	Define the term "extinct"	when there are no more individuals of a species left in the world
Fossil record	Fossils of a species that show how a species has changed over time	Give 3 reasons why a species may become extinct	changes to the environment, destruction of habitat, outbreak of a new disease, introduction of new predators, competition for resources (any sensible answers)
Gene	A section of DNA that determines an inherited characteristic	Define the term "endangered"	a species that is at risk of becoming extinct
Genetic modification	A technique in which scientists insert foreign genes into organisms to change their characteristics	Define the term "biodiversity"	a measure of the variety of all the different species of organisms on Earth
Mutation	A change to the DNA that can cause disease	What is the purpose of a gene bank?	to store genetic samples from different species to use for research or produce new individuals
Natural selection	Process of organisms most suited to the environment survive and reproduce	Define the term "conservation"	protecting a natural environment, to ensure that habitats are not lost

Keyword	Definition	Retrieval Question	Retrieval Answer
Population	Group of organisms of the same kind living in the same place	Give an advantage and a disadvantage of captive breeding programmes	Adv: create stable, healthy populations of a species, re-introduce the species back into its habitat. Dis: difficult to maintain genetic diversity, small numbers of breeding partners, organisms may not be suitable for release in the wild
Punnet square	A diagram used to show possible allele combinations inherited from the parents	State 2 ways biodiversity benefits humans	rich varied food supply, useful products e.g. medicines from plants (any sensible answers)
Recessive	A recessive allele will only be expressed if 2 alleles are present	What is the purpose of DNA?	genetic material needed to make an organism

Retrieval Question	Retrieval Answer	Retrieval Question	Retrieval Answer
Define the term "peer review"	where a scientist's work is checked by another scientist who works in a similar area of science	Where can DNA be found in the cell?	inside the nucleus (arranged in strands called chromosomes)
Name 2 of the scientists involved in the discovery of the DNA molecule	Erwin Chargaff, Maurice Wilkins, Rosalind Franklin, James Watson, Francis Crick	Describe the structure of DNA	double-helix (twisted ladder)
Which are the only individuals who will have identical DNA?	twins	What is the section of a DNA molecule called?	gene
Define the term "allele"	different forms of the same gene	What is a mutation?	a change in the DNA
Describe the differences between dominant and recessive alleles	dominant alleles always produce the characteristic in an organism (you only need one copy), recessive alleles require two copies for the chacteristic to be expressed in the organism	What is the result of a mutation?	it affects the organisms characteristics
What do you use to produce a genetic cross?	Punett square	Describe 3 features of a DNA molecule	two strands, twisted in a double-helix shape, joined by 4 chemicals called bases (Adenine, Thymine, Cytosine and Guanine)
What is the probability of a mother and father having a baby boy?	50%	State an advantage of genetic modification	quick, precise
Define the term "genetic modification"	altering an organisms genes	Name 2 useful chemicals produced by genetically modified bacteria	vaccines and antibiotics

Chemical reactions

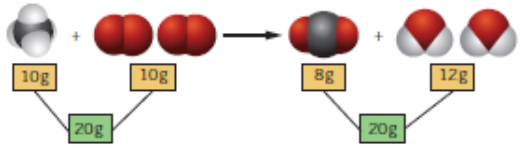
- Word equations can represent a **chemical reaction:**



- The **reactants** are on the left side of the arrow and the **products** are on the right side of the arrow
- We use an arrow instead of an equals sign as it represents that the reactants are changing into a new substance
- In a reaction, the amount of each type of atom stays the same, however they are rearranged to form a new product

Conservation of mass

- In a reaction the mass will be **conserved**, this means that the total mass of the reactants will be equal to the total mass of the products
- If it appears that some of the mass has been lost, this means that a gas has been produced and escaped, accounting for the lost mass



Balanced symbol equations show the amounts of all of the individual atoms in a reaction

- The symbols used are from the Periodic Table
- They also show:
  - Formulae of reactants and products
  - How the atoms are rearranged
  - Relative amounts of reactants and products

$$2H_2 + O_2 \rightarrow 2H_2O$$

Combustion

- **Combustion** is the burning of a **fuel** in oxygen
- A fuel is a substance which stores energy in a chemical store
- Examples of fuels include petrol, diesel, coal and hydrogen
- When a carbon based fuel undergoes combustion, it will produce water and carbon dioxide

methane + oxygen → carbon dioxide + water

- Hydrogen can also be used as a fuel, this is much better than traditional fossil fuels as it does not produce carbon dioxide:

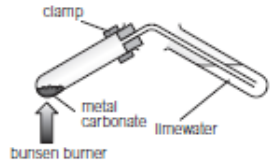
hydrogen + oxygen → water

Thermal decomposition

- A **thermal decomposition** reaction is one where the reactants are broken down (decomposition) using heat (thermal energy)
- An example of this is with metal carbonates:

zinc carbonate → zinc oxide + carbon dioxide

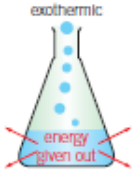
- We can test for this carbon dioxide by bubbling the gas through limewater, if the limewater turns cloudy, the gas is carbon dioxide



Exothermic and endothermic reactions

Exothermic reactions involve a transfer of energy from the reactants to the surroundings

- As energy is transferred to the surroundings this will show an increase in temperature
- Examples of exothermic reactions include combustion, freezing, and condensing



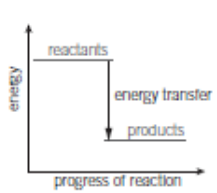
Endothermic reactions involve a transfer of energy from the surroundings to the reactants

- As energy is taken into the reactants a decrease in temperature will be shown
- Examples of endothermic reactions include thermal decomposition, melting, and boiling

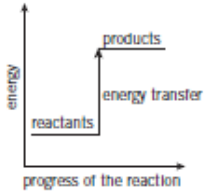
Energy level diagrams

Energy level diagrams show the values of energy between the reactants and the products in a reaction

- If the energy is greater in the reactants than the products then the reaction is exothermic as energy has been given out to the surroundings
- If the energy is lower in the reactants than the products then the reaction is endothermic as energy has been taken in from the surroundings



Exothermic



Endothermic

Bond energies

- Energy must be used to break **chemical bonds**, meaning that this reaction is endothermic
- Energy is given out when chemical bonds are made, meaning that this reaction is exothermic
- To see if a reaction is endothermic or exothermic, you must find the difference in the energy needed to break and to make the bonds in the reaction
- If the energy needed to break the bonds is less than the energy given out when making the bonds, the reaction is exothermic
- If the energy needed to break the bonds is more than the energy released when making the bonds, the reaction is endothermic

Key terms Make sure you can write definitions for these key terms.

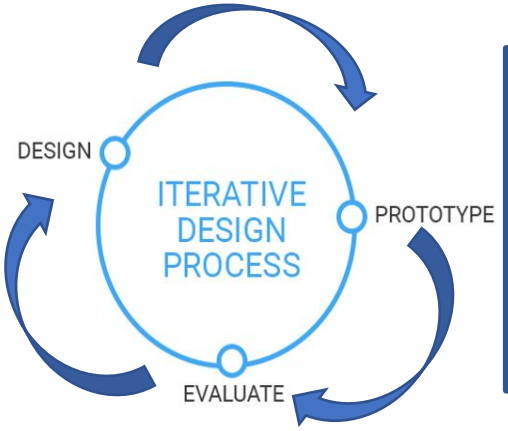
balanced symbol equation · chemical bond · chemical reaction · combustion · conserved · conservation of mass · decomposition · fuel · endothermic · energy level diagram · exothermic · products · reactants · thermal decomposition

Keyword	Definition	Retrieval Question	Retrieval Answer
Balanced symbol equation	Show the amounts of all the individual atoms in a reaction	What is a chemical reaction?	When atoms rearrange and form new products
Chemical bond	the force that holds atoms together in molecules	What is meant by the conservation of atoms?	The number of atoms at each element before and after the reaction is the same
Chemical reaction	A change in which a new substance is formed	Draw a particle diagram showing the arrangement in a solid	Diagram showing particles joined together in a regular order
Combustion	A chemical reaction in which a substance reacts with oxygen and gives out heat and light	Draw a diagram showing what happens to particles when copper and oxygen produce copper oxide	Diagram showing 1 atom of copper (Cu) and 1 molecule of oxygen (O_2) forming a molecule of copper oxide (CuO)
Conserved	When the quantity of something does not change	What are the substances added in a reaction called?	Reactants
Conservation of mass	The total mass of the reactants is equal to the total mass of the products	What happens in a combustion reaction?	A substance reacts with oxygen to form carbon dioxide and water
Decomposition	A chemical reaction in which a compound breaks down	What is a fuel?	A substance that stores energy in a chemical store
Fuel	A substance that stores energy in a chemical store	Give an example of a finite / non-renewable fuel	Petrol, diesel, coal, methane
Endothermic	A reaction that takes in energy, usually heat from the surroundings	Give an example of a renewable fuel	Cooking oil, animal waste, hydrogen
Energy level diagram	A diagram showing whether a reaction is endothermic or exothermic	Write the word equation for combustion	Fuel + oxygen --> carbon dioxide + water
Exothermic	A reaction that gives out energy into the surroundings	What does a carbonate consist of?	Carbon and oxygen
Products	Substances formed in a reaction	Define the term "decomposition"	A single compound breaks down into simpler compounds or elements
Reactants	Substances that react together	Define the term "thermal decomposition"	A single substance breaks down on heating to make more than one product
Thermal decomposition	A chemical reaction in which a compound breaks down when heated	How do we test for carbon dioxide gas?	Use limewater which turns cloudy
		Name the products of the thermal decomposition of calcium carbonate	Calcium and carbon dioxide
		What is meant by the conservation of mass in reactions?	The total mass of reactants is equal to the total mass of products

Retrieval Question	Retrieval Answer	Retrieval Question	Retrieval Answer
Draw an energy level diagram for an endothermic reaction	Diagram showing products higher than the reactants	What does a balanced symbol equation show?	The formulae of reactants and products, how the atoms are rearranged, the relative amounts of reactants and products
Is ice melting an exothermic or endothermic process?	Endothermic	Write the word equation for the burning of carbon	Carbon + Oxygen --> Carbon dioxide
Do the reactants or the products have more energy in an exothermic reaction?	Reactant have more energy than the products	Write the balanced symbol equation for the burning of carbon	C + O2 --> CO2
What is the unit of measurement for energy?	Joules (J) or Kilojoules (KJ)	What is an endothermic reaction?	A reaction where energy is transferred from the surroundings to the substances that are reacting
What is the unit of measurement for mass?	grams (g) or Kilograms (Kg)	What is an exothermic reaction?	A reaction where energy is transferred to the surroundings from the substances that are reacting
Is bond breaking endothermic or exothermic?	Endothermic	What piece of scientific apparatus measures temperature?	Thermometer
Is bond making endothermic or exothermic?	Exothermic	How do we calculate change in temperature?	Temperature after - temperature before
What is a catalyst?	A substance that speeds up a chemical reaction but remains unchanged	Draw an energy level diagram for an exothermic reaction	Diagram showing products lower than the reactants
What is a chemical bond?	A strong force that holds atoms together		

Research	
It helps designers to gain a better understanding of the problem that needs solving and equips us with the knowledge to be more successful when we start to design	
Primary research	Collecting information/ data directly from people, first hand. Examples include interviews and observations, product analysis
Secondary research	Gaining information/ data from existing sources or published information. Examples include books and the internet
Product analysis	Examining an existing product to find out information about it. When analysing a product you may consider; how its made, what its made from, what its function is, strengths and weaknesses, cost to make, components used in manufacture, shape, colour, size
Target market	The person/ group of people you are designing your product for
Needs and wants	**Needs** – what the target market needs a product to do in order for it to work **Wants** – desirable qualities that a target user would *like* a product to have For example: A target user needs a travel cup that will contain a liquid without it spilling but they may want it to have an adjustable handle to make it easier to carry
Material investigation	Experimenting with materials to find out their working properties

Models and Prototypes	
Designers make models and prototypes before deciding on a final design. Faults and improvements can be identified and corrected, before they manufacture a final product. Target user feedback can be gained along the way	
Models	Models can be made whilst designing. They can be models of individual parts or the whole product. It helps designers see how parts/ a product will look and work
Prototype	A **prototype** attempts to simulate the final design, aesthetics, materials and functionality of the intended design. It is the final step before a product is manufactured. A prototype is made after lots of modelling has taken place



Iterative design:
A design process that works on a continuous cycle until a solution is found. A designer will produce designs, model the design, evaluate the success of the design. The process starts again with the designer making alterations until a suitable solution is found

SCAMPER:
When designing you can use different aspects of SCAMPER to improve/ alter your design. For example if your design is too complex, you may choose to eliminate parts of it to simplify the design

Key topics: Motion and Mechanisms, Product Analysis – ACCESSFM, Vacuum Forming and Polymers, Electronic components, soldering and Health and Safety

1. Key Vocabulary & Definition

Motion	This is the action of a process or something being moved
Levers	A ridge or bar resting on a pivot
Mechanisms	Systems of parts working together in a machine
Mechanical advantage	the ratio of the force produced by a machine to the force applied to it, used in assessing the performance of a machine. $MA = \frac{Load}{Effort}$
Effort	the amount of force applied by the user, also referred to as the input.
Product Analysis	primary research and involves looking at existing products, working out how they were made and seeing what features might be useful to any possible new design. Product analysis can often be referred to as ACCESS FM.
Vacuum Former	Use to heat a single sheet of polymers to a temperature which allows the plastic to stretched and formed over a mould.
Polymers	Polymers are materials made of long, repeating chains of molecules.
Electric current	A flow of electrons
Circuit	An unbroken loop that allows the electrons to flow
Conductor	A material that allows electrons to flow freely e.g. a copper wire
Insulator	A material that doesn't allow electrons to flow through them e.g. the plastic sleeving on a cable
System	A system is a set of devices or things which are connected and work in conjunction with each other in order to perform a specific function.

2. Motions and Mechanisms

Reciprocating motion is a repetitive back and forth or up and down movement. E.g. a sewing machine needle

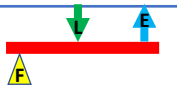
Linear motion is when an object moves in a straight line. E.g. Usain Bolt running 100 metres

Rotary motion is when an object moves around a fixed point or axis. E.g. handles of a clock or a spinning top

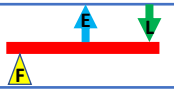
Oscillating motion is when an object moves to and fro from a pivot or fixed point. E.g. a swing or pendulum

Class 1 Lever have the **Fulcrum** between the **Force** and the **Load**.
E.g. pliers, scissors, a crowbar, a claw hammer, a see-saw

Class 2 Lever have the **Load** between the **Force** and the **Fulcrum**.
E.g. stapler, nut-cracker, wheel-barrow and nail clipper



Class 3 Lever have the **Force** between the **Load** and the **Fulcrum**.
E.g. Fishing rod, arm, and broom

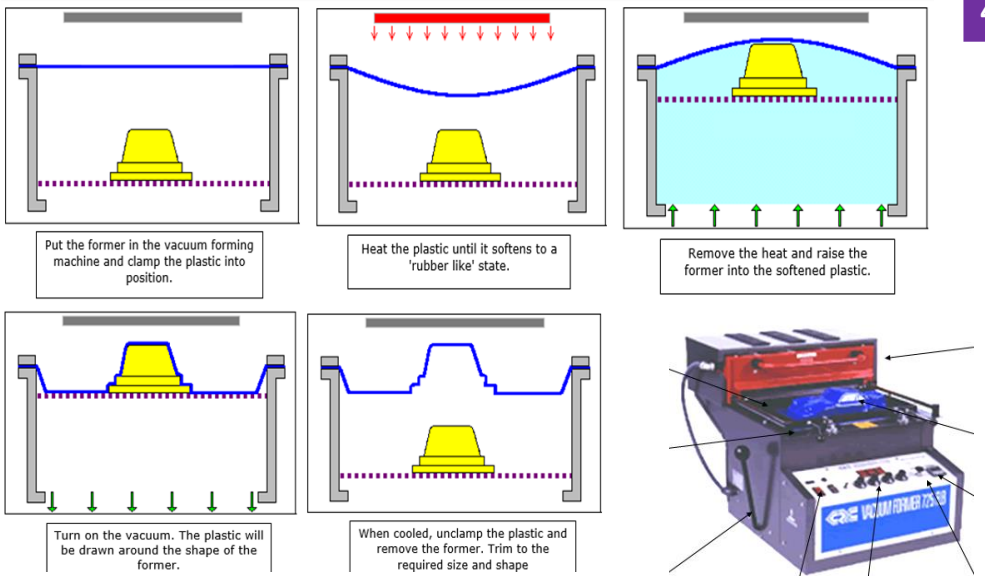


Soldering Health and Safety

- Soldering irons and holders get very hot.
- Be careful not to burn yourself.
- If you burn yourself then walk to the sink and run your it under the cold tap.
- Always place your soldering iron in the holder when you are not using it.
- Only one person should be soldering at a time.
- Always wear goggles and an apron.
- Soldering creates gases which you should try to not breath in.
- Sit on a stool whilst soldering.
- Never touch the soldering iron to see if it is on.

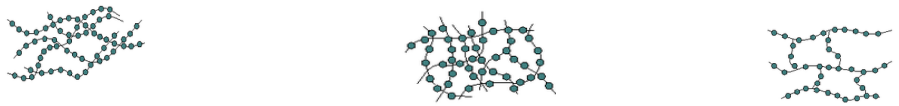
Vacuum forming

4



Polymers	Uses
Acrylic (PMMA)	is a transparent thermoplastic used as a lightweight, shatter-resistant alternative to glass. Acrylic comes in different colours is typically used in sheet form create various products such as acrylic mirrors and other artifacts.
High Impact Polystyrene (HIPs)	Thermoplastic used for display and signage. It comes in lots of colours, has good electrical conductivity, impact-resistant material, which makes it easy to vacuum form, extrude, bend and mould into shape. It is environmentally friendly, as it can be recycled.

Thermo	Thermosetting	Elastomers

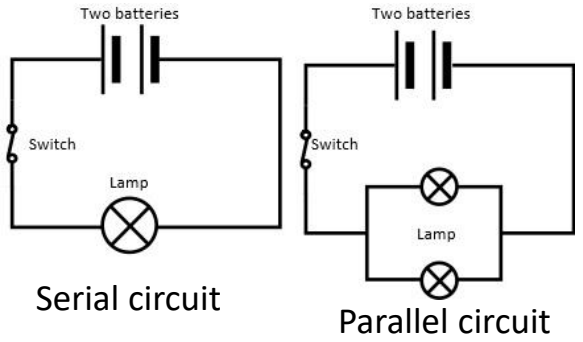


5

6. Electronic Components and Systems

INPUT	PROCESS	OUTPUT
Input devices receive an external signal that triggers the start of the system.	This is what happens to the input to change it to an output. Process devices make all the decisions.	This is the result of the system.

Component		Purpose	System
	Cell	Source of current electricity	Input
	open switch *(off)*	Stops the flow of current	Process
	lamp	Converts electrical energy into light	Output
	closed switch *(on)*	Allows the flow of current	Process
	LED (light emitting diode)	A semiconductor light source that emits light when current flows through it.	Output
	resistor	Controls the flow of electricity in the circuit	Process
	battery	Two or more cells joined together	Input
	LDR (light dependent resistor)	A photo-conductive cell that decreases resistance. It depends on the light falling on its surface.	Output

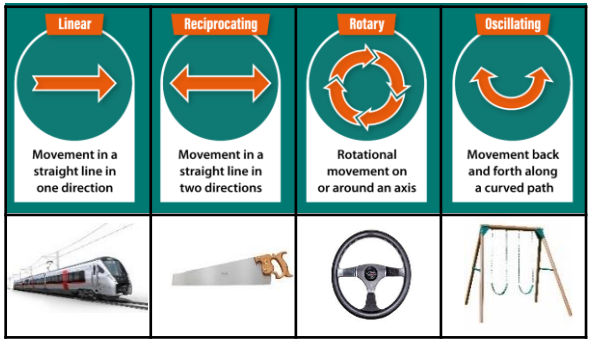


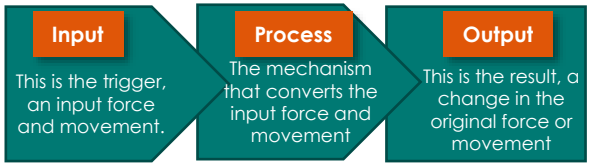
Serial circuit

Parallel circuit

1

Movement and motion – mechanical devices can be used to produce different types of motion.

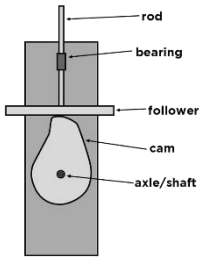




2

Keywords	Definition
Mechanism	Mechanism devices change an input force and movement in to a desired output force and movement. They can change magnitude and direction of force.
Cam	Cam's are used to convert rotary motion in to reciprocating. A rod, known as a follower rests on the cam and rises and falls as the cam rotates.
Lever	A lever is a mechanical device used to transmit and transform the effect of forces. The input force is transferred through the lever to move a load.
Linkage	Levers can be joined together to make linkages. Linkages can change an input motion + force in to an output motion + force.

3



4

Woods

TIMBER

A natural renewable resource

Hardwoods	Softwoods
Deciduous	Coniferous
Loose leaves	Evergreen
Grows some of the year	Grows all year round
Rings closer together	Rings further apart
100 years to grow	30 – 40 years to grow
Oak, Ash, Beech	Pine, Cedar, Fir
Furniture	Building

5

Tools		
Marking Gauge		Mark out lines by running it along an edge and using the pin to mark a line into the material
Try Square		Used for marking out and checking 90° angles on wood, metal or plastic
Tenon Saw		A saw used for cutting wood. Its flat blade makes it good for cutting straight lines
Belt Sander		A machine that rotates a belt of sand paper at high speeds. Used to neaten up edges of wood
Coping Saw		A saw used to cut wood and plastic. Its think blade makes it ideal for cutting curved lines
Chisel		Is a cutting tool with a sharp edge. Sometimes used with a mallet to run along the surface off wood and remove shavings
Sand Paper		An abrasive paper used to smooth the surface of wood. It comes in a range of 'grit sizes' which range from rough to very fine

6

Keywords	Definition
Wasting	The term used to describe the process of removing material when manufacturing. This can be through drilling, sawing, filling or cutting.
Template	A shaped piece of rigid material that is used to draw or cut around to increase accuracy. They can also be used when shaping or drilling.
Finishing	The term used to describe the process of adding a 'finish' such as paint, varnish, wax or stain to a material for functional or aesthetic reasons.
Quality control	Quality control is when your check the quality of a product against a set standard or specification. Products will often have a tolerance of how accurate they need to be.

Y8 D&T – PAPERS AND BOARDS

1

Key Words		
1	**Anthropometrics**	The **study of the human body** and its movement, often involving **research into measurements** relating to people. It also involves collecting statistics or measurements relevant to the human body, called **Anthropometric Data.**
2	**Ergonome**	Ergonomes are models of people in normal proportions.
3	**Ergonomics**	Defined as the science of fitting a workplace to the user's needs, *ergonomics* aims to increase efficiency and productivity and reduce discomfort
4	**Product Analysis**	Examining product features, costs, availability, quality, appearance and other aspects. We can use the acronym ACCESS FM to help us remember the key features of a product Analysis
5	**Triangulation**	Triangulation involves the use of triangular shapes to give stability to structures
6	**Biomimicry**	a practice that learns from and mimics the strategies found in nature to solve human design challenges
7	**Crating**	Using sketched 3D cubes/ cuboids to help structure more complex drawings
8	**Attachment Techniques**	Ways to join pieces of material together. In the case of this project it refers to modelling materials

2

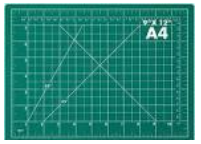
Scaling:
Scaling is a drawing method used to enlarge or reduce a drawing in size while keeping the proportions of the drawing the same. Scales are generally expressed as ratios.

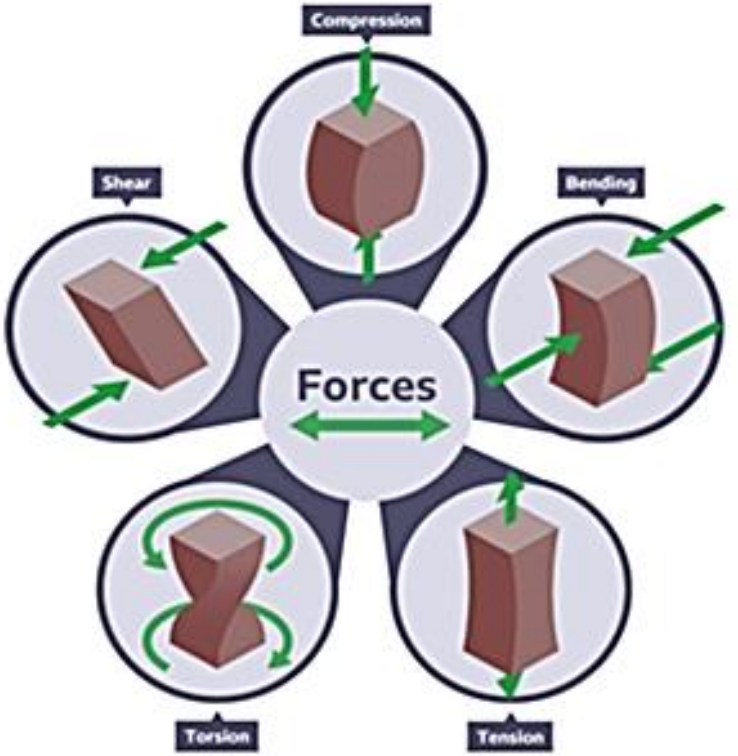
1:1	Full size		
1:2	Half of the original size	2:1	Twice the original size
1:5	A fifth of the original size	5:1	Five times larger than the original size
1:10	A tenth of the original size	10:1	Ten times larger than the original size
1:20	A twenty-fifth of the original size	25:1	Twenty five times larger than the original size

3

A	Aesthetics	Appearance: colour, shape, texture, design style
C	Cost	How much does the product cost? How much would it cost to manufacture?
C	Customer	Who is it aimed at? Will this person be buying the product for themselves?
E	Environment	Environmental impact of the product. From manufacture, use and disposal
S	Safety	H&S considerations of a product during use and manufacture
S	Size	Dimensions of a product. Consider ergonomic aspects to the design
F	Function	What is its job?
M	Manufacture/ Materials	How is it made? What is it made from?

Y8 D&T – PAPERS AND BOARDS

Tools, equipment and joining methods			
1	**Craft Knife**	craft knife is a single bladed knife that easily cuts through a variety of different materials. The craft knives we use in school have a plastic handle and a retractable blade.	
2	**Cutting Board**	self healing cutting mats are purpose-built to be extremely durable and resilient, creating the perfect cutting surface that reduces blunting but also ensures any worksurface is well protected from damage . They often have lines printed on them to help you when cutting straight lines	
3	**Metal Rule**	Metal safety Rule's features a unique M profile which allows you **to keep your fingers well away from any knife edge** when used for cutting or scoring. They are made from metal to prevent the rule being damaged by the blade of a craft knife	
4	**Glue Gun**	Heats up glue sticks to change the glue into liquid form. Good for gluing paper and boards quickly	
5	**Tab**	An extra rectangle added to a piece of card/ paper. Tabs are folded over, glued and used to add support when joining two piece s of material together	
6	**Flange**	A number of tabs cut around the base of a tube. These are flattened down to give more surface area to glue the tube to a surface	
7	**Gusset**	Triangular shaped support that add strength when joining two piece of material at a 90 degree angle	
8	**Split Pin**	A metal pin that has two legs that can be spilt when joining two pieces of card of paper. It allows for rotational movement when modelling	

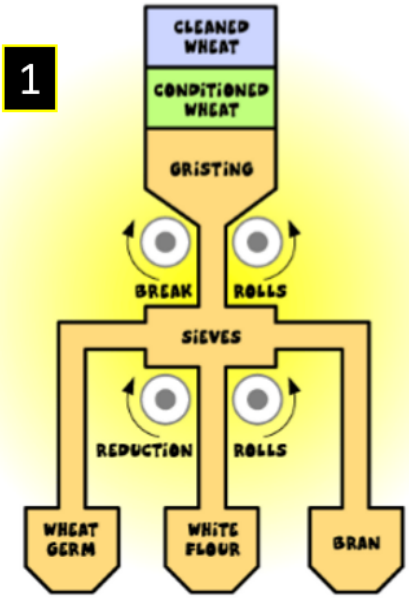


Modelling Materials	
1	Styrofoam
2	Foam Board
3	Corrugated Cardboard
4	Balsa Wood
5	Plasticine
6	Art Straws

CAD / CAM terms	
1	CAD = Computer Aided Design
2	CAM = Computer Aided Manufacture
3	Google Sketchup = 3D CAD package
4	2D Design = CAD package we use with the laser cutter
5	CNC Machine = Computer Numerical Control Machine

Farm to Fork – How flour is made

1



On arrival at the mill the wheat is cleaned to remove dust, straw and other impurities.
Conditioning with water softens the bran layer of the wheat and makes it easier to separate the parts of the wheat.
The wheat is blended with other types of wheat in a process called gristing to make different kinds of flour.
It is then milled through steel rollers with teeth that break the grains open
The fragments of wheat grain are separated by sieves.
The bran, wheatgerm and endosperm have all been separated out. They can now be blended to make different types of flour.

2

	Intensive Farming	Organic Farming
Quantity (yield)	High yield, large amounts of food produced.	Lower yield of crops and more is lost and less is grown.
Pesticides	Keep pests away resulting in more crop.	Pesticides restricted, natural predators encouraged
Animals	Battery rearing of animals in enclosures , less humane and can cause disease to spread quickly through the animal population..	Animals have a better quality of life with access to outdoors. Animals not given antibiotics.
Labour	Artificial chemicals and machines means fewer people are needed for work	More people are needed to work the farms.
Fertilisers	If too much is used, it can wash in to steams and lead to pollution.	Only natural fertilisers are used along with crop rotations.
Cost	Low cost of production but a high initial set up, maximum output is achieved resulting in a lower cost for consumers	Production is lower and more space is needed, resulting in higher cost produce for consumers.

3

Key Terms

Key terms	Definition
Halal	refers to foods that are allowed to be eaten according to Islamic law, and how and animal is slaughtered.
Kosher	Is a word used to describe food and drink that complies with Jewish religious dietary law, and refers to how and animal is slaughtered.
Organic	Food produced without the use of chemical fertilisers, pesticides or other artificial chemicals.
Intensive farming	A way of producing large amounts of crops, by using chemicals and machines as well as keeping animals indoors to restrict movement.
Seasonal	The times of the year when the harvest or the flavour of a food is at its peak.
Food miles	The distance food is transported from the time of its making, until it reaches the consumer.

4

RSPCA ASSURED

Farmed animals that have been inspected to **VERY high welfare standards** – providing them with physically and mentally stimulating environments from birth to slaughter.

ASSURED FOOD STANDARDS

This symbol means that the food you buy has been **responsibly sourced** from **British** farmers, safely produced and comes from crops and animals that have been well cared for

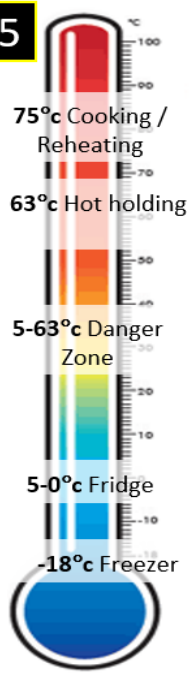
Lion Quality

This logo is stamped on to egg to certify that they are **British** and that the **hens have been vaccinated** against Salmonella.

SOIL ASSOCIATION · ORGANIC STANDARD ·

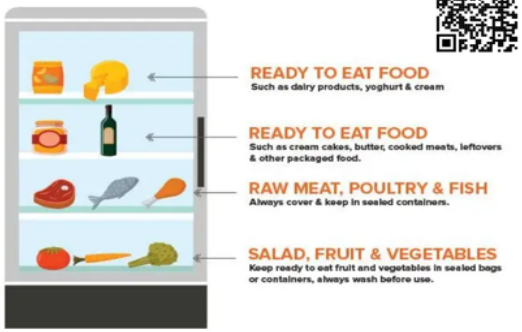
This symbol means that the product is certified to **high organic standards** and provides an assurance of organic authenticity.

5



6 Food Safety

Microorganism	Tiny living things, such as bacteria, yeasts and moulds which cause food spoilage.
Pathogen	Harmful bacteria which can cause food poisoning.
High Risk Food	Foods which are ideal for the growth of bacteria or micro-organisms (e.g., chicken and shellfish).
Contamination	When food is affected with micro-organisms.



7 Different ages have different nutritional needs

Age	Definition
Young children	Diet should be based on the Eatwell guide. Children have small stomachs and should have small meals more frequently. Dairy is important for calcium. They should be encouraged to try new foods.
Children	They are very active and growing rapidly. Need a balanced diet, sugar and snacking should be avoided.
Teenagers	Growth is in spurts, protein required for muscles and calcium for skeleton. Teenage girls begin mensuration (blood loss – loss of iron). Teenagers deal with stress and this can lead to poor eating habits.
Adults	Stop growing so needs don't vary much. Eatwell guide should be followed. Metabolic rate slows through age. Muscle is lost and fat gained.
Elderly	Usually less active and need less energy. Taste and smell can change which affects enjoyment. Calcium, vitamin D and B12 are important.

8 Diet Related Health Problems

Health Problem	Definition
Obesity	The most common over nutrition problem is **obesity** caused by too much energy being consumed, or high levels of inactivity. It is measured as a ratio of weight to height.
Dental Health	To maintain healthy teeth you need to have a balanced diet. Bacteria feeds on the sucrose found in food and produce acid.
CHD & High blood pressure	**Coronary heart disease** (CHD) is related to the amount of fat in the diet and is caused by a narrowing of the blood vessels to the heart. This reduces the flow of blood to the heart. **High levels of cholesterol** in blood increase the risk of CHD.
Type 2 Diabetes	This is a metabolic disorder caused by poor absorption of glucose. Diet plays a strong role in preventing type 2 diabetes, a condition that causes the level of sugar (glucose) in the blood to become too high.
Anaemia	A condition caused by insufficient **iron** in the body. Common symptoms include tiredness and lethargy. 
Diverticulitis	A condition which affects the large intestine. It is linked to a low fibre diet and causes the lining of the bowel to become inflamed, infected and damaged. 
Osteoporosis & rickets	**Calcium** is important for strong bones. Vitamin D is needed for calcium to be absorbed from food. Rickets is caused by a lack of calcium and vitamin D in children. Osteoporosis is a disease in which the bones start to lose minerals and their strength and break easily.

Year 8 F&F – Fabric and Fibres

Key word	Definition	
Fabric	Textile fabrics are woven or knitted from **yarn**, which is made from **fibres**: 1	
Natural Fibre	Natural fibres are from **plants** and **animals**	They are renewable, sustainable and biodegradable.
Synthetic Fibre	Man-made fibres/ manufactured from fossil fuels (coal, oil and gas).	Cannot be replaced, do not decompose and contribute to environmental problems if they end up in landfills.
Regenerated Fibre	a mixture of manmade and natural	E.g. Polyester cotton is used to makes shirts. It improves the properties of the material.
Bonded	A nonwoven fabric in which the fibres are held together by a bonding material.	
Smart Textiles	Fabrics that can sense and react to environmental stimuli, which may be mechanical, thermal, chemical, biological, and magnetic amongst others.	
Sublimation Printing	A method of **printing** that transfers a design into a material or fabric using ink and heat.	
Fabric Embellishment	This is a method of adding surface decoration to fabric or garments. E.g. quilting, embroidery applique, patchwork, piping, beads and trims.	
Tessellation	Is an arrangement of shapes closely fitted together in a repeated pattern without gaps or overlapping. Triangles squares and hexagons are three polygons that tessellate.	
Cutting list	A cutting list, is as a material list, that simply lists all the parts that will be required to construct a project.	
Seam allowance	This is the area that is allowed for stitching, between the fabric edge and the stitching line on two pieces of material being sewn together.	

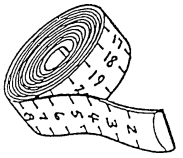
Fibre	Source	Used for
Polyester	is a synthetic fibre that comes from crude oil. When made into fabric, it tends to feel slippery and silky. Some polyester is blended with other fabrics to provide more stretch, or to reduce skin irritation.	Polyester is used to make shirts, jackets and furnishings. School blazer 2
Polyester wadding	Is made up fibres that are punched through a very fine scrim (netting), normally of polypropylene where it gets tangled up.	A bonded fabric used to quilt or form padding between two layers of fabric. It is soft and fluffy to touch.
Elastane/ Spandex	an elastic polyurethane material, Often mixed with cotton or polyester.	used for hosiery, underwear, and other close- fitting clothing such as leggings.

Equipment

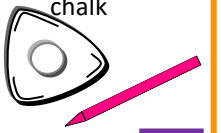
Pins

Heat press

Tape measure



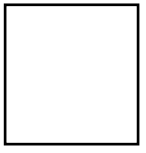
Tailors chalk

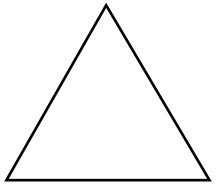


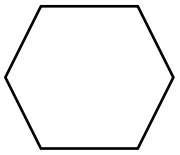
3

Tessellation

A regular tessellation is made up of regular polygons. Only **three** regular polygons tessellate: triangles, squares, and hexagons.







5

Year 8 F&F – Fabric and Fibres

4

Fabric Embellishment

Quilting

Applique

Beading

Piping

Smart textiles

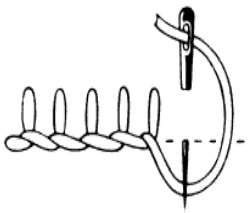
Thermochromic pigment

Shape memory alloy

Photochromic pigment

Vilene and **Bondaweb** are bonded fabric that stop the fabric from fraying and are used to stabilise the fabric - stopping it from stretching.
They are smart textiles because they react with heat.

Embroidery Stitches

Embroidery Stitches	Image
Chain Stitch Bring the thread up at the top of the line and hold it down with the left thumb. Insert the needle where it last emerged and bring the point out a short distance away. Pull the thread through, keeping the working thread under the needle point.	
Blanket Stitch To make a blanket stitch, bring the needle and thread up through the first hole then down through the next, leaving a loop. Bring needle up through the loop, pull gently to tighten, and then push needle down through next hole. Repeat along edge.	

3

Adding colour

Dyeing techniques

- Fabric dyeing involves soaking fabric in a dye bath so that it absorbs the colour into the fibre. **Methods of dyeing include;** Tie dyeing, Batik, Dip Dye and Space dye.

Printing Techniques

- A Printing technique is a ***process*** of applying colour to fabric in definite patterns or designs.

Block Printing

- A technique for printing text, images or patterns using a block

Screen Printing

- A printing technique where a mesh is used to transfer ink onto a substrate, except in areas made impermeable to the ink by a blocking

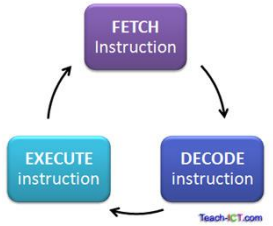
Sublimation Printing

- A method of **printing** that transfers a design into a material or fabric using ink and heat.

6

6

The Central Processing Unit	
INSTRUCTIONS	A single action that can be performed by a computer processor.
CPU Central Processing Unit	The CPU is also known as the processor or microprocessor. The CPU is responsible for executing a sequence of stored instructions called a program.
Arithmetic Logic Unit ALU	The arithmetic and logic unit (ALU) is where the CPU performs the arithmetic and logic operations. Every task that your computer carries out is completed here
RAM	RAM is a fast temporary type of memory in which programs, applications and data are stored. Here are some examples of what's stored in RAM:
ROM	memory that cannot be changed by a program or user. ROM retains its memory even after the computer is turned off. For example, ROM stores the instructions for the computer to start up when it is turned on again.



Fetch – Decode – Execute		
1	**Fetch**	Gets the instructions that it needs to run from the RAM of the computer
2	**Decode**	Breaks down the codes (to binary – 0s and 1s) to perform instructions
3	**Execute**	Based on instructions it can perform difficult calculations or move data from one memory place to another create an output

Base Number system keywords	
Binary	Counting using base 2 (0s & 1s) – the only language that computers truly understand. 0 means off, 1 means on.
Denary	Counting using base 10 (0-9) – these are our normal numbers that we use every day.
Bit	The smallest amount of data (stands for binary digit) (0 or 1).
Byte	8 bits.

Binary Place Values (for 1 byte)							
128	64	32	16	8	4	2	1
0	0	0	0	0	0	0	0

Bits to Bytes	
Bit	The smallest amount of data (stands for binary digit) (0 or 1).
Byte (B)	8 bits
Kilobyte (KB)	1024 bytes
Megabyte (MB)	1024 kilobytes
Gigabyte (GB)	1024 megabytes
Terabyte	1024 gigabytes

Hardware	The components kept inside a computer
Peripheral	A device which can add extra functionality to a computer system. Peripherals can either input or output data from the computer.
Input	A peripheral device which takes data from the real world and enters it into a computer systems.
Output	A peripheral device which takes data from a computer system and presents it into the real world.
Storage	Devices that store virtually all the data and applications on a computer.
Motherboard	Connects all components in the computer together.
Hard Drive	Stores information in long term memory.
Fan	Used to cool down the components and prevent them from overheating.
Assistive technology	Any object or system that increases or maintains the capabilities of people with disabilities.
Power Supply Unit (PSU)	Inputs power to the system.

Vocabulary

Absolute cell reference	Cell reference that does not adjust to its new location when copied or moved.
Autofill	Automatically replicates data and formulae into cells.
Autosum	A function that automatically adds the values in a range.
Break even	To not make a profit, not make a loss, but arrive at an outcome of zero.
Chart	A graphical way to show data.
Filter	Allows you to display only certain data to make it easier to find specific information in a table.
Formula	Equation that performs a calculation on values in a worksheet.
Function	A built-in formula that makes it easy for you to perform common calculations.
Goal seek	A process that automatically works out a specific required value by changing the value in a related cell.
Hide/unhide	Show or reveal selected rows or columns.
Model	a computer program that is designed to simulate what might (or what *did*) happen in a situation.
Print area	Setting the print area restricts what is going to be printed. This is important when trying to fit a large spreadsheet on to one page while printing.
Range	A group of cells on a worksheet identified by the cell in the upper left corner and the cell in the lower right corner, separated by a colon. For example, A1:B20.
Relative cell reference	Cell reference that adjusts automatically when moved or copied.
Replicate	Another word meaning "to copy", especially for formulae.
Sort	Arranging the contents of a range in ascending (A to Z) or descending (Z to A) order.
Spreadsheet	A grid of rows and columns containing numbers, text, and formulas. Used to solve number-based problems.
What if...?' questions	Types of questions that explore different possible events or situations.
Worksheet	The workspace where you enter data.

Spreadsheet Functions

AVERAGE Shows the average of values in a range

=SUM Adds up the total value of the cells in a range

MAX Displays the biggest value from the range

=MIN Displays the smallest value from the range

IF A logical function that can be helpful in decision-making. It tests to see if a condition is true or false, e.g.

=IF(A1>75,"Pass","Fail")

If the value in cell A1 is greater than 75, it will display **Pass**. If it is not, it will display **Fail**. Text strings must be inside quotation marks.

COUNTIF A logical function that counts the cells within a range that meet criteria you specify, e.g.

=COUNTIF(A1:A25,"apples")

This will show the number of cells from the range A1:A25 that contain the word **apples**.

AVERAGEIF A logical function that displays the average of values in cells within a range that meet criteria you specify, e.g.

=AVERAGEIF(B5:B30,"male",D5:D30)

This will show the average value from the cells in column D that are on the same row as a cell in column B that contains the word **male**.

=SUMIF A logical function that displays the sum total of values in cells within a range that meet criteria you specify, e.g.

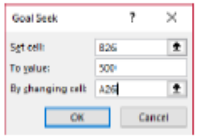
=SUMIF(D2:D20,"Toyota",E2:E20)

This will add up and display the total values from column E that are on the same row as the cells in column D containing the word **Toyota**.

Numerical operators

>	greater than	<	less than
>=	greater than or equal to	<=	less than or equal to
=	equal to	<>	not equal to

Goalseek

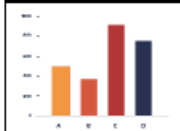


A process that automatically works out a required value by changing the value in a related cell.

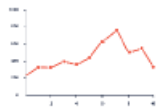
In the example to the left, we are setting the value of B26 to 500 by changing cell A26.

This can be very useful when working on an incomplete model.

Representing Data Graphically

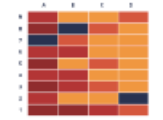


Bar charts are used to **compare variables**. They can appear vertically (also called a column chart) or horizontally.



Line graphs are used to show **trends over time**.

Pie charts are used to show the **components** of a **larger whole**.



Conditional formatting applies formatting to a range based on the contents of the cells. A common approach is a **heat map** like the example to the left.

Key components of a chart

Title	No chart is complete without a descriptive title. Think carefully when naming a chart.
Axes	The horizontal and vertical axes of your chart should be labelled and use appropriate units.
Series	The name given to a row or column of numbers plotted in a chart.
Data labels	It is essential that data displayed graphically is well-labelled to enable the viewer to understand the data being presented.

Examples